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Outcome Measurement in Shoulder Diseases: Focus on Shoulder Pain and Disability Index (SPADI)

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Physiatrists deal with the evaluation, diagnosis and nonsurgical management of neuromusculoskeletal conditions, of which shoulder pain (such as rotator cuff spectrum diseases, frozen shoulder, degenerative arthritis, instability, and rheumatic diseases) is one of the common manifestations. Outcome measures for shoulder care included pain severity, range of motion, and patient-reported outcome measures (PROMs). In this editorial, I would like to comment on some issues regarding PROMs applied to shoulder diseases and recommend options for appropriate PROMs in Korean clinical settings.

There are numerous PROMs with more than 30 different tools for measuring the symptoms and functional states of patients with shoulder diseases [1-4]. Validated legacy PROMs commonly refer to Disabilities of the Arm, Shoulder, and Hand Questionnaire (DASH) and its Short Version (QuickDASH), Shoulder Pain and Disability Index (SPADI), American Shoulder and Elbow Surgeons (ASES) Society Standardized Shoulder Assessment Form, Constant (Murley) Score (CS), Simple Shoulder Test, Oxford Shoulder Score, and Western Ontario Rotator Cuff index (WORC) [5]. Previous articles summarized the psychometric properties of legacy PROMs for shoulder diseases [1,2,6]. While these instruments have an overall high quality of psychometric properties, respondent and administrative burdens and ceiling/floor effects have been reported in some PROMs such as ASES and DASH [6].

Most PROMs were developed in English. The preferred PROMs tend to differ depending on the continent because of the historical requirements and availability of the translated version [7]. A recent survey reported that ASES was most commonly used in articles originating from North America and Asia, while it was CS from Europe [7]. Although there are few reports on the transcultural adaptation validation of the ASES in Asia, the fact that many studies using the ASES have been published indicates that it involves a transcultural adaptation issue [8-10]. As far as my knowledge, validity studies on the Korean versions of the SPADI and DASH have been conducted, but there is no validation of the Korean versions of other commonly used evaluation tools, such as the ASES, CS, and WORC [11]. A transcultural adaptation procedure from the English version to the Korean version for major PROMs and a comparative analysis of the psychometric properties of the Korean and original versions are needed.

Currently, there is no consensus regarding the recommended PROMs for specific shoulder diseases. A recent study revealed that ASES was most commonly used for rotator cuff and subacromial pathology, followed by DASH and SPADI, while the use of SPADI is overwhelming for

shoulder stiffness, calcific tendinitis, and nonspecific shoulder pain [12]. Moreover, a recent study demonstrated that the SPADI can be used as a shoulder-specific PROMs in patients with rotator cuff tears because of its strong reliability and excellent discriminatory properties [13]. Considering the presence of the Korean version and good evidence in support of its high-quality psychometric properties, the SPADI can be recommended for monitoring common shoulder diseases such as rotator cuff pathology and shoulder stiffness in Korean clinical practice.

The SPADI was designed to evaluate the degree of shoulder pain and discomfort in performing activities of daily living by the patients themselves, without clinician components. The original version was developed by a panel of rheumatologists and physical therapists and was published in 1991 [14]. Because of this background, SPADI still tends to be preferred in the field of rheumatology and rehabilitation medicine. It has 13 items, with 5 items for pain and 8 items for disability. In the original version, items were rated using a visual analog scale; however, in the more recent version, each item used an 11-point numerical rating scale (0–10) (Table 1) [14,15]. SPADI takes

2–3 minutes to complete. The SPADI total score is the mean of the pain and disability sub-scores. SPADI has been shown to have excellent internal reliability/consistency (Cronbach's alpha=0.86–0.96) and test-retest reliability (intra-class correlation coefficient=0.84–0.95) [2,6]. SPADI total score correlated well with the ASES score, although there was a low correlation between the SPADI total score and the Short Form 36. However, some disability items (items 4, 7, and 8) showed unsuitable criterion validity [6]. Disability items included only one item to assess overhead words or heavy use. Therefore, the SPADI could have a ceiling effect because it is difficult to accurately evaluate activities that require high shoulder function. A previous study reported that the minimum clinically important difference (MCID) of 13.2 was smaller than the minimally detectable change (MDC) of 18.1%; thus, a change in the MDC is necessary to be confident in the MCID (Table 1) [16].

In conclusion, I recommend the SPADI as a shoulder-specific PROM in patients with shoulder stiffness, rotator cuff spectrum disease, and nonspecific shoulder pain, given the overall psychometric properties and availability of the Korean-language

Table 1. SPADI items, practical application and psychometric information

1. SPADI items	
Pain scale (5 items) (0=no pain, 10=the worst pain imagnable)	Disability scale (8 items) (0=no disability, 10=unable to perform)
(1) At its worst?	(1) Washing your hair?
(2) When lying on the involvled side?	(2) Washing your back?
(3) Reaching for something on a high shelf?	(3) Putting on an undershirt or jumper?
(4) Touching the back of your neck?	(4) Putting on a shirt that buttons down the front?
(5) Pushing with the involved arm?	(5) Putting on your pants?
Total pain score: _____/50×100=%	(6) Placing an object on a high shelf?
	(7) Carrying a heavy object of 10 pounds
	(8) Removing something from your back pocket?
	Total disability score: _____/80×100=%
Total SPADI score: _____/130×100=%	
2. Practical application and psychometric properties	
Time to complete	2–3 minutes to complete
Translation	Spanish, Chinese, Arabic, Danish, Norwegian, Dutch, Indian, Hindi, Greek, Turkish, Brazilian Portuguese, Persian, Thai, Nepali, Italian, German, and Korean
Reliability	Internal consistency (Cronbach's alpha=0.86–0.96)
	Test-retest reliability (intra-class correlation coefficient=0.84–0.95)
Validity	American Shoulder and Elbow Surgeon Score: r=0.77 in patients referred to an upper extremity clinic for shoulder problems
	Short Form 36 physical component scale: r=-0.46 in patients with shoulder pain
Ability to detect change	Estimated minimal detectable change 18.1 for musculoskeletal upper extremity problems
	Estimated minimal clinically important difference 13.2 for musculoskeletal upper extremity problems

SPADI, Shoulder Pain and Disability Index.

version. Considering its frequency of use and psychometric properties, the ASES can also be an excellent option; however, the issue of transcultural adaptation remains.

CONFLICTS OF INTEREST

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