Original Article

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The Minimal Important Difference of the Thai Version of the Shoulder Pain and Disability Index and the Bodily Pain Subscale of the Thai Short Form 36 Version 2 Among Patients with Shoulder Pain

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Abstract:

Objective: The present study aimed to determine the minimal important difference (MID) of the Thai version of the shoulder pain and disability index (Thai SPADI) and the bodily pain subscale of the thai short form 36 version 2 (Thai SF36v2-BP) among patients with shoulder pain.

Material and Methods: A prospective observational study was conducted. Participants with unilateral shoulder pain were assessed using the Thai SPADI and the Thai SF36v2-BP at the baseline and follow-up sessions. Using an anchor-based approach, the MID value was the mean difference in value between the minimal improvement group and the no change group.

Results: Of 92 participants, 70 (76%) were diagnosed with myofascial pain, 53 (58%) had pain>6 months. Additionally, the number of participants whose symptoms had undergone deterioration, no change, minimal improvement, and marked improvement were 4, 13, 32, and 43, respectively. The MID (95% confidence interval [CI]) for the total Thai SPADI scale was 10.1 (0.7 to 19.5), while the MID (95% CI) for the Thai SF36v2-BP was 3.1 (-7.2 to 13.5).

Conclusion: In patients with shoulder pain, the Thai SPADI had more sensitivity to minimal clinical improvement than the Thai SF36v2-BP.

Keywords: bodily pain, manimal important difference, questionnaires, shoulder, SPADI

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Introduction

Shoulder pain is one of the most common symptoms among the general population. A systematic study has revealed that the prevalence of shoulder pain can be as high as 66.7% throughout one's lifetime. In certain professions, such as dentists, the prevalence of shoulder pain can increase to 72%. This leads to physical and mental problems, impacting overall well-being and the ability to perform daily activities[1,2].

Widely used questionnaires for evaluating shoulder disorders include the disabilities of the arm, shoulder, and hand (DASH), the American shoulder and elbow surgeon (ASES) score, and the shoulder pain and disability index (SPADI)[3]. In addition, general body pain assessments, such as the bodily pain (BP) subscale of the short form 36 health survey second version (SF36v2-BP), might be used among patients with shoulder pain.

For evaluating treatment effectiveness, the clinically significant differences in the scores of each assessment tool may be subtle, and patients may not perceive the distinction. This highlights the importance of the minimal important difference (MID), which refers to the smallest change in the score of a specific domain that patients perceive as beneficial. This change is significant enough to warrant a modification in the patient's management plan, provided no substantial side effects or prohibitive costs are associated with the intervention[4].

The SPADI is a self-reported instrument comprising 13 items categorized into 2 subscales: pain and disability. The SF36v2-BP subscale consists of 2 items assessing the intensity of BP and how much pain interferes with daily functioning, reflecting the individual's experiences over the preceding 4 weeks. Both are commonly used to evaluate treatment responses in Thailand.

Currently, no study has established the MID values for the Thai SPADI and Thai SF36v2-BP. These values may differ from those of other populations, highlighting the need for context-specific research in the Thai population. The objective of this study was to determine the MID for the Thai SPADI and the Thai SF36v2-BP in patients experiencing shoulder pain.

Material and Methods

Study design and participants

This prospective observational study was conducted between September 2022 and November 2023 at the Department of Rehabilitation Medicine, Phramongkutklao Hospital, Thailand. The inclusion criteria were Thai adults over 20 years of age who had suffered from shoulder pain or dysfunction. However, participants with a history of fracture in the shoulder area and pain originating either from other regions or from neurological diseases, such as radiculopathy or severe cognitive/communication impairments, were excluded. All participants signed an informed consent form approved by the Institutional Review Board of the Royal Thai Army Medical Department (R032q/65_Exp).

Assessments

Thai SPADI

The SPADI is a 13-item, self-reported questionnaire categorized into 2 parts: the pain (5 questions) and the disability (8 questions) subscales. Each question of both subscales can be scored ranging from 0 to 10. Each score is summed up and transformed into a percentage of the maximum possible total. Higher scores indicate greater shoulder pain and disability. The SPADI is a practical assessment tool for shoulder pathologies that has been translated into the Thai language with exceptional internal consistency and a high correlation with the DASH score[5].

Bodily pain subscale of Thai short form 36

SF36v2 is an 8-domain self-administered questionnaire that assesses the quality of life related to health. The present study used only the BP domain, which has 2 items: the intensity of BP and the extent of pain causing disability, reflecting experiences in the preceding 4 weeks. The pain intensity and disability items were reported from 6-point and 5-point Likert scales, respectively. The total score was the average value of the 2 items, ranging from 0 (the worst) to 100 (the best). The SF36v2 questionnaire has been translated into Thai (Thai SF36v2) and exhibits good reliability with a Cronbach's alpha coefficient of 0.86[6].

Global change scales

An overall change after treatment was determined using a 4-point scale: deterioration (-1), no change (0), minimal improvement (+1), and marked improvement (+2).

Data collection

At enrollment, demographic and clinical characteristics were collected. Both the Thai SPADI and the Thai SF36v2-BP were evaluated at the baseline and 8-week follow-up sessions. A global change scale was assessed only at the follow-up session.

Statistical analysis

To determine the MID of the Thai SPADI and Thai SF36v2-BP, the Global change scale was used as an external reference. According to the anchor-based approach, the MID value was the mean difference value between the 'minimal improvement (+1)' group and the 'no change (0)' group. Additionally, when the global change scales were dichotomized as improvement (+1 and +2) and no improvement (-1 and 0), a receiver operating characteristic (ROC) was used to determine the optimal cut-off value of the Thai SPADI and Thai SF36v2-BP where sensitivity and specificity were balanced. The correlation between Thai-SPADI and Thai SF36v2-BP was evaluated using Pearson's correlation coefficient.

Results

Of 103 participants, 92 (89%) attended a follow-up assessment with an average follow-up time of 9 (1.6) weeks. Based on the 92 participants who completed the study, 61 (66%) were female, 70 (76%) were diagnosed with myofascial pain, and 53 (58%) had experienced continuous pain for over 6 months. Additionally, the number of participants whose symptoms had undergone deterioration, no change, minimal improvement, and marked improvement were 4 (4%), 13 (14%), 32 (35%), and 43 (47%), respectively.

The mean (standard deviation) score of the total Thai SPADI scale was 36.5 (20.9) at the baseline session and 24.7 (15.9) at the follow-up sessions, resulting in a mean change of 11.8 (18.9). The mean scores of the Thai SF36v2-BP were 46.2 (16.6) at the baseline and 59.8 (17.1) at the follow-up sessions, resulting in a mean change of 13.5 (17.5).

According to the anchor-based approach, the MID (95% confidence interval [CI]) for the total Thai SPADI scale was 10.1 (0.7 to 19.5), while the MID (95% CI) for Thai SF36v2-BP was 3.1 (-7.2 to 13.5), as shown in Table 1. Based on the ROC method, the optimal cut-off value of 11.5 for the Thai SPADI scale showed a sensitivity of 62.8% and specificity of 75.5% with an area under the curve (AUC) of 0.74 (Figure 1), whereas the optimal cut-off value was 20 for the Thai SF36v2-BP, which had a sensitivity of 60.5% and specificity of 75.5% with an AUC of 0.71 (Figure 2).

The correlation between the Thai SPADI and Thai SF36v2-BP showed a weak to moderate relationship in both sessions, along with mean change scores when compared directly with the disability subscale, pain subscale, and total scale, as shown in Table 2.

Table 1 Minimal Important Difference based on the anchor-based approach

Questionnaire	No change (n=13)	Minimal improvement (n=32)	MID
Thai SPADI			
Total	-2.26	7.83	10.09
	(-9.35 to 4.84)	(2.44 to 13.22)	(0.71 to 19.47)
Pain	-3.09	13.31	16.40
	(-8.97 to 2.79)	(6.55 to 20.07)	(5.30 to 27.50)
Disability	-1.56	4.66	6.22
	(-11.58 to 8.46)	(-0.87 to 10.18)	(-4.19 to 16.63)
Thai SF36v2-BP			
Total	5.38	8.52	3.14
	(-2.09 to 12.86)	(2.5 to 14.53)	(-7.21 to 13.49)
Pain	3.08	6.88	3.80
	(-3.63 to 9.78)	(1.20 to 12.55)	(-5.88 to 13.48)
Disability	7.69	10.16	2.47
	(-5.22 to 20.61)	(1.63 to 18.68)	(-12.80 to 17.74)

Values are mean change (95% confidence intervals), MID=minimal important difference, n=number

Table 2 Correlation between the Thai SPADI and Thai SF36v2-BP

Questionnaire	SF-36v2-BP: Total		SF-36v2-BP: Pain		SF-36v2-BP: Disability	
	r	p-value	r	p-value	r	p-value
First session						
SPADI: Total	-0.467	<0.001	-0.317	0.002	-0.476	<0.001
SPADI: Pain	-0.414	<0.001	-0.281	0.007	-0.421	<0.001
SPADI: Disability	-0.44	<0.001	-0.298	0.004	-0.449	<0.001
Last session						
SPADI: Total	-0.566	<0.001	-0.505	<0.001	-0.53	<0.001
SPADI: Pain	-0.615	<0.001	-0.572	<0.001	-0.554	<0.001
SPADI: Disability	-0.451	<0.001	-0.385	<0.001	-0.438	<0.001
Change						
SPADI: Total	0.461	<0.001	0.411	<0.001	0.374	<0.001
SPADI: Pain	0.393	<0.001	0.336	0.001	0.331	0.001
SPADI: Disability	0.439	<0.001	0.397	<0.001	0.352	0.001

Pearson correlation coefficient (r), significant if p-value<0.05, SPADI=shoulder pain and disability index, BP=bodily pain

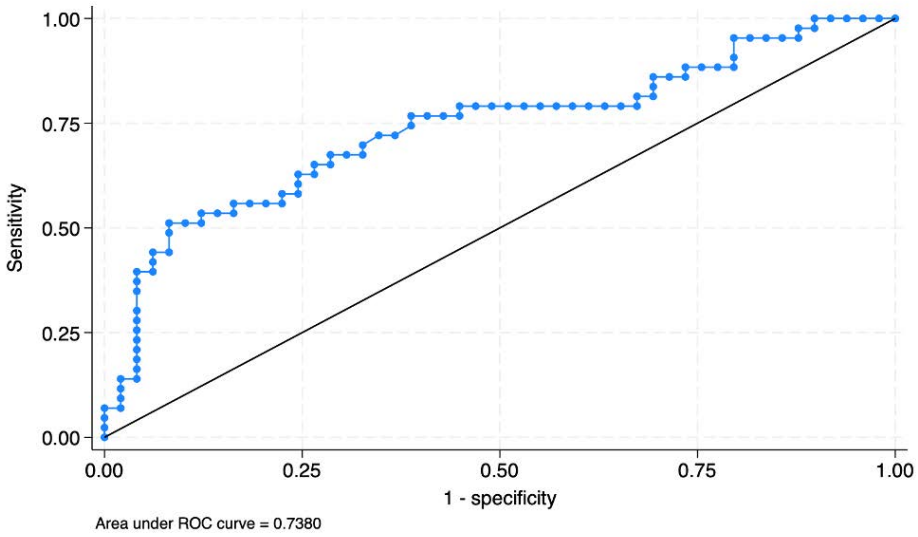

Figure 1 The receiver-operating-characteristic curves of the Thai SPADI showing overall accuracy in identifying an improvement according to the global change scale (-1 and 0 versus +1 and +2)

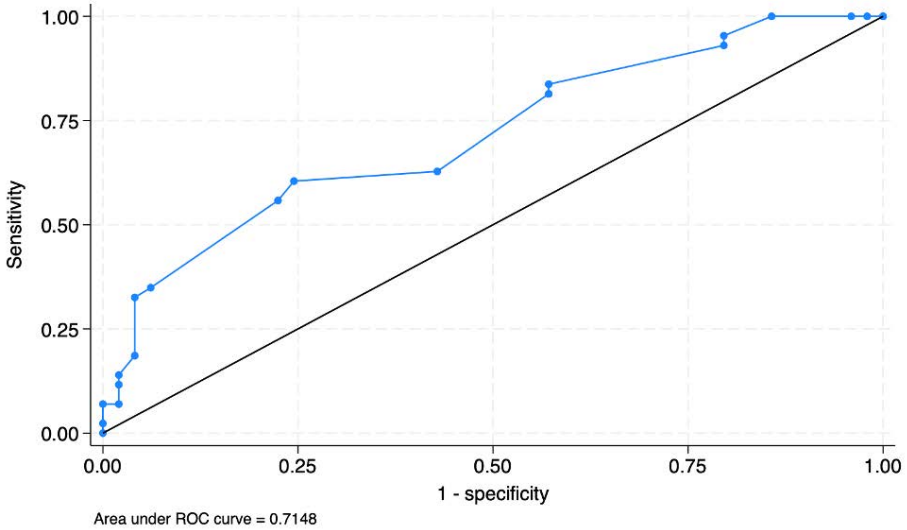

Figure 2 The receiver-operating-characteristic curves of the Thai SF36v2-BP showing overall accuracy in identifying an improvement according to the global change scale (-1 and 0 versus +1 and +2)

Discussion

The evaluation criteria for shoulder care involved assessing pain severity, range of motion, and patient-reported outcome measures (PROMs). Among the analyzed publications, the ASES, DASH, and SPADI were the most frequently reported PROMs[7]. Recent studies recommended using SPADI as a shoulder-specific assessment tool for patients with rotator cuff tears. Additionally, SPADI was proposed as the preferred set of PROMS for addressing shoulder stiffness and pain of unknown origin[7,8].

The main results of the present study demonstrated that the MID value of the Thai SPADI was 10.1 (95% CI: 0.7 to 19.5) based on the anchor-based approach, corresponding to the ROC method with an optimal cut-off of 11.5. This finding was similar to previous studies investigating unspecified shoulder disorders[9-11]. However, in patients with post-surgical conditions, such as shoulder arthroplasty, shoulder instability, and proximal humeral fracture, the MID value tends to be higher (19.7)[12,13]. This difference may be attributed to variations in the externally anchored questionnaires, baseline characteristics, levels of education, hospital settings, follow-up times, and the baseline scores of the outcome measures[3,14].

The MID value of the Thai SF36v2-BP was 3.14 (95% CI: -7.21 to 13.49) based on the anchor-based approach. However, the 95% CI of the mean difference value contained the value of zero (no statistical significance), possibly indicating insufficient power to determine the minimal improvement of shoulder pain/disabilities. Additionally, the optimal ROC cut-off value was 20, which is considerably larger than the MID value, as determined by the anchor-based method. This value might result from participants in the 'marked improvement' group having an oversized impact on the ROC method optimal cut-off. Another possible explanation is that the Thai SF36v2-BP was not sensitive to patient-reported outcomes for patients with shoulder pain.

The current study has some limitations: First, most participants (76%) were patients with myofascial pain syndrome, and there were no patients with post shoulder surgery participating in this study. Secondly, the 'no change' group was small (n=13, 14%), which may have resulted in a wide CI and less precision in both the MID of the Thai SPADI and Thai SF36v2-BP. Thirdly, the outcome measures are subjective outcomes, and external anchors can vary throughout the duration of data collection[15]. Lastly, the participants of this study may not represent the general population of patients with shoulder pain because the present study was conducted in a tertiary care center.

Conclusion

This study used an anchor-based method to propose MID values for the Thai SPADI and Thai SF36v2-BP. The study findings may assist in interpreting results from clinical evaluations that are truly effective from the patient's perspective. However, it is important to use these values cautiously in the appropriate population. Thai SPADI is convenient, easy to use, and has a high validity for patients with shoulder pain; therefore, we recommend against using only the Thai SF36v2-BP to evaluate clinical outcomes in patients experiencing shoulder pain.

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Conflict of interest

The authors report no conflicts of interest or financial benefits relevant to the present study.

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