Research Paper: Translation, Cultural Adaptation, Face and Content Validity of the Persian Version "Patient-Rated Wrist Evaluation" (PRWE-Persian) Questionnaire

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ABSTRACT

Introduction: The following study was carried out in order to translate, cultural adaptation, and determine the content and face validity of the "Patient-Rated Wrist Evaluation" questionnaire with the aim of evaluating the two components of pain and disability in patients with wrist injuries.

Materials and Methods: The methodology of this survey was non-experimental study. After translation and cultural adaptation according to the Beaton method (approved by the American Surgeon Association), the pilot test was performed on patients with wrist injuries (fractures of the distal radius, scaphoid fractures and carpal tunnel syndrome). To assess content and face validity, the questionnaire was given to 10 specialists (6 of whom were occupational therapists, 2 were physiotherapists, and 2 were orthopaedic surgeons), and 20 patients with wrist injuries.

Results: The qualitative content and face validity of the questionnaire for wrist injuries was appropriately reported good. Each item of the content validity ratio was slightly higher than 0.75 and this justified the necessity to include all items. Each item of the content validity index was slightly higher than 0.79. Therefore, all the items were approved in terms of their simplicity, clarity, and relevance. The impact score in order to evaluate the importance of each item was calculated and all were higher than 1.5. Therefore, in terms of face validity all the items were approved.

Conclusion: The results showed that the Persian version of the "Patient-Rated Wrist Evaluation" questionnaire for evaluating the pain and disability of wrist injuries was indeed satisfactory, in terms of it's content and face validity, thus it can be used in patients by specialists and therapists.

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1. Introduction

The wrist joint and it's position are key during the function of the upper limb. Injury or disease within the wrist region of the hand, for any reason (involving the bones, muscles, and ligaments), can result in instability and pain. This causes functional disability in performing daily, leisure, and work related activities and ultimately reduces the individual's overall quality of life [1-3]. The ultimate goal of surgical treatment and hand rehabilitation is acquirement of the individual's independence in performing everyday activities. Therefore, having a precise and standard assessment tool to assess pain and disability in a variety of intervention process is important [4-6].

Despite the presence of clinical tools for the assessment of pain and function, there is a tendency towards the use of patient-centric or patient-based instruments. The main reason behind this can be the practitioners understanding of the patients' experience of pain and disability, caused by various wrist injuries while performing activities; as well as reducing the possibility of clinician-based instrument errors during the assessment of pain and function. Furthermore, the presence of clinical tools that can report subjective experiences in the forms of more quantitative reports is something professionals need within the field of tools [7]. In order to solve this problem, in recent years, experts are in search of developing Patient-Rated questionnaires that are based on accurate assessments of performance [8]. In 1996 in Ontario, Canada MacDermid devised the "Patient-Rated Wrist Evaluation" (PRWE) questionnaire to measure pain and function in a variety of wrist injuries (such as distal radius fractures, scaphoid fractures, carpal tunnel syndrome, De-Quervain syndrome, wrist ganglion cysts, osteoarthritis diseases, rheumatoid arthritis, Kienbock and other connective tissue lesions) [9, 10].

According to previous studies this questionnaire shows more sensitivity to distal radius fractures compared to evaluations of other upper limb structures (such as Disability of Arm, Shoulder and Hand questionnaire) that showed the functional capacity of the whole body as one functional unit [11]. The PRWE questionnaire shows an understanding of the patients' pain and disability in performing usual and specific activities by measuring 15 items and a numerical scale of 0-10 is reported by the patient [1]. This questionnaire assesses the intensity and frequency of pain. In addition to assessing pain throughout various activities, such as repetitive movements and lifting, it also measures the most severe pain at rest and the time that the patient experiences the most pain, providing a more comprehensive view of the pain [7]. Also the individual's performance of usual activities (the four personal domains of care, professional roles, personal life and hobbies) and special ones (including wrist strength and movement that may be affected by various pathologies) will be evaluated [11], meaning that both limitations in performance and participation will be evaluated. The advantages of using the PRWE questionnaire include it's simplicity, inexpensiveness, conciseness, standardness, and desirable reliability and validity [12]. Furthermore, it's clinical performance and it's scoring system are easy and require very little time (approximately 3 minutes) [13]. This questionnaire has been used for research in various countries. It's translation, validity and reliability has been tested such as Sweden, Netherlands, Brazil, Korea, China, Japan, Turkey, India, Germany, France and Finland; and the results have shown that this tool can be used as self-reported assessment for patients with a variety of wrist injuries [8, 14-23].

A variety of different patients with various wrist injuries are referred to rehabilitation clinics, and occupational therapy canters, with regards to the patients' complaints as they find it difficult to carry out their daily activities as a result of wrist pain. Having a dedicated assessment tool to determine the outcome of various treatment courses, including surgical and conservative methods, is necessary. Since the PRWE questionnaire is in English, and has not yet been translated into Persian or culturally adapted, it's validity has not been studied; The aim of the present study was to translate, cultural adaptation, content and face validation of this questionnaire in patients with wrist fractures of the distal radius and scaphoid and those with carpal tunnel syndrome.

2. Materials and Methods

The methodology of the following study was a non-experimental one, assessing the psychometric characteristics of the PRWE questionnaire. The PRWE questionnaire was developed by MacDermid in 1996 in Ontario, Canada. The questionnaire consists of 15 items. Five items evaluating pain (with 4 items regarding pain intensity and 1 item about the frequency of pain), and 10 items assessing the function (with 6 items from doing specific activities and 4 items from performing usual daily activities). This questionnaire analysed pain caused by various wrist injuries, these included: distal radius fractures, scaphoid fractures, and carpal tunnel syndrome.

The patients were asked to give scores to all the item of the questionnaire regarding pain when performing spe-

cific and usual activities during a course of 1 week, on an 11-point scale, from a score of 0 (meaning no pain/no difficulty in performing activities) to 10 (meaning extreme pain/inability in performing activities). The patients were asked to consider the best estimation of their pain or level of performance. The total score was of 0 (having no problems) to 100 (having the most problems). The mean time for completing the questionnaire was 3 minutes. This study was completed in two stages: I) the translation and cultural adaptation, II) the content and face validity stage.

Translation and cultural adaptation stage

In the preliminary stage, we attained permission from the developer of this questionnaire, the recommended forward-backward translation and cultural adaptation method, by Beaton and colleagues, was used (approved by the American Orthopaedic Association). In the initial phase of the translation (from English to Persian) was performed by two translators (1 and 2), their native language being Persian. The translators were required to have had experience translating questionnaires in general, but were not familiar with this particular questionnaire. After explaining the steps of translation to the translators by the researcher, each translator did a translation of the desired items of the questionnaire and provided a list of possible alternative translations.

The translators paid more attention to the overall meaning of the translations they were making rather than each word being directly translated (literal translation was not required), and considered the fact that this questionnaire was to be filled by patients, choice of words and it's phraseology was of great importance as it's concept had to be understood by individuals above the age of 14 years. After the translation, the translators measured how difficult or easy the translation presented for each item was by marking it on a 100 cm line (with 0 meaning no difficulty and 100 meaning extremely difficult) on the Lasa scale [24].

During the second stage, after the documentation of the translations, a panel was formed which included the two translators of research group and two experts from outside the group. They determined if the researcher agreed or disagreed with the translation, thus a discussion was held among the translators. Finally, a documented translation of the questionnaire was produced. The developer of the questionnaire was contacted for more information if there were any problems with interpretation. Based on her explanations the appropriate changes were made which eventually led to the presentation of the final version of the translation. This was done so that the best version of the translation could be produced and relatively equivalent to the original English version.

After completing the initial stages of the translation we began the third stage, which consisted of backward translation. Two bilingual translators (translators 3 and 4), English being their native language with a sufficient understanding of the Persian language, were chosen to translate the Persian version of the questionnaire into it's original English version. Translators 3 and 4 did not have access to the original version of the questionnaire. Then, during the fourth stage a voting session was held

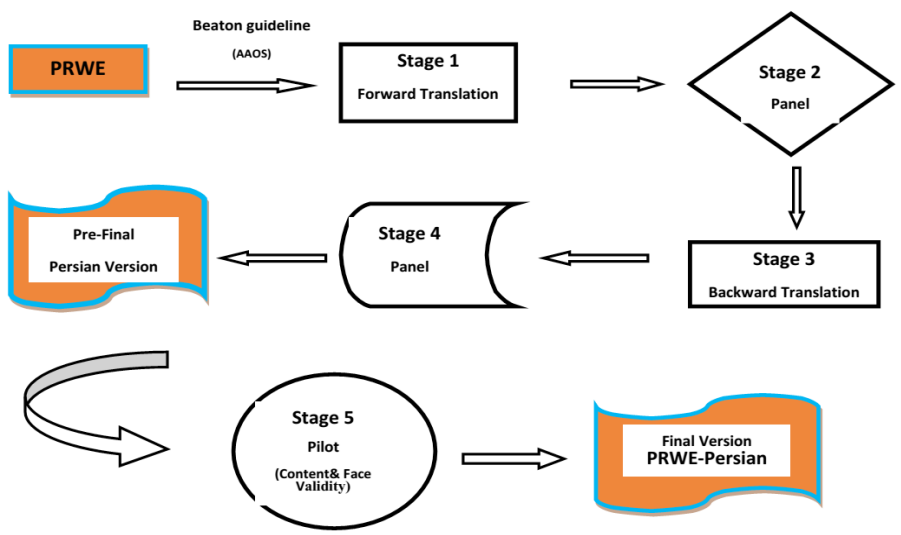

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Figure 1. The stages of translation and cultural adaptation process of the Patient-Rated Wrist Evaluation questionnaire

by a panel that included the translators, the research team, and two experts outside the group. In this meeting, the items that did not seem to agree with the original version in terms of concept were discussed by the principal investigators of the research group. Ultimately, a prefinal advanced version was produced. Moreover, these discussions were useful for the cultural adaptation of the questionnaire [25]. In the fifth stage, the prefinal version of this questionnaire was investigated for it's content and faces validity, which will be explained in more detail and approval a final version was produced (Figure 1).

Content and face validity stage

Qualitative evaluation of the content validity

In order to evaluate the content validity of the translated questionnaire (the initial stage) it was given to a group of specialists consisting of 10 people (6 occupational therapists, 2 physiotherapists, 2 orthopaedic surgeons) with at least 5 years of work experience in the field of hand rehabilitation. They were asked to study the questionnaire carefully and compare it to the original version in terms of it being equivalent in meaning, it's clarity, cultural relevance of the items, and whether the items were able to reflect the pain and disability associated with wrist injuries. If necessary, they could then submit any comments on how any of the items could be improved. It was stressed that during the qualitative assessment of the content validity, they carefully considered the use of correct grammar, vocabulary, importance of the questions, situating the items in the correct places, correct scores, and the time taken to complete the questionnaire. An overall evaluation was made by asking them to check one of the following options (good, moderate, bad) to describe the translation of each of the items. The results of this study were analyzed and implemented by the research team.

Quantitative evaluation of the content validity

The 10 hand rehabilitation specialists were given a booklet, containing the translated version of the questionnaire along with tables for the purpose of evaluating the it's content validity, to complete. In the current study, two different methods were used to check the content validity of the questionnaire: Content Validity Ratio and Content Validity Index.

Content Validity Ratio (CVR): For evaluating the necessity of each of the items of the questionnaire, the content validity ratio, based on the Lawshe scale, was used. According to the Lawshe scale the CVR was calculated on a three-point graph. Each item was scored according to three options on the graph (1=not necessary, 2=useful, but not essential, and 3=essential). If more than half of the experts stated that an item is essential that item would have the minimum amount of content validity. If the CVR score is higher than 0.75, the content validity of the scale has been approved (Formula 1) [26, 27].

Formula 1. The method used to calculate the quantitative Content Validity Ratio

$$CVR=\frac{N_E-N/2}{N/2}$$

N=The total number of specialists

nE=The number of specialists who have checked option 3

Content Validity Index (CVI): To investigate the appropriate develop of the questionnaire, the quantitative content validity index was used. To this end, each item of the questionnaire was examined, on a four-option Likert scale, based on the following three concepts of it's simplicity, relevance or specificity, and clarity. The simplicity of the meaning of each item was measured with the options of 1 (complex), 2 (requires modifications), 3 (simple but requires reviewing), and 4 (simple and clear); the relevance or specificity of each item was characterized with the following options of 1 (not relevant), 2 (somewhat relevant), 3 (quite relevant), and 4 (highly relevant). And finally, the clarity of each of the items was characterized using the options of 1 (not clear), 2 (somewhat clear), 3 (quite clear), and 4 (highly clear). Then, according to formula 2 the quantitative CVI of the questionnaire was evaluated. The acceptable and adequate amount for the CVI was equal to 0.79 and if the CVI for each of the items was found to be less than 0.79 it would be considered unacceptable and that item would be eliminated from the questionnaire. If the CVI scores for each of the items was between 0.70–0.79 that item is questionable and so requires further revision and modifications [26, 28-30].

Formula 2. The method used to calculate the quantitative Content Validity Index

$$CVI=\frac{\text{The Number of the specialists who have checked option 3 and 4}}{\text{The total number of specialists}}$$

After reviewing the results of the qualitative and quantitative content validity, the items with the least CVI score were corrected and modified with using the advice from the specialists and a new version of the questionnaire was produced. Afterwards, again there was a qualitative and quantitative CVI evaluation of the questionnaire. At this

stage, the questionnaire was given to 8 hand rehabilitation specialists (5 occupational therapists, 1 physiotherapist and 2 orthopaedic surgeons) and the results were analyzed.

Qualitative evaluation of the face validity

A qualitative evaluation of the face validity was performed for finding the relevant connections between the items, any ambiguous and vague impression of the expressions, or any difficulty with comprehension and understanding of the concepts. The opinions of 10 individuals (consisting of orthopaedic surgeons, occupational therapist, and physiotherapist), who had at least 5 years work experience within hand rehabilitation field, (who were also present in the content validity process) were used, and their suggestions were implemented in the questionnaire. The questionnaire was then completed by 20 patients with wrist injuries, and they were asked about the concept of each of the questions. The patient completed the questionnaire in the presence of the therapist and if there were any problems with understanding any of the items the therapist took notes, interpretation of the items by each patient was examined and they were asked to check one of the following options (good, moderate, or bad) to describe face validity of the questionnaire [31].

Quantitative evaluation of the face validity

In order to determine the face validity, the Persian version of the PRWE questionnaire was given to 20 patients with wrist injuries (10 males and 10 females aged over 18 years) from simple non probability the orthopaedic clinics of Shafa-Yahyaian hospital, located in Tehran. These patients all had normal cognitive statuses (with a score above 21 in the Mental Mini-State Examination) [32]. The descriptive characteristics of patients for conducting content and face validity is shown in Table 1.

To determine the quantitative face validity of each item, the item impact score was used. First, for each of the 15 items within the questionnaire, a Likert scale with 5 options and scores of 1-5 was considered and rated. The range of options include: very important (score 5), important (score 4), standard importance (score 3), slightly important (score 2), and not important (score 1). After the questionnaire was completed by the target group, using the item impact score formula (formula 3) quantitative face validity was calculated. If the impact score is higher than 1.5, the item is kept and chosen for further analysis [26, 31]. At this stage the view points of the patients were used to formulate the final version of the questionnaire, leading to modifications in the translated version of the questionnaire. Again, the processes were reported to the original developer of this questionnaire and after checking and confirming the changes, the final version of the translated questionnaire was prepared (Appendix 1).

Formula 3. The method used to calculate the Impact Score

$$Impact\ Score = Frequency(\%) \times Importance$$

Importance=Patients who have checked options 4 and 5

Table 1. Descriptive characteristics of patients

Variable		Frequency (%)
Gender	Male	10(50)
	Female	10(50)
Affected hand	Right	10(50)
	Left	10(50)
Hand laterality	Right	10(50)
	Left	10(50)
Treatment method	Conservative	10(50)
	Surgery	10(50)
Diagnosis	Distal radius fracture	10(50)
	Scaphoid fracture	5(25)
	Carpal tunnel syndrome	5(25)

3. Results

The results of the translation and cultural adaptation

During the stage of the translation of the PRWE questionnaire in to Persian, alterations were made to certain items that were inapplicable for the Iranian culture. For example, item number 10 "carry a 10 Ib object in my affected hand" was changed from a 10 decibel unit (Ib) to a more common measurement unit of 5 kg. There was complete agreement among all the translators involved regarding any difficulties in translation of the items. The mean score of the 4 criteria for assessing the quality of the translation (clarity of the translation, common language, providing the same concept and quality of the translation) for all items in the translation (scoring from 0 to 100) with an excellent mean score of 90 to 100. The results are as follows (Table 2):

1. Title of the questionnaire: completely acceptable and understandable; 2. Items 6, 8, 9, 12, 13, 14 of the questionnaire: were perfectly acceptable and understandable by the patients; 3. The items related to pain: items 1, 2, 3, 4 of this section were satisfactory, but in order to complete the meaning of the sentences the expression "pain intensity" was added to the beginning of each of the items. It was suggested that for completing the meaning of the sentence for item 2, to use several examples of activities that would require a repeated movements of the wrist. For item 3 it was suggested to have the same heavy object be used for all the patients. The expression 5 Kg was added above. For item 4 it was reported that the term "at it's worst" was not an intelligible word to use and the expression "severe condition" was added to better deliver the concept of that term. Item 5 was reported to be acceptable, but in order to complete the concept, the term "frequency of pain" was added to the beginning of the item; and 4. Items related to function-specific activities: item 7 was understandable but according to the Iranian culture, and to better understand the term, the expression "cutting meat/vegetable" was added. According to the measurement system in Iran, item 10, instead of 10 IB was replaced with 5 kg. For item 11, in accordance with the Iranian culture, the use of hand as well as toilet paper was added. Items from the function-usual activities: item 15 was reported acceptable from this section, but suggestions were made to add the term "leisure activities" as well.

Overall, it appears that the questionnaire does not have major cultural differences and the reports from the patients regarding the items of the questionnaire, were acceptable. Therefore, the Persian version of the PRWE questionnaire was evaluated desirable and acceptable in terms of structure and concept.

Results from the content and face validity

Results of qualitative content validity

The content validity of this questionnaire was reported good based on opinions from the group of specialists.

Table 2. Translation and cultural adaptation alterations in the PRWE-Persian

Item (Original Version)	First Alteration	Last Alteration
1. At rest	Pain intensity at rest	-
2. When doing a task with a repeated wrist movement	Pain intensity when doing an activity with repetitive wrist movement	Pain intensity when doing an activity with repetitive wrist movement (e.g. Driving, wringing, hammering& screwing)
3. When lifting a heavy object	Pain intensity when lifting a heavy object	Pain intensity when lifting a heavy object (more than 5 kg)
4. When it is at its worst	Pain intensity at it's worst	Pain intensity at it's worst (severe condition)
5. How often do you have pain?	Pain frequency: how many times did you have pain during last week?	-
7. Cut meat using a knife in my affected hand	Cut meat/vegetable with knife by your affected hand	-
10. Carry a 10 Ib object in my affected hand	Carry a 5 kg object with your affected hand	-
11. Use bathroom tissue with my affected hand	Clean yourself after toilet by hand/toilet paper with affected hand	-
15. Recreational activities	Recreation and leisure activities	-

Table 3. Content validity ratio results of PRWE-Persian

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CVR	0.8	1	1	1	0.9	0.8	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8

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Results of quantitative content validity

Results of the Content Validity Ratio (CVR): Based on the results obtained from examining the CVR, by 10 hand rehabilitation specialists, in the initial phase of "importance of the presence of item" a score above 0.75 was given to each of the 15 items, which meant they approved the necessary presence of all the 15 items (Table 3).

Results of the Content Validity Index (CVI): Moreover, in evaluating the CVI by 10 hand rehabilitation specialists, all items except for items 4, 5 and 11 had a CVI score of above 0.79, and so were identified as suitable. The CVI score of items 4, 5 and 11 were respectively 0.6, 0.73 and 0.63. This meant that these items needed to be revised and corrected. After correct modifications were made to these items in the second stage content validity was conducted with the presence of 8 hand rehabilitation specialists. The CVI score of the items 4, 5 and 11 improved to 0.79 (Table 4).

Results of the qualitative and quantitative face validity

In studying the face validity, the Persian version of the PRWE questionnaire was recognized as understandable and clear by 10 specialists and 20 patients with various wrist injuries. 87% of the specialists and patients said that the PRWE-Persian questionnaire had a good face validity for assessing patients with wrist injuries. The impact scores showed that all the questions had a score equal to or greater than 1.5, hence included in the questionnaire (Table 5).

Table 4. Content validity index results of PRWE-Persian

Item	CVI (Simplicity)	CVI (Relevancy)	CVI (Clarity)	CVI (Total)
1	0.9	0.9	0.9	0.9
2	1	1	1	1
3	1	0.8	0.8	0.86
4*	0.6	0.6	0.6	0.6
5*	0.7	0.8	0.7	0.73
6	1	0.9	1	0.96
7	0.8	0.8	0.9	0.83
8	1	1	1	1
9	1	1	1	1
10	0.9	0.9	1	0.93
11*	0.7	0.4	0.8	0.63
12	1	1	1	1
13	1	1	1	1
14	1	1	1	1
15	0.7	0.8	0.7	0.75

*Items needed to be revised and corrected

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Table 5. Face validity results of PRWE-Persian

Item Number	PRWE-Persian Items	Impact Factor	Result
1	Pain intensity at rest	4.7	Acceptable
2	Pain intensity when doing an activity with repetitive wrist movement (e.g. Driving, wringing, hammering & screwing)	5	Acceptable
3	Pain intensity when lifting a heavy object (more than 5 kg)	4.5	Acceptable
4	Pain intensity at it's worst (Severe condition)	5	Acceptable
5	Pain frequency: How many times did you have pain during last week?	4.8	Acceptable
6	While turning a door knob with your affected hand	3.6	Acceptable
7	While cutting meat/vegetable with knife by your affected hand	4.32	Acceptable
8	While closing the buttons of shirt	4.9	Acceptable
9	While using your affected hand to push up from a chair	4.14	Acceptable
10	While carrying a 5 kg object with your affected hand	5	Acceptable
11	While cleaning yourself after toilet by hand/toilet paper with affected hand	4.8	Acceptable
12	Personal care activities (dressing, washing)	3.6	Acceptable
13	Household work (cleaning, maintenance, repairing)	3.6	Acceptable
14	Work (job or daily routine work)	5	Acceptable
15	Recreation and leisure activities	3.32	Acceptable

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4. Discussion

The PRWE-Persian questionnaire is a multidimensional scale for measuring pain and disability in various wrist injuries (such as distal radius and scaphoid fractures, carpal tunnel syndrome) that is widely use for clinical and research studies [7, 12, 13]. In this study, the items of the questionnaire were culturally adapted, and the comments and suggestions of the patients and specialists were used to produce the final version of this questionnaire.

Reviews and discussions regarding translation and cultural adaptation: For item number 7, the term "Cut meat using a knife in my affected hand" was changed to "Cut meat/vegetable using knife by your affected hand". This term is highly dependent on the culture of that particular society so that even in the Indian version of the questionnaire, due to the low prevalence of meat consumption, this term was changed to "Cut vegetables using a knife with the affected hand" [20]; and in the Korean version this term was changed to "Cut food using a knife with the affected hand" because of the availability of presliced meat in this country [16].

Moreover, item number 10, the term "Carry a 10 Ib object in my affected hand", in accordance with the common measuring system here, was changed to "Carry a 5 kg object with your affected hand", similar to the Brazilian, Turkish, Korean, Indian, and German versions [15, 16, 19, 20, 21]. For item number 11, the term "Use bathroom tissue with my affected hand" was changed to "Clean yourself after toilet by hand/toilet paper with affected hand" in accordance with the beliefs and cultural issues in Iran. This item was criticized in the German and Indian versions and in terms of physical, cultural and economical suitability, was not considered appropriate. Therefore, they had placed the option of not having to respond to this selected item [20, 21]. Moreover, for item number 15, the term "Recreational activities" was changed to the term "Recreation and leisure activities", and the result of our work was similar to the Brazilian version of the questionnaire [15].

Reviews and discussions regarding the content and face validity: The PRWE-Persian questionnaire for distal radius and scaphoid fractures as well as carpal tunnel syndrome, was characterized as good and appropri-

ate and in terms of quantity was acceptable, according to the results obtained from the process of content and face validity. Just as in the original English version (distal radius and scaphoid fractures, 1996), Chinese (various wrist injuries, 2005), German (acute distal radius fractures, 2008), Swedish (various orthopaedic injuries of the upper limb, 2011), Finnish (acute distal radius fractures, 2015) that undertook a qualitative examination of this questionnaire. They reported good and appropriate content and face validity [8, 12, 17, 21, 23]. Some of the strong points of this study is doing a complete content and face validity process (qualitative, content validity ratio, content validity index, and impact scores for each of the items). This can be said to have quite a useful, applicable and culturally adapted questionnaire which is acceptable, appropriate for hand rehabilitation specialists.

It should also be noted that the validity (criterion and construct) and reliability of the Persian version of this questionnaire is currently being implemented. Since this questionnaire managed to effectively assess two components of pain and disability, it is proposed that the potential use and validity of this questionnaire could be investigated in cancer and other neurological conditions. From the limitations of this study lack of factor analysis could be due to the low sample size so it is suggested to be considered in future studies. The results of this study showed that the PRWE-Persian questionnaire has a good and acceptable content and face validity, and so can used as a specialised tool in hand rehabilitation, in order to assess pain and disability of various wrist injuries.

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Conflict of Interest

The authors declared no conflicts of interest.

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