VALIDITY AND AGREEMENT OF THE THAI SELF-REPORTED QUESTIONNAIRE BASED ON THE ACTTION-APS PAIN TAXONOMY FIBROMYALGIA DIAGNOSTIC CRITERIA IN PATIENTS WITH CHRONIC MUSCULOSKELETAL PAIN

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Abstract

Background: Fibromyalgia (FM) is a chronic widespread pain syndrome that leads to functional impairment and poor quality of life. The American College of Rheumatology (ACR) diagnostic criteria, introduced in 2016, have been widely used. However, the ACTTION-American Pain Society Pain Taxonomy (AAPT) group introduced new, shorter criteria in 2018 to simplify the diagnosis. The FM self-administered questionnaire (FSQ), based on the ACR 2016, had good validity; however, studies on the shorter and more user-friendly AAPT criteria were needed.

Objectives: This study aimed to develop a Thai version of the short AAPT criteria for the FM self-administered questionnaire (AAPT-FSQ) and to assess its validity and agreement with the ACR 2016.

Methods: AAPT criteria were translated into Thai. Of the 128 patients with chronic musculoskeletal pain for more than three months at the Rehabilitation Medicine outpatient clinic were asked to complete a self-questionnaire that included the Thai AAPT-FSQ, Thai Fatigue Severity Scale (FSS), and Thai Pittsburgh Sleep Quality Index (PSQI). Lastly, FM diagnosis for each participant was done by physiatrists based on the ACR 2016 diagnostic criteria.

Results: Construct validity showed strong correlations between AAPT pain sites and Widespread Pain Index (rs = 0.78, p < 0.001); AAPT sleep problems and Thai PSQI (rs = 0.64, $p < 0.001$), and AAPT fatigue problems and Thai FSS (rs = 0.67, $p < 0.001$). Diagnosis agreement between the AAPT and ACR 2016 criteria was 90.6%, with a substantial Kappa coefficient of 0.67 ($p< 0.001$), indicating good concordance. The sensitivity and specificity were 48.3% (95% CI: 29.4%–67.5%) and 99.0% (95% CI: 94.5%–100.0%), respectively.

Conclusion: The Thai AAPT-FSQ had good construct validity and agreement in patients with chronic musculoskeletal pain. Due to its shorter criteria and simplicity, it may serve as a practical self-administered questionnaire for FM.

Keywords: fibromyalgia, diagnosis, questionnaire, validity, agreement

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Introduction

Fibromyalgia (FM) is a chronic condition characterized by widespread pain, frequently accompanied by physical and mental fatigue, memory issues, sleep disturbances, or other psychosomatic symptoms.[1] It affected approximately 2.7% of the global population, varying prevalence by region and diagnostic criteria: 3.1% in the Americas, 2.5% in Europe, and 1.7% in Asia.[2] In Thailand, the prevalence among the general population in an outpatient Rehabilitation Medicine clinic had been reported at 3.4% at Phramongkutklao Hospital,[3] and 25.7% among patients with chronic myofascial pain syndrome at Siriraj Hospital.[4]

The exact pathophysiology of FM is not yet fully understood. Still, central nervous system abnormalities in pain processing, including central sensitization and impairment of descending pain inhibition, are believed to play a key role.[5] The Rheumatology and Pain Research communities accepted the centralized nociplastic pain concept as a new fibromyalgia pain mechanism.[6] FM led to functional impairment, poor quality of life, and socioeconomic burdens.[7, 8]

The American College of Rheumatology (ACR) developed diagnostic criteria in 1990,[9] revised in 2010, 2011, and 2016. ACR 2016 is simplified, misclassification has been eliminated, and it is widely used to diagnose FM nowadays [10] based on the Widespread Pain Index (WPI) and Symptom Severity Scale (SSS), which assess pain, fatigue, wakening unrefreshed, and cognitive symptoms.[1]

Despite these advancements, underdiagnosis and delayed diagnosis remained issues, often taking up to two years and several physician consultations.[11] More than half of physicians reported difficulty with diagnosing FM.[12] In 2018, The Analgesic, Anesthetic, and Addiction Clinical Trial Translations Innovations Opportunities and Networks (ACTTION) public-private partnership with the US Food and Drug Administration (FDA) and the American Pain Society introduced simplified the ACTTION-American Pain Society Pain Taxonomy (AAPT) diagnostic criteria,[13] focusing on three core aspects: pain in six or more of nine body regions, moderate-to-severe sleep disturbance or fatigue, and symptom duration of at least three months, that are practical for clinicians and researchers. However, studies on the AAPT criteria were limited, particularly in Thailand.

A recent study developed a Thai FM self-administered questionnaire (FSQ) based on the ACR 2016 criteria, which showed good validity and internal consistency.[14] However, the questionnaire was lengthy and contained numerous detailed questions. This study aimed to develop a Thai version of a shorter, more user-friendly AAPT criteria for the FM self-administered questionnaire (AAPT-FSQ) and to assess its validity and agreement with the ACR 2016 diagnostic criteria, to improve case finding and care access for FM patients in Thailand.

Methods

Study design

The present study was a cross-sectional questionnaire-based study conducted at the Rehabilitation Medicine outpatient clinic of Phramongkutklao Hospital between July 2023 and June 2024. This study was ethically approved by the Institutional Review Board of the Royal Thai Army Medical Department (Number R081q/66).

Participants

Adults aged 20 years or older who had chronic musculoskeletal pain for at least three months were eligible to participate in this study. The exclusion criteria were pregnancy, psychotic disorders, inability to read the questionnaire, and refusal to sign the informed consent.

Development of the AAPT-FSQ

Two physiatrists and a linguist independently translated the AAPT criteria into the Thai language, and then the wording was reviewed and selected. Reverse translation was performed by a bilingual, native English speaker who was blinded to the original English version. The comparison between the original and backward versions was made and discussed among the translators to create the final questionnaires with consensus **(Supplemetary Material).**

Data collection

Participants were asked to complete questionnaires that included their demographic data (age, sex, and educational level), the Thai version of the AAPT-FSQ, the Thai version of the Fatigue Severity Scale (FSS), and the Thai version of the Pittsburgh Sleep Quality Index (PSQI). The participants were assessed using the ACR 2016 diagnostic criteria by physiatrists in the rehabilitation department who have more than two years of working experience. The physiatrists were blinded to the answers of the self-questionnaires.

The PSQI was a self-report questionnaire that assessed sleep quality over a 1-month time interval, consisting of 7 components. Each score ranged from 0 (no difficulty) to 3 (severe difficulty). The scores were summed up to produce global scores ranging from 0 to 21. Higher scores indicated worse sleep quality.[15] The Thai version of PSQI had good inter-rater agreement and high validity.[16] FSS consisted of 9 questions to assess fatigue symptoms. It was a Likert scale with a score ranging from 1 to 7, where 1 indicated "strongly disagree" and 7 indicated "strongly agree." A higher score meant greater fatigue severity.[17] The Thai version of FSS had very good reliability.[18]

Outcome measurements

Each aspect of the AAPT criteria in the questionnaire was compared to other well-known Thai version questionnaires, with approval from the copyright owner, to assess the construct validity. The number of pain sites was compared with WPI from the ACR 2016 diagnostic criteria. Sleep problem was compared with the Thai version of PSQI. Fatigue was compared with the Thai version of FSS. Moreover, the diagnosis based on the AAPT-FSQ was compared to the physiatrists' diagnosis based on the ACR 2016 diagnostic criteria.

Statistical methods

The sample size was calculated using the formula for Cohen's kappa.[19] Based on the study of Prateepavanich et al[4] and Kang et al[20] the minimum sample size was 128 participants. Demographic data were expressed as mean and standard deviation (SD) for continuous variables and as percentages for categorical variables. Spearman correlation coefficients (rs) were used to assess construct validity. The agreement between the AAPT criteria and the ACR 2016 criteria was analyzed using Cohen's kappa statistic. Sensitivity, specificity, PPV, and NPV were calculated. A p-value of < 0.05 was considered statistically significant.

Results

As shown in **Table 1**, A total of 128 participants were included in the study, with a mean age of 55.2 years (SD = 12.6), and 73.4% were female. The majority (71.9%) had a bachelor's degree or higher. Based on the AAPT diagnostic criteria, the median number of pain sites was 3 (range, 1-9), while the median scores for sleep disturbance and fatigue were 2 (range, 0-3). For the ACR 2016 criteria, the median WPI score was 5 (range 1-17), and the median SSS was 3 (range 0-11). Global PSQI had a mean score of 8.6 (SD = 4), and the FSS score was 3.67 (SD = 1.58).

Table 1. Baseline characteristics of participants	
Characteristics	
Age (year)[1]	55.24 (12.61)
Sex[2]	
Male	34 (26.56)
Female	94 (73.44)
Education[2]	
Below primary education	3 (2.34)
Primary education or equivalent	5 (3.91)
Secondary education or equivalent	28 (21.88)
Bachelor's degree or equivalent	64 (50)
Higher than bachelor's degree	28 (21.88)
AAPT criteria[3]	
Pain site	3 (2-5)
Sleep problems	2 (1-2)
Fatigue	2 (1-2)
ACR 2016 criteria[3]	
Widespread Pain Index (WPI)	5 (3-9)
Symptom Severity Scale (SSS)	3 (2-6)
Fibromyalgia severity (WPI + SSS)	9 (6-13)
Pittsburgh Sleep Quality Index [1]	8.64 (4.03)
Fatigue severity scale [1]	3.67 (1.58)

[1] Mean (SD), [2] Number (%), [3] Median (IQR)

AAPT: ACTTION-American Pain Society Pain Taxonomy; ACR: American College of Rheumatology

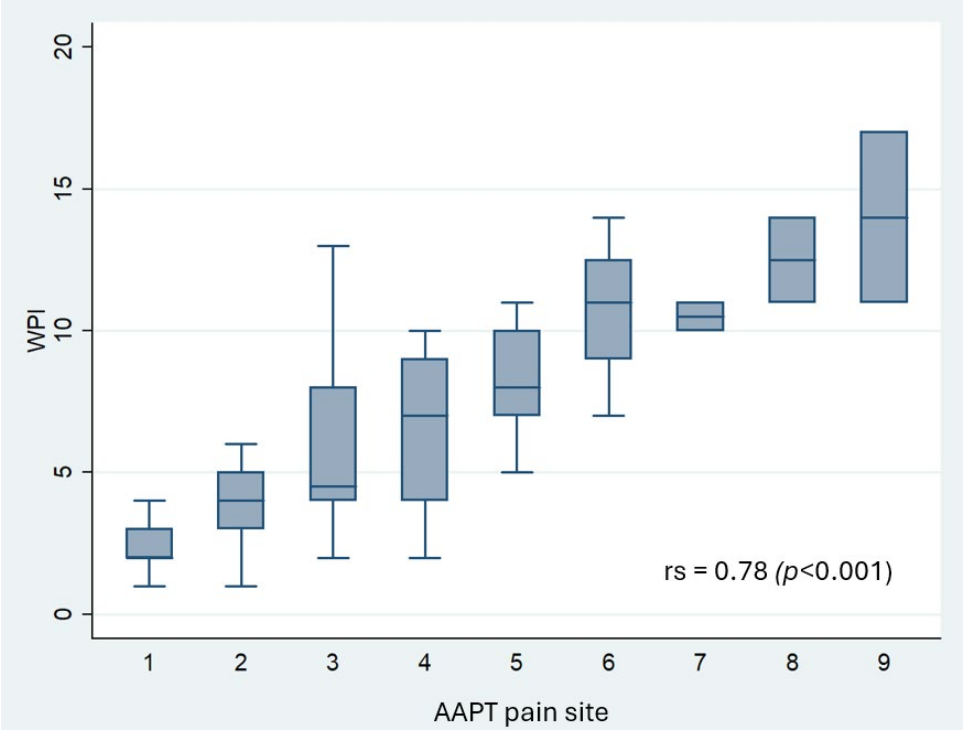

Figure 1. Spearman correlation coefficients between AAPT pain sites and WPI

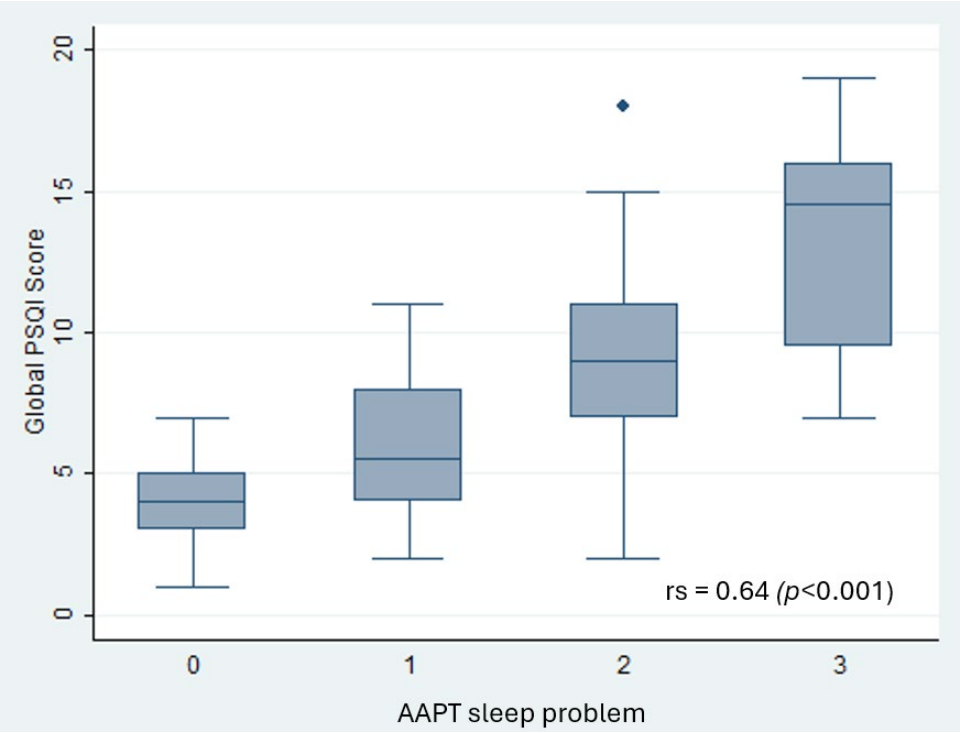

Figure 2. Spearman correlation coefficients between AAPT sleep problems and PSQI score

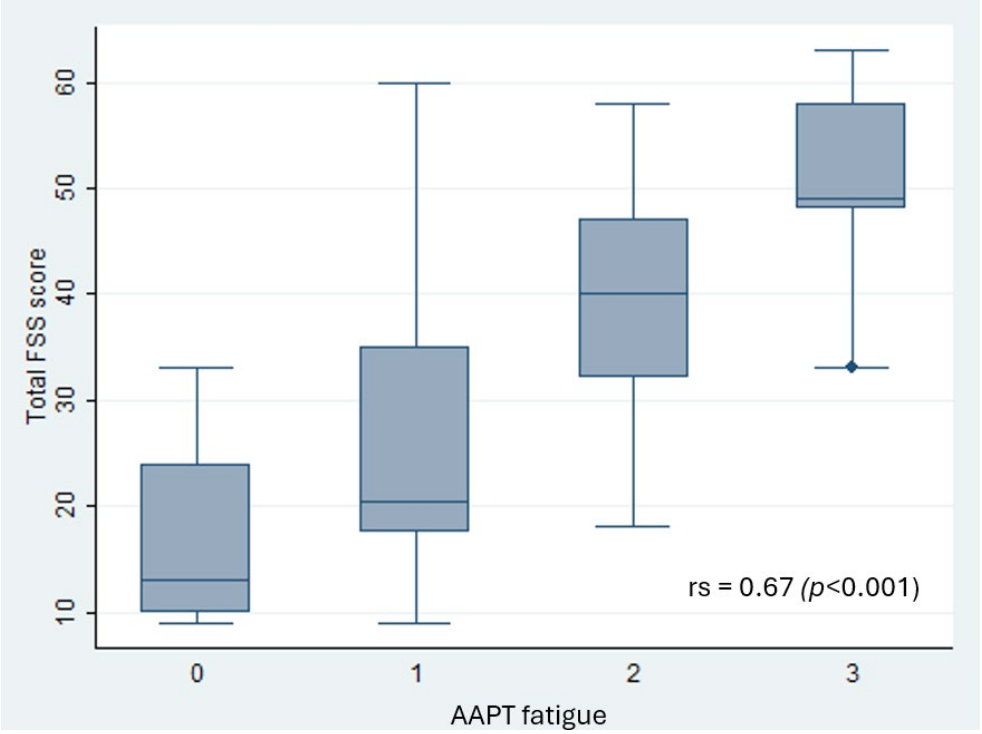

Figure 3. Spearman correlation coefficients between AAPT fatigue problems and total FSS score

Construct validity showed strong correlations between AAPT pain sites and WPI (rs = 0.78, $p < 0.001$) (Figure 1), AAPT sleep problems and PSQI (rs = 0.64, p < 0.001) (Figure 2), and AAPT fatigue problems and FSS (rs = 0.67, $p < 0.001$) **(Figure 3).**

As shown in **Table 2**, diagnosis agreement between the AAPT and ACR 2016 criteria was 90.6%, with a substantial Kappa coefficient of 0.67 ($p < 0.001$), indicating good concordance between the two diagnostic tools.

Table 3 shows the sensitivity, specificity, PPV, and NPV of the AAPT-FSQ. The sensitivity and specificity were 48.3% (95% CI: 29.4%-67.5%) and 99.0% (95% CI: 94.5%-100.0%), respectively, and the PPV and NPV were 93.3% (95% CI: 68.1%–99.8%) and 86.7% (95% CI: 79.1%-92.4%), respectively.

Table 2. Diagnosis agreement between the AAPT-FSQ and ACR 2016 criteria

AAPT-FSQ diagnosis	Physician diagnosis (ACR2016)		Total
	Yes	No	
Yes	16	2	18
No	10	100	110
Total	26	102	128

AAPT, the ACTTION-APS Pain Taxonomy; ACR, American College of Rheumatology

Table 3. Sensitivity, specificity, positive and negative predictive values of the AAPT-FSQ

Diagnostic testing	Percent (%)	95%CI
Sensitivity	48.3	29.4-67.5
Specificity	99.0	94.5-100.0
Positive predictive value (PPV)	93.3	68.1-99.8
Negative predictive value (NPV)	86.7	79.1-92.4

Discussion

The findings of the present study showed that the Thai AAPT-FSQ demonstrated good construct validity and agreement with the ACR 2016 diagnostic criteria for FM in Thai patients with chronic musculoskeletal pain.

The correlation between the AAPT pain site and WPI was strong, slightly higher than the Korean version reported by Kang et al. (rs = 0.542).[20] It was also higher than the correlation between sleep severity and PSQI and between fatigue severity and FSS in this study; this might have been because the part of the AAPT pain site used YES-NO questions similar to those in the WPI of ACR 2016. However, each part of the AAPT severity of sleep and fatigue problems used a simple question classified into four grades more roughly. In contrast, the PSQI and FSS questionnaires contained more questions and provided more detailed descriptions of problems.

The agreement between the AAPT and the ACR 2016 criteria in this study was substantial. This result was consistent with the Korean version (Kappa coefficient = 0.779)[20] and the study by Salaffi et al. in Italy.[21] The Thai AAPT-FSQ diagnosed only 16 of 26 (61.5%) FM patients based on the physiatrists' diagnoses using the ACR 2016 diagnostic criteria. This low diagnostic accuracy was in line with studies in Korea[20] and Italy,[21] suggesting that multisite pain in the AAPT criteria was a stricter requirement (at least six out of nine sites of pain) than the WPI in the ACR 2016 criteria. Moreover, the AAPT criteria focused only on symptoms of sleep problems and fatigue. In contrast, patients with FM may also present with other symptoms, such as memory problems, headaches, or depression, which are included in the ACR 2016 criteria.

This study demonstrated a high specificity (99.0%) and a strong positive predictive value (93.3%) for the AAPT-FSQ, consistent with findings from the Korean study, which also reported a high specificity (94.4%) but a similarly low sensitivity (56.7%).[20] In contrast, the Italian study reported both high specificity (91.7%) and a markedly higher sensitivity (73.8%).[21] These findings suggest that while the AAPT-FSQ consistently exhibits strong specificity across different populations, the instrument's sensitivity may vary depending on regional, cultural, or linguistic contexts. The relatively lower sensitivity observed in the Thai version may reflect cultural nuances in symptom perception or reporting. These results highlighted the diagnostic value of the AAPT-FSQ, particularly its strength in ruling in fibromyalgia; however, due to its limited sensitivity, it should be used as an adjunct to comprehensive clinical evaluation and established diagnostic criteria by physiatrists.

The present research had some limitations that needed to be considered. First, some terms that may have multiple interpretations were not validated, which could lead to misunderstandings among respondents and impact the overall validity of the questionnaire. Furthermore, clinical data such as comorbidities and other musculoskeletal conditions that may cause generalized pain similar to fibromyalgia were not collected, which may have impacted diagnostic accuracy. The participants were enrolled through convenience sampling from a single tertiary hospital which might not represent the general Thai population. Most participants (71.9%) had a good education; however, the validity may vary in low-educated individuals, as highly educated individuals may be more likely to evaluate and respond to target tests more effectively. Future research should be incorporated in other settings and with larger populations. Including a control group of individuals with fibromyalgia and other chronic pain conditions would be beneficial. Self-reported questionnaires can often lead to overreporting or underreporting of symptoms, potentially resulting in incorrect diagnoses. Moreover, diagnosing fibromyalgia can be particularly difficult, especially in resource-limited settings where access to specialists may be restricted. The Thai AAPT-FSQ may serve as a useful initial self-diagnostic tool for fibromyalgia; however, its reliability and generalizability should be carefully considered, as they may be impacted in broader clinical practice.

Conclusion

The Thai AAPT-FSQ is a self-reported questionnaire designed to diagnose FM. It demonstrates good construct validity and aligns well with physician diagnoses. With fewer criteria and a simpler format, the Thai AAPT-FSQ appears more user-friendly and may be better suited for self-administration than the ACR 2016 criteria. This tool could benefit Thai patients experiencing chronic musculoskeletal pain by providing a provisional diagnosis of fibromyalgia, improving patient outcomes, and lessening the burden of this condition.

Supplemental material

The Supplementary Material for this article can be found online at: https://jseamed.org/index.php/jseamed/article/view/238/150

Disclosure

The authors declare there are no conflicts of interest related to this study.

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