

Cross-cultural adaptation, reliability, and validity study of the Thai version of the
Manchester-Oxford Foot Questionnaire in individuals with chronic foot pain



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การปรับข้ามวัฒนธรรมและการศึกษาความเที่ยงและความตรงของแบบประเมินห้าแมนเชสเตอร์
ออกซฟอร์ดฉบับภาษาไทยในผู้ที่มีอาการปวดเท้าเรื้อรัง



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ปรมัตต์ กุลอึ้ง : การปรับข้ามวัฒนธรรมและการศึกษาความเที่ยงและความตรงของแบบประเมินเท้า
แมนเชสเตอร์ออกซฟอร์ดฉบับภาษาไทยในผู้ที่มีอาการปวดเท้าเรื้อรัง. (Cross-cultural adaptation,
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จากการทบทวนวรรณกรรมพบว่าร้อยละ 10 ถึง 24 ของประชากรมีภาวะปวดเท้าเรื้อรัง การตอบ
แบบสอบถามโดยผู้ป่วยเป็นเครื่องมือที่ได้มาตรฐานในการประเมินผลการรักษา แบบประเมินเท้าแมนเชสเตอร์
ออกซฟอร์ด (MOXFQ) เป็นแบบประเมินที่มีความจำเพาะในการประเมินเท้าได้ถูกพัฒนามาเพื่อใช้สำหรับประเมิน
ผลการรักษาในผู้ป่วยที่ได้รับการผ่าตัดหรือมีปัญหากับเท้า แบบประเมินฉบับนี้ประกอบด้วย 3 หมวดหมู่ได้แก่ การ
ยืนการเดิน อาการปวด และการมีปฏิสัมพันธ์ทางสังคม แบบประเมิน MOXFQ ได้ถูกแปลเป็นภาษาอื่นหลายภาษา แต่ยังไม่
เคยได้รับการแปลเป็นภาษาไทย การศึกษานี้มีวัตถุประสงค์เพื่อดัดแปลงแบบประเมิน MOXFQ จากต้นฉบับ
ภาษาอังกฤษเป็นภาษาไทย และปรับปรุงให้สอดคล้องกับบริบทของคนไทย และทดสอบความเที่ยงและความตรงในผู้ที่มี
อาการปวดเท้าเรื้อรัง การศึกษานี้ใช้กระบวนการปรับข้ามวัฒนธรรมในการแปลแบบประเมิน MOXFQ แบบประเมินฉบับ
ภาษาไทยถูกนำมาทดสอบในอาสาสมัครที่มีอาการปวดเท้าเรื้อรังจำนวน 100 ราย โดยทดสอบความเที่ยงเมื่อทดสอบซ้ำ
(Test-retest reliability) ความสอดคล้องภายใน (Internal consistency) และความตรงเชิงโครงสร้าง (Construct
validity) ร่วมกับแบบประเมิน Foot and Ankle Ability Measure (FAAM) แบบสอบถาม Short Form-36 (SF-36)
และแบบทดสอบ Visual Analogue Scale (VAS) แบบประเมิน MOXFQ ฉบับภาษาไทยได้ถูกดัดแปลงโดยมีการ
ปรับเปลี่ยนเล็กน้อยจากต้นฉบับ โดยแบบประเมินมีค่าความเที่ยงเมื่อทดสอบซ้ำและค่าความสอดคล้องภายในในระดับสูง
(Intra-class correlation coefficient ระหว่าง 0.763 ถึง 0.833 และ Cronbach alpha ในช่วง 0.738 ถึง 0.871)
แบบประเมินฉบับนี้มีความตรงเชิงโครงสร้างในระดับปานกลางเมื่อเปรียบเทียบกับแบบประเมิน FAAM แบบสอบถาม
SF-36 และแบบทดสอบ VAS ($p < 0.05$ และ Spearman rank correlation > 0.5) โดยคะแนนการยืนการเดินจะมี
ความสำคัญกับ Physical domain ของ SF-36 และ FAAM ส่วนคะแนนอาการปวดมีความสัมพันธ์กับแบบทดสอบ VAS
และ Bodily pain ของ SF-36 นอกจากนี้คะแนนส่วนการมีปฏิสัมพันธ์ทางสังคมมีความสัมพันธ์ปานกลางกับ Bodily
pain Social functioning ของ SF-36 และ FAAM แบบประเมิน MOXFQ ฉบับภาษาไทย ได้ถูกดัดแปลงจากต้นฉบับ
ภาษาอังกฤษ ซึ่งมีค่าความเที่ยงเมื่อทดสอบซ้ำและค่าความสอดคล้องภายในระดับสูง มีความตรงเชิงโครงสร้างกับ SF-36,
FAAM, และ VAS ในระดับที่ยอมรับได้ตั้งนั้น แบบประเมิน Thai-MOXFQ เป็นแบบประเมินเท้าที่มีความตรงและความ
เที่ยงสามารถนำมาใช้ประเมินผู้ที่มีอาการปวดเท้าเรื้อรังได้

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ลายมือชื่อนิสิต

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There are 10-24% of the population who experience chronic foot pain. Patient-reported outcome measurement (PROM) is a standardized tool that is useful in measuring the outcomes of treatment. The Manchester-Oxford Foot Questionnaire (MOXFQ) is a foot-specific questionnaire that was developed for surgical outcomes and foot conditions assessment. There are 3 subscales of MOXFQ including walking/standing, pain, and social interaction. MOXFQ has been translated into several languages but there is no previous Thai version. This study aimed to cross-culturally adapt and test for reliability and validity of the Thai version of MOXFQ (Thai-MOXFQ) in participants with chronic foot problems. The original version of MOXFQ was translated into the Thai language by cross-cultural adaptation. The Thai-MOXFQ had been investigated in 100 participants with chronic foot pain for reliability and construct validity. Test-retest reliability was evaluated via intraclass correlation coefficients (ICC 3,1). Construct validity was analyzed by Spearman's rank correlation between Thai-MOXFQ, Foot and Ankle Ability Measure (FAAM), SF-36, and Visual Analogue Scale (VAS). Thai-MOXFQ was successfully adapted from the original version with minor changes. The Thai-MOXFQ demonstrated good level of test-retest reliability (Intra-class correlation coefficient of 0.763 to 0.833) and internal consistency (Cronbach alpha of 0.738 to 0.871). Construct validity was supported via moderate relationship with FAAM, SF-36, and VAS ($p < 0.05$, Spearman rank correlation > 0.5). The study showed that MOXFQ-walking/standing was related to the physical domain of SF-36 and FAAM. While MOXFQ-pain was related to VAS and bodily pain of SF-36. Moreover, MOXFQ-social interaction showed moderate relationship with bodily pain, social functioning of SF-36 and FAAM. The Thai-MOXFQ was developed and demonstrated good reliability and internal consistency. The Thai-MOXFQ showed acceptable level of construct validity with SF-36, FAAM, and VAS. Therefore, the Thai-MOXFQ is a reliable and valid foot-specific PROM for assessing outcome measurement in patients with chronic foot pain.

Field of Study: Physical Therapy

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Chapter 1

Introduction

1.1 Background and rationale

Foot pain is an uncomfortable feeling that is related to tissue damages located below the tibia and fibula. Foot pain is generally found in the hospital and clinical setting. The previous studies stated that 10-24% of the population experienced foot problems at least one time (1, 3). The prevalence of foot problems increased in obese, females (4), and those aged over 45 years (5). People with foot problems were associated with ankle joint limitation, loss of balance (6), risk of falling, and decreased health-related quality of life (7). According to two studies involving Thai populations, they found 9% and 13.4% of population had foot problems (8, 9).

Health-related questionnaire is a subjective measurement that provides standardised measure for evaluating treatment outcomes from the respondent's perspective (10). The biopsychosocial model is a multifactorial approach that should be evaluated in a person affected by musculoskeletal problems (11). In Thailand, three foot-specific questionnaires were translated into Thai versions including the Foot and Ankle Outcome Scale (FAOS) (12), the FAAM (13), and the Foot Function Index (FFI) (14).

The MOXFQ is a foot-specific PROM for hallux valgus surgery in the initial phase (15). Later, the MOXFQ has been validated in musculoskeletal foot conditions (16, 17). In systematic reviews, the MOXFQ was reported to demonstrate overall psychometric properties at an acceptable level and recommended for use in participants with foot and ankle conditions (18). The original version of MOXFQ was translated into 10 languages including Italian (19), Persian (20), Spanish (21), Turkish (22), Dutch (23), German (24), Korean (25), French (26), Finnish (27), and Chinese versions (28). Each translation process was performed by using cross-cultural adaptation to minimize errors from cultural difference (29).

A previous systematic review of measurement properties of PROMs reported that the FAAM had positive evidence on four properties including reliability, measurement error, structural validity, and discriminant validity (18). There was negative evidence of internal consistency and convergent validity. Regarding the FAOS, there was positive evidence on three properties that consisted of structural validity, convergent validity, and discriminant validity, while there was negative evidence on internal consistency and conflicting evidence was reported on reliability. This review also indicated that the MOXFQ had the best positive evidence for overall psychometric properties including internal consistency, reliability, measurement error, structural validity, convergent validity, discriminant validity, discriminative validity,

and responsiveness. It is thus assumed that the MOXFQ is an appropriate tool with high-quality evidence to evaluate patients with foot and ankle diseases (18).

The existing Thai versions of three foot-specific questionnaires evaluate pain, symptoms, disability, and quality of life of individuals with foot problems (12, 13). These questionnaires have no items relating to social domain. While the original MOXFQ contained 16 items asking for an individual's pain, walking/standing, and social interaction domains. However, a Thai version of MOXFQ is unavailable to Thai peoples. Therefore, this study was to cross-culturally adapt the MOXFQ from the original version into the Thai version and determine the test-retest reliability and construct validity of the Thai-MOXFQ in participants with chronic foot problems. This study also determined floor and ceiling effects to demonstrate lower and upper limits of the Thai-MOXFQ.

1.2 Research questions

1.2.1 Can the MOXFQ be culturally adapted into Thai version?

1.2.2 Does the Thai-MOXFQ have an acceptable level of reliability for measuring foot disability of individuals with chronic foot pain?

1.2.3 Does the Thai-MOXFQ have an acceptable level of construct validity for measuring foot disability of individuals with chronic foot pain?

1.3 Objectives of research

1.3.1 To cross-culturally adapt the original version of the MOXFQ into Thai version

1.3.2 To examine the reliability of the Thai-MOXFQ for use in individuals with chronic foot pain in Thailand. Reliability study included test-retest reliability and internal consistency

1.3.3 To examine the construct validity of the Thai-MOXFQ for use in individuals with chronic foot pain in Thailand. Validity study included construct validity when compared the Thai-MOXFQ with the Thai-FAAM, Thai SF-36, and VAS.

1.4 Hypothesis of research

1.4.1 The Thai-MOXFQ will demonstrate an excellent level of test-retest reliability (Intraclass correlation coefficient above 0.7) (30).

1.4.2 The Thai-MOXFQ will demonstrate a high level of internal consistency coefficient. (Cronbach's alpha coefficient above 0.7) (31).

1.4.3 The Thai-MOXFQ walking/standing subscale will demonstrate a good level of negative relationship with the activities of daily living subscale of the Thai-FAAM, physical functioning and role physical subscale of the Thai SF-36. The Thai-MOXFQ pain subscale will be expected to demonstrate good level of positive relationship with the VAS and a good level of negative relationship with

bodily pain of the SF-36. (Spearman's rank correlation coefficients will reach 0.5) (32).

The social interaction subscale of the Thai-MOXFQ will be expected to demonstrate fair to poor level of negative relationship with all subscales of the SF-36 and Thai-FAAM (Spearman's rank correlation coefficients will under 0.5) (32).

1.5 Scope of research

This research included three studies. The first study cross-culturally adapted the original version of the Thai-MOXFQ. The second study examined the reliability (Internal consistency and test-retest reliability) of the Thai-MOXFQ. The third study examined the validity of the Thai-MOXFQ when compared with the Thai-FAAM, the Thai SF-36, and VAS. The participants in the second and third studies were 100 participants with chronic foot pain.

1.6 Expected benefits and application

This study produced the Thai-MOXFQ which is reliable and validated for use in patients with chronic foot pain. This questionnaire may help a health care provider in outcome approach for individuals with chronic foot pain.

Chapter 2

Literature review

2.1 Definition and prevalence of foot pain

2.1.1 Definition of foot pain

In 1979, the International Association for the Study of Pain (IASP) described the definition of pain as an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage (33). This statement defines pain as a subjective experience and links pain among sensory, emotional, and cognitive aspects. In 2009, Hawke and Burns described foot pain as an unpleasant sensory and emotional experience following perceived damage to any tissue distal to the tibia or fibula and has been attributed to direct trauma, musculoskeletal overload, infection, systematic, and proximal pathology (34). Hill et al. divided the area of foot pain into 6 areas including toes, nails, forefoot, hind-foot, heel, arch of foot and ball of foot, as showed in Figure 1.

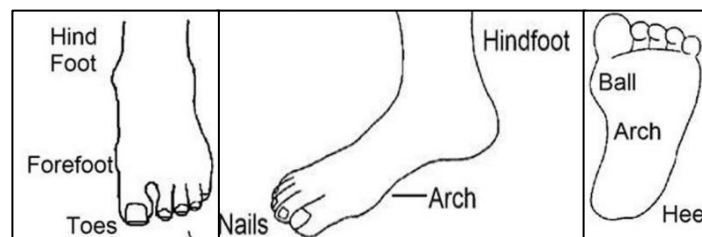


Figure 1 Foot pain map of the left foot

From Hill et al. in 2008 (1)

2.1.2 Prevalence of foot pain

The prevalence of foot pain is up to 10-24% of the general population (1). The prevalence is distributed from gender, health-related condition, and participant's age. Generally, a higher prevalence has been found in female, obesity, and older-aged population (4, 35). For example, a previous systematic review estimated that 24% of foot pain and 16% of ankle pain were founded in middle to older-aged people (36). These results can be considered as intrinsic factors. For the extrinsic factor, there are two factors including inappropriate footwear (3, 37) and occupational activities that related to foot pain such as prolonged standing or walking (38, 39). A summary of the prevalence of foot pain is demonstrated in Table 1.

In Thailand, there are only two studies about the prevalence of foot pain, 35.4% of foot pain in Thai monk (9) and 9% of foot pain in Thai boxers were reported (8). However, the study of prevalence and/or incidence of foot pain in the general population is still limited.

Foot pain has been associated with disabled locomotion (40), reduced functional ability, impaired balance (41), increased falling risk (42, 43), loss of independence, and reduced quality of life (1, 7). Regarding the effects of foot pain, this study defines the effects of chronic foot pain according to the biopsychosocial model as presented in Figure 2. Foot pain affects health-related quality of life which

can be divided into five domains including the physical, mental, social, interface of mental and social, and other domains (44). In order to understand foot pain, the previous study demonstrated the International classification of functioning, disability, and health (ICF) as presented in Table 2.

Table 1 Prevalence and of foot pain

Author, year	Type of study	Sample sources	Prevalence
Gay et al., 2014 (35)	Cohort study	1,003 female participants aged 45-64 years from the Chingford study in England, 1995 (28)	22%
Thomas et al., 2011 (36)	Systematic review	Studies of Hill, et al. in 2008 (1), Dufour, et al. in 2009 (4), Leveille, et al. in 2008 (29)	24%
Dufour et al., 2009 (3)	Cross-sectional study	3,378 participants from the Framingham Studies in the United States, 1950 (30), 1975 (31)	25%
Hill et al., 2008 (1)	Cross-sectional study	3,206 participants aged over 20 years in South Australia.	17%
Garrow et al., 2004 (45)	Cross-sectional study	3,417 participants aged 18-80 years England.	22%

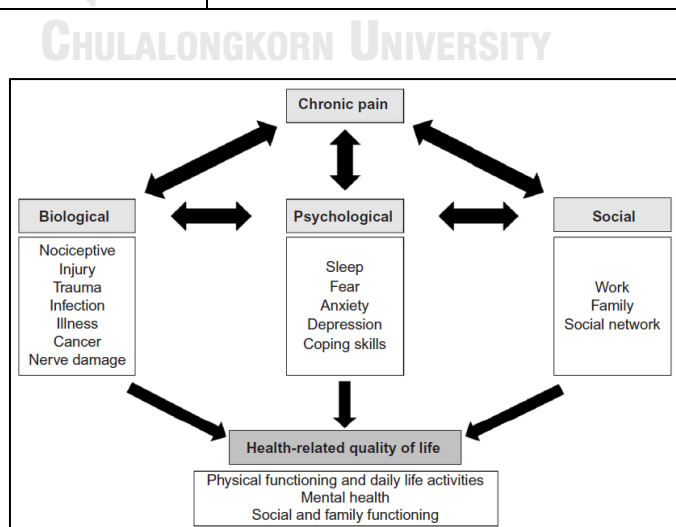


Figure 2 Biopsychosocial model of pain and consequences on the quality of life

From Dueñas et al, in 2016 (2).

Table 2 ICD-10 and ICF codes associated with heel pain

Adapted from McPoil et al, in 2008 (46)

ICD-10 M72.2 Plantar fascial fibromatosis and Plantar fasciitis	ICD-10 G57.5 Tarsal tunnel syndrome G57.6 Lesion of plantar nerve
Body functions b28015 Pain in lower limb b2804 Radiating pain in a segment or region	Body functions b7100 Mobility of a single joint (increase or decrease in mobility) b7101 Mobility of several joints (increase or decrease in mobility) b7203 Mobility of tarsal bones (increase or decrease in mobility) b7300 Power of isolated muscles and muscle groups (weakness of intrinsics) b7401 Endurance of muscle groups b770 Gait pattern functions (antalgic gait)
Body structure s75023 Ligaments and fascia of ankle and foot s75028 Structures of ankle and foot, neural	Body structure s75020 Bones of ankle and foot (calcaneus/heel spur) s75022 Muscles of ankle and feet (extensor digitorum brevis, abductor hallucis, abductor digiti quinti, gastrocnemius/soleus) s75028 Structure of ankle and foot, specified as tarsal tunnel/flexor retinaculum s198 Structure of the nervous system, specified as tibial nerve and branches
Activities and participation d4500 Walking short distances d4501 Walking long distances d4154 Maintaining a standing position	Activities and participation d4101 Squatting d4104 Standing d4106 Shifting the body's center of gravity d4302 Carrying in arms (object) d4303 Carrying on shoulders, hip, and back d4350 Pushing with lower extremities d4351 Kicking d4502 Walking on different slopes d4503 Walking around obstacles d4551 Climbing d4552 Running d4553 Jumping d4600 Moving around within the home d4601 Moving around within buildings other than home d4602 Moving around outside the home or other buildings

2.2 Physiology of foot pain

In this study, the physiology of foot pain could be explained by a nociceptive pathway. This pathway provides a feedback system that immediately reduces external stimulation (withdrawal reflex). For example, foot automatically lifted after stepping on a sharped stone or hand automatically removed from touching a hot stove. The neural signal from external stimuli is transmitted to the primary sensorimotor cortex and limbic cortical area at the thalamus. The ending of this pathway provides personal pain via five processes including transduction, conduction, transmission, modulation, and perception (47).

Foot pain is originated by the noxious stimuli that can be either the mechanical stimulus, chemical stimulus, or thermal stimulus. The free nerve ending, a nociceptor of the primary order neuron, is excited by the harmful stimuli at damaged tissue. These stimuli are converted into pain signal that provokes depolarization of the cell membrane if the signal is strong enough to activate. This process occurs at the terminal branch of primary neuron called “transduction”. The next process is “conduction”; the activated membrane excites an adjacent cell membrane at the voltage-gated sodium channels. The pain signal within foot potentially transmits back to the site of stimulation (efferent transmission) or away from the site of stimulation (afferent transmission) that involved the A-delta and C fibers of the primary order neuron. The neural signal is transmitted through the

anterior and lateral spinothalamic tract via primary, secondary, and tertiary order neuron that locate at the dorsal root ganglion, dorsal horn, and thalamus, respectively. The “modulation” process regulates the intensity of pain signal in both peripheral and central nervous systems (47). For example, Melzack and Wall introduced the gate-control theory that explained afferent pain signal and mechanical sensation convert at the same primary order neuron resulting in the pain signal is inhibited by the inhibitory interneuron when stimulated the mechanical sensation together (48). In the central nervous system, there is the central inhibitory mechanism that controls the endogenous system for pain suppression. The pain signal ascends to the periaqueductal grey matter and rostroventral medulla that release noradrenergic and serotonergic neurotransmitter. These neurotransmitters inhibit the 2nd order neuron (49, 50). After modulation of the pain signal, the “perception” occurs at the cerebral cortex for the pain sensation and limbic cortical area for the emotional experience (51, 52). The results of pain perception explain the difference in foot pain experience even they are excited by the same stimuli or same therapy.

2.3 Chronic foot pain

Foot problems can be divided into dermatological, neurological, musculoskeletal, and vascular aspects. These conditions are generally involved with the specific body structure such as plantar fascia in the patients with plantar fasciitis

and the first metatarsophalangeal joint in the patients with hallux valgus. Pain can be physiologically provoked via the noxious stimuli at the injured structure in the foot. Generally, chronic musculoskeletal pain is defined as chronic primary pain located in the muscle, tendon, bones, joints, or tendons (53). According to the IASP definition of chronic foot pain, pain is persistent or recurrence for more than 3 months and the symptom is associated with significant emotional distress and/or significant functional disability without any specific diagnostic criteria (34, 53). As showed in Table 3, chronic foot pain is a symptom that can be presented in various musculoskeletal disorders; the details of common foot and ankle disorders are described following.

Table 3 Common foot and ankle disorders and their definitions

Foot and ankle disorders	Definitions
Plantar fasciitis	Degenerative irritation of the plantar fascia especially at the medial calcaneal tuberosity of the heel and the surrounding perifascial structures (54).
Ankle instability	Repetitive bouts of lateral ankle instability resulting in numerous ankle sprains (55).
Achilles tendinopathy	The presence of pain and thickening in the Achilles tendon (56).
Hallux valgus	Lateral angulation of the big toe at the metatarsophalangeal joint (57).
Ankle impingement -Anterior impingement -Posterior impingement	Entrapment of the structures along the anterior margin of the tibiotalar joint during terminal dorsiflexion (58). Compression of the structures posteriorly to the tibiotalar and talocalcaneal articulations during terminal plantar flexion (58).
Tarsal tunnel syndrome	Entrapment of the posterior tibial nerve or its branches (medial plantar, lateral plantar and calcaneal nerves) within its fibro-osseous tunnel beneath the flexor retinaculum on the medial side of the ankle (59).

2.4 Quantifying of foot pain

Since pain has been described as a subjective sensory and emotional experience, a self-reported pain instrument is generally used in clinical practice and research (10, 60). The common PROMs include the VAS and the numerical rating scales (NRS). The previous review demonstrated that 50 PROMs was developed and used to assess the patients with foot and ankle diseases (18). To select the appropriate PROM to evaluate the patients, the health care provider should consider the psychometric properties and specific patient's condition (10, 60).

From the previous systematic reviews (18, 61), many questionnaires have been developed to assess the patients with specific disease at foot and ankle regions such as the Ankle Osteoarthritis Scale (AOS), Juvenile Arthritis Foot Disability Index (JADI), Rowan Foot Pain Assessment Questionnaire (ROFPAQ), Karlsson Ankle Function Score (KAFS), and Olerud Scoring Scale (OSS). In addition, nine questionnaires were used to evaluate the patients with general foot and ankle pain which included the FAAM, the MOXFQ, the Manchester Foot Pain and Disability Index (MFPDI), the FAOS, the FFI, the Self-reported Foot and Ankle Scale (SEFAS), the Foot health status questionnaire (FHSQ), the Maryland Foot Score (MFS), and the Sports Ankle Rating System Quality of Life (QOL) measure.

A previous systematic review suggested that three questionnaires including the MOXFQ, the FAOS, and the FAAM were appropriate to assess the patients with

foot and ankle pain (18). In this review, positive evidence is defined as the measurement properties with an acceptable level of statistical value and perfect methodological quality. Negative evidence is defined as the measurement properties with an unacceptable level of statistical value or poor methodological quality. Regarding the psychometric properties of each questionnaire, the FAAM had four measurement properties with positive evidence including reliability, measurement error, structural validity, and discriminant validity. However, there is negative evidence of internal consistency and convergent validity. The FAOS had positive evidence on three properties that included structural validity, convergent validity, and discriminant validity, while there was negative evidence on internal consistency and conflict evidence on reliability. Concerning the MOXFQ, positive evidence was reported for overall psychometric properties including internal consistency, reliability, measurement error, structural validity, convergent validity, discriminant validity, discriminative validity, and responsiveness. Therefore, the MOXFQ was considered as the most appropriate tools in clinic and research for the assessment of patients with foot and ankle pain.

2.4.1 Manchester-Oxford Foot Questionnaire

The MOXFQ is a region-specific questionnaire for foot that contains 16 items with 3 subscales, including pain (5 items), walking/standing (7 items), and social interaction (4 items). This questionnaire has been developed from the MFPDI by Dawson et al. in 2006 (15). Each item includes 5 Linkert scales ranging from 0 (no limitation) to 4 (maximum limitation). In order to calculate the MOXFQ score, raw scores of each subscale are transformed into a metric of 0-100 as illustrated in Figure 3. All three subscales can be summed and converted to a metric of 0-100 for the total score (16). The greater score represents greater severity. The psychometric properties of MOXFQ have been firstly studied in patients undergoing hallux valgus surgery (62, 63), and then extended to patients undergoing foot and ankle surgery (17, 64, 65).

$$\text{Metric score} = \frac{100}{\text{Maximum possible score}} \times \text{Actual score}$$

Figure 3 Metric formula

The original version of the MOXFQ has been translated into 10 different languages Italian (19), Persian (20), Spanish (21), Turkish (22), Dutch (23), German (24), Korean (25), French (26), Finnish (27), and Chinese versions (28). Regarding the Persian version of the MOXFQ, the modifications have been demonstrated (12). For example, the term “feel self-conscious” has been replaced by the term “should be careful”. In addition, the term “evening” has been replaced by the term

“night” to correct semantic equivalence. Although the MOXFQ was developed from the MFPDI, the MOXFQ has been studied extensively (18).

2.4.2 Foot and Ankle Outcome Score

The FAOS is a 42-item questionnaire that aims to evaluate symptoms and functional limitation in general foot and ankle disorders. This instrument has been adapted from the knee injury and osteoarthritis outcome score (KOOS) by Roos et al. in 2001 (66). The FAOS is divided into 5 subscales; symptom (7 items), pain (9 items), the activity of daily living (ADL; 17 items), sport and recreational activities (S/R; 5 items), and foot and ankle-related quality of life (QOL; 4 items). Regarding the symptom's subscale of the FAOS, this subscale encompassed common foot and ankle related symptoms such as swelling, stiffness, or crepitation. Each item can be answered with 5 Likert scales from none (0 points) to extreme (4 points). Raw scores of each subscale are transformed into a metric of 0-100 with the higher score represent the higher disability. The FAOS is reported in the summary of subscale. The time to complete was reported within 10 minutes. The FAOS has been validated in ligament reconstruction (66), osteoarthritis (67, 68), flatfoot deformity (69), and chronic foot and ankle problems (70, 71).

In 2001, the FAOS was developed in the English version (66). The FAOS has been translated into Turkish (72), Persian (73), Korean (70), German (74), Dutch (75), Thai (68), Danish (76), and Chinese (71). Regarding the conceptual equivalence from

cross-cultural adaptation, there were some modifications for suitable meaning in each version. For example, the term of “get in/out of bath” was changed to “take a bath” in the Persian version because bathtubs are not used frequently in the Iran version (73), and “How much are you troubled with lack of confidence in your foot/ankle?” sentence was adapted to “Are you afraid to move your foot/ankle?” in the back translation process in the Korean version (70).

2.4.3 Foot and Ankle Ability Measure

The FAAM is a 29-item questionnaire that has been developed by Martin et al. in 2005 to assess the physical performance of foot and ankle (77). It consists of 2 domains, i.e., ADL domain (21 items) and sports domain (8 items). Each item can be individually answered with a 5 Likert scales ranging from 0 (representing in no difficulty) to 4 (representing in unable to do). Raw scores are converted from 0 (highest disability) to 100 (lowest disability) for ADL and sports subscales. The FAAM takes 10 minutes to be completed. It was studied in many foot and ankle conditions including foot and ankle related musculoskeletal disorders (77), chronic ankle instability (78), and Diabetes Mellitus (79, 80).

The available translation of the FAAM has been translated from English (77) into 11 different languages including Persian (81), French (82), German (83), Italian (84), Thai (85), Japanese (86), Turkish (87), Brazilian (88), Dutch (89), Spanish (90), and Chinese (91). Due to specific activity in ADL and sports subscales, some words

i.e. “landing” and “cutting/lateral movement” cannot be directly translated in the Japanese version (86) and Brazilian version (88). After minor discrepancies were collected, the respondent was able to complete with no difficulties.

2.5 The Basic aspect of psychometric properties

In order to assess the quality of health-related questionnaire, the psychometric properties should be evaluated in clinical and research measurement with statistical values. According to the international Delphi study of Mokkink et al. in 2010 (92), the taxonomy of psychometric properties is divided into three quality domains which consist of reliability, validity, and responsiveness. Each quality domain contains measurement properties as presented in Table 4.

Table 4 Domains and measurement properties of psychometric properties
Adapted from Mokkink et al., 2010 (92)

Domain	Measurement property
Reliability	Internal consistency
	Reliability
	Measurement error
Validity	Content validity
	Construct validity
	- Convergent validity
	- Divergent validity
	Criterion validity
Responsiveness	- Concurrent validity
	- Predictive validity
	Responsiveness

2.5.1 Reliability

Reliability is the main component that should be evaluated in the assessment of psychometric properties for both clinical practice and research measurement. The term of “Reliability” can be described as the ability to produce consistent and reproducible scores (93). The true score cannot be identified in clinical practice or research because the observed score is a summary of the true score and measurement error (Observed score = True score + Measurement error) (94). This can be explained via the concept of variance that calculated from the observed value (X), the mean value (\bar{X}), and a number of populations (N), as presented in Figure 4.

$$\text{Variance} = \frac{\sum(X - \bar{X})^2}{N}$$

Figure 4 Variance formula

Reliability indicates the amount of error in the observed score that deviates from the true score; the less error indicates the adjacent score between the observed score and the true score. This can be presented as the reliability coefficients that is calculated from a ratio between the true score variance and the total variance, as presented in Figure 5.

$$\text{Reliability coefficients} = \frac{\text{True score variance}}{\text{True score variance} + \text{Error variance}}$$

Figure 5 Reliability coefficients formula

From Portney and Watkins (94)

Reliability coefficients referred to the measurement properties in the reliability domain ranged from 0.00 to 1.00 and classified into four levels, i.e., poor reliability (0.00-0.50), moderate reliability (0.50-0.75), good reliability (above 0.75), and perfect reliability when reliability coefficients reach 1.00, as presented in Table 5.

Table 5 General guideline of reliability coefficients levels

From Portney and Watkins in 2009 (94).

Reliability coefficients levels	Interpretations
0.00-0.50	Poor reliability
0.50-0.75	Moderate reliability
Above 0.75	Good reliability
Reach 1.00	Perfect reliability

2.5.1.1 Internal consistency

Internal consistency is defined as the correlation of each item in similar dimension or the homogeneity of the measurement. Internal consistency should be separately evaluated for each subscale if the questionnaire measures more than one subscale. The items in the similar subscale should be a good relationship, this mean respondent is measured in the same aspect, for example, if the respondent is evaluated in the physical function subscale by the questionnaire, the items should

be related to the physical activity or daily activity. In the case of the items about emotional experience or psychological well-being, such a questionnaire would not be consistent with the physical function subscale. The items should be grouped during the developing process of the questionnaire. Furthermore, the items can be examined with the summary score that represents the item-to-total correlation. This should be evaluated in a single subscale or several relevant subscale questionnaires for indicating internal consistency. In statistical analysis, the Cronbach alpha coefficient can represent the evaluation of the internal consistency. The Cronbach alpha coefficient is ranged from 0.00 to 1.00 while the acceptable level is above 0.7. However, the Cronbach's alpha coefficient over 0.9 can be considered as redundancy (95).

2.5.1.2 Test-retest reliability

The score is measured over a period of time while the true score doesn't change. This can be considered as the test-retest reliability, reproducibility, or response stability of the instrument. The test-retest reliability should be evaluated in a self-administered questionnaire or physical measure in which the rater does not involve. In the self-administered questionnaire study, the researcher has to avoid the memory effect, the respondent may remember the answer at the previous time and write down the same answer. On the other hand, if the time interval is too long, the score can be influenced by the change of respondent. Then, the interval time

should be considered on the stability of the respondent's variables (94). The recommendation of the participants and interval duration of the test-retest study are 36 participants with an interval time between 2-14 days (94, 96). Evaluation of the degree of the test-retest reliability can be represented by intraclass correlation coefficients (ICC) as showed in Table 5. The acceptable level of ICC should be greater than 0.7 (60, 94).

2.5.2 Validity

Validity is defined as the extent to which an instrument that is intended to measure (94, 97). consisting of content validity, criterion-related validity, and construct validity (92). A summary of each type of the validity is reported in Table 6. The criterion-related validity and construct validity were assessed from the relationship between two instruments by using either Spearman's correlation or Pearson's correlation (94). The level of correlation is described by correlation coefficients (r) that is ranged from -1.00 (negative relationship) to +1.00 (positive relationship). The magnitude of correlation coefficients specifies the magnitude of relationship between two instruments that can be classified into 4 levels including little or no relationship (0.00 to ± 0.25), fair relationship (± 0.25 to ± 0.50), moderate to good relationship (± 0.50 to ± 0.75), and good to excellent relationship (± 0.75 to ± 1.00) (94).

Table 6 Types of measurement validity from Portney and Watkins in 2009(94)

Type of measurement validity	Definition
1) Content validity	Indicates that the items that make up an instrument adequately sample the universe of content that defines the variable being measured. Most useful with questionnaires and inventories.
1.1) Face validity	Indicates that an instrument appears to test what it is supposed to; the weakest form of measurement validity.
2) Construct validity	Establishes the ability of an instrument to measure an abstract construct and the degree to which the instrument reflects the theoretical components of the construct.
2.1) Convergent validity	indicates that two measures believed to reflect the same underlying phenomenon will yield similar results or will correlate highly.
2.2) Divergent validity or discriminant validity	Indicates that different results, or low correlations, are expected from measures that are believed to assess different characteristics. Therefore, the results of an intelligence test should not be expected to correlate with results of a test of gross motor skill.
2.3) Known group validity or discriminative validity	Identify the presence or absence of a particular characteristic, and the theoretical context behind the construct is used to predict how different groups are expected to behave.
3) Criterion validity	Indicates that the outcomes of one instrument, the target test, can be used as a substitute measure for an established reference standard criterion test. Can be tested as concurrent or predictive validity.
3.1) Concurrent validity	Establishes validity when two measures are taken at relatively the same time. Most often used when the target test is considered more efficient than the gold standard and, therefore, can be used instead of the gold standard.
3.2) Predictive validity	Establishes that the outcome of the target test can be used to predict a future criterion score or outcome.

2.6 The psychometric properties of foot-specific questionnaires

2.6.1 Manchester-Oxford Foot Questionnaire

The MOXFQ was previously reported as the tools with acceptable level of the reliability for the evaluation of foot and ankle diseases (18). The original version of the MOXFQ was reported to have acceptable reliability for three unidimensional domains, i.e., internal consistency, test-retest reliability, and standard error of measurement (SEM). Regarding the internal consistency, the Cronbach's α coefficients for walking/standing, pain, and social interaction were 0.96, 0.86, and 0.73, respectively (62). Test-retest reliability has excellent level with intraclass correlation coefficient (ICC) of 0.96 (walking/standing domain), 0.94 (pain domain), 0.92 (social interaction domain) (64). SEM was 5.70 for walking/standing domain, 5.36 for pain domain, and 7.13 for social interaction (17). Regarding the translated version of the MOXFQ, the internal consistency and test-retest reliability had acceptable level with Cronbach's α coefficients ranging from 0.65 to 0.93 and ICC more than 0.7 (98-103). The summary of findings was reported in Table 7.

Considering the construct validity and convergent validity, the questionnaire had moderate to good relationship with the 36-item short-form health survey (SF-36) in physical functioning, role physical, and bodily pain. The walking/standing and pain subscales had moderate to good relationship with the American Orthopaedic Foot and Ankle Society Scale (AOFAS) as showed in Table 7 (62, 64).

In addition, the translated version of the MOXFQ had acceptable validity with the SF-36 and the AOFAS. Regarding the German version, the MOXFQ is correlated with the FAOS, it reached the moderate to good relationship with pain, activity of daily living (ADL), sports and recreational activity (S/R), and foot and ankle related quality of life (QOL) domains. The walking/standing and social interaction domains were fair relationships with symptom domains of the FAOS (104). For divergent validity, walking/standing and pain domains of the MOXFQ was fairly associated with the SF-36 role emotional, social functioning, mental health, energy/vitality, and general health domains while the social interaction domain was fairly associated with the AOFAS and SF-36 in all domains (62, 64). There was no evidence of content validity, discriminative validity, and criterion validity.

Table 7 The psychometric properties of the MOXFQ

Authors, Year, Language	Participants (number of patients = n)	Reliability		Validity		Responsiveness
		Internal consistency (α)	Test-retest (ICC)	Standard error of measurement	Construct validity (Spearman's rank correlation coefficients, r)	
Dawson et al., 2006, English (62, 63)	Patient undergoing hallux valgus surgery (n = 100)	W/S = 0.92 P = 0.86 SI = 0.73	-	W/S = 7.38 P = 8.10 SI = 11.92	MOXFQ-AOFAS MOXFQ-SF-36 W/S-PF = -0.68 W/S-RP = -0.58 W/S-BP = -0.54 W/S-PCS = -0.63 P-BP = -0.53 P-PCS = -0.52	MCID W/S = -16 P = -12 SI = -24 Best cut- points W/S=-15 P=-25 SI=-25
Dawson et al., 2011, English (17, 64)	Patient undergoing foot and ankle surgery (n = 671)	W/S = 0.93 P = 0.84 SI = 0.71	W/S = 0.96 P = 0.94 SI = 0.92	W/S = 5.70 P = 5.36 SI = 7.13	MOXFQ-AOFAS MOXFQ-SF-36 W/S-PF = -0.71 W/S-RP = -0.64 0.65 W/S-BP = -0.64 P-AOFAS = -0.28 to 0.50 SI-AOFAS = -0.23 to -0.45 P-BP = -0.64	MDC W/S = 11 P = 12 SI = 16 Effect size (9 months) W/S = 0.86 P = 1.10 SI = 0.87

Abbreviations: MOXFQ, Manchester Oxford foot Questionnaire; W/S, walking/standing; P, Pain; SI, social interaction; AOFAS, American Orthopaedic Foot and Ankle Society Scale; SF-36, the Medical Outcome Study Short-Form Survey; PF, physical functioning; RP, role physical; RE, role emotional; SF, social functioning; MH, mental health; BP, bodily pain; GH, general health perception; PCS, physical component summary

Statistical value: α , Cronbach's alpha coefficients; ICC, intraclass correlation coefficients; SRM, standardized response mean; MDC, minimal detectable change; MCID, minimal clinically important difference.

Table 7 The psychometric properties of the MOXFQ (Continued)

Authors, Year, Language	Participants (number of patients = n)	Reliability		Standard error of measurement	Validity		Responsiveness
		Internal consistency (α)	Test-retest (ICC)		Construct validity (Spearman's rank correlation coefficients, r)		
Marinozzi et al., 2009, Italian (98)	Patient undergoing hallux valgus surgery (n = 172)	W/S = 0.78	W/S = 0.85	MOXFQ-SF-36			
		P = 0.83	P = 0.86		W/S-PF = -0.60	SI-PF = -0.65	
		SI = 0.72	SI = 0.92		W/S-BP = -0.56	SI-BP = -0.70	
Mousavian et al., 2015, Persian (99)	Patients with chronic foot and ankle condition (n = 308)	W/S = 0.88	W/S = 0.89	MOXFQ-SF-36			
		P = 0.86	P = 0.85		W/S-SF = -0.58	SI-SF = -0.51	
		SI = 0.89	SI = 0.83		W/S-SF = -0.53	SI-BP = -0.59	
					W/S-BP = -0.58	SI-PCS = -0.51	
		W/S-PCS = -0.62					
		MOXFQ-AOFAS					
Garcés et al., 2016, Spanish (100)	Patients with primary foot and ankle surgery (n = 120)	W/S = 0.90	W/S = 0.97	MOXFQ-SF-36			
		P = 0.78	P = 0.95		W/S-PF = -0.69	Effect size (6, 12 months)	MDC 95%CI
		SI = 0.65	SI = 0.96		W/S-AOFAS = -0.47	W/S = 20.76	
		W/S = 7.49	P = 9.70	W/S-RP = -0.64	W/S = 2.6,3.0	P = 26.89	
		SI = 13.97	SI = 13.97	W/S-BP = -0.71	P = 2.3,2.7	SI = 38.72	
				P-AOFAS = -0.37	W/S-PCS = -0.68		
				SI-AOFAS = -0.48	SI-SF = -0.61		
					SI-SF = -0.61		

Table 7 The psychometric properties of the MOXFQ (Continued)

Authors, Year, Language	Participants (number of patients = n)	Reliability		Standard error of measurement	Validity		Responsiveness	
		Internal consistency (α)	Test-retest (ICC)		Construct validity (Spearman's rank correlation coefficients, r)	Effect size (6 months)		
Venkatesan et al., 2016 Dutch (101)	Patient undergoing hallux valgus surgery (n = 79)	W/S = 0.77 P = 0.86 SI = 0.74	W/S = 0.95 P = 0.98 SI = 0.95	-	MOXFQ-SF-36			-
					W/S-PF = -0.57	SI-PF = -0.64	SRM W/S = 0.96 P = 1.32 SI = 0.93 SI = 5.27	
					W/S-RP = -0.52	SI-RP = -0.63		
					W/S-SF = -0.61	SI-SF = -0.52		
					W/S-MH = -0.57	SI-MH = -0.64		
W/S-GH = -0.50	SI-GH = -0.53							
Arbab et al., 2017, German (104)	Patient undergoing foot and ankle surgery (n = 177)	W/S = 0.92 P = 0.83 SI = 0.70	W/S = 0.97 P = 0.94 SI = 0.92	W/S = 2.75 P = 2.33 SI = 2.26	MOXFQ-SF-36			MDC (90%CI) W/S = 6.42 P = 5.44 SI = 5.27
					W/S-PF = -0.66	SI-PF = -0.57		
					W/S-RP = -0.56	SI-RP = -0.63		
					W/S-BP = -0.67	SI-BP = -0.63		
					W/S-SF = -0.51	SI-SF = -0.52		
					W/S-PCS = -0.65	SI-PCS = -0.53		
					MOXFQ-FAOS			
					W/S-S = -0.49	SI-S = -0.46		
					W/S-P = -0.69	SI-P = -0.58		
					W/S-ADL = -0.70	SI-ADL = -0.59		
W/S-S/R = -0.68	SI-S/R = -0.64							
W/S-QOL = -0.69	SI-QOL = -0.72							
MOXFQ-NRS			SRM W/S = 1.18 P = 1.59 SI = 1.26					
W/S-NRS = 0.51	SI-NRS = 0.58	SI-NRS = 0.50						

Table 7 The psychometric properties of the original English version and the translated versions of the MOXFQ (Continued)

Authors, Year, Language	Participants (number of patients = n)	Reliability		Validity Construct validity (Spearman's rank correlation coefficients, r)	Responsiveness
		Internal consistency (α)	Test-retest (ICC)		
Park et al., 2017, Korean (103)	Patient with hallux valgus (n = 104)	W/S = 0.93	W/S = 0.82	MOXFQ-SF-36 W/S-PF = -0.75 P-PF = -0.65 SI-PF = -0.68	-
		P = 0.84	P = 0.81	W/S-RP = -0.61 P-RP = -0.52 SI-RP = -0.59	
		SI = 0.80	SI = 0.82	W/S-BP = -0.68 P-BP = -0.69 SI-BP = -0.56 MOXFQ-VAS P-VAS = 0.86	
Ruiz-Muñoz et al., 2019, Chinese (105)	Patient with hallux valgus (n = 369)	W/S = 0.98	W/S = 0.97	MOXFQ-FFI = 0.378 to 0.738	-
		P = 0.99	P = 0.99	MOXFQ-SF12-V2 = 0.104 to 0.719	
		SI = 0.98	SI = 0.98	MOXFQ-EQ-5D = 0.610 to 0.729	

2.6.2 Foot and Ankle Outcome Score

Previous studies reported the internal consistency of the FAOS. The level of Cronbach's alpha coefficients was acceptable which was ranged from 0.72 to 0.82 in the FAOS symptoms subscale on five domains including symptoms (0.88), pain (0.97), ADL (0.94), S/R (0.94), and QOL (0.97) (66). There are two items in symptoms domain that related to range of movement (67, 106). For the test-retest reliability, it demonstrated the good level with ICC of 0.78 for symptoms, of 0.86 for pain, of 0.70 for ADL, of 0.85 for S/R, and of 0.92 for QOL (20). However, there was conflicting evidence in the Thai version with ICC of 0.43 for symptoms, of 0.16 for pain, of 0.33 for ADL, of 0.10 for S/R, and of 0.06 for QOL (68). There was no evidence on standard error of measurement.

For convergent and divergent validity, the FAOS was frequently correlated with the SF-36, AOFAS, and VAS, resulting in moderate positive evidence. In the original version, the correlation coefficient was ranged from 0.58 to 0.67 when compared with the Karlsson and Peterson Scoring System for Ankle function (66). In addition, the five domains of FAOS had moderate to good relationship with the short-form health survey (SF-12) in physical functioning, role physical, bodily pain, social functioning, and physical component summary (PCS), while it had fair to little relationship with SF-12 in mental health, role emotional, vitality, and mental

component summary (MCS) (69). There was no evidence regarding the content validity and discriminative validity.

2.6.3 Foot and Ankle Ability Measure

Previous study reported the internal consistency of the FAAM with Cronbach's alpha coefficients of 0.98 on the activity of daily living (ADL) and sports domains (77). Regarding test-retest reliability, the ADL domain had ICC of 0.89 and the sport domain had ICC of 0.87. Standard error of measurement was 6.9 and 10 for ADL and sports domains, respectively. A total of 11 translated versions of the FAAM had acceptable level of the reliability. The Cronbach's alpha was ranged from 0.87 to 0.96 for the ADL and from 0.91 to 0.97 for the sports domain that demonstrated the good reliability. Similarly, test-retest reliability was considered as good reliability for ADL (ICC ranging from 0.53 to 0.98) and sports domain (ICC ranging from 0.49 to 0.98) (81-91). Only the German version reported the poor level in internal consistency (83).

Regarding convergent validity, the previous studies reported that both domains of FAAM has moderate to good relationship with physical function domain and physical component summary of the SF-36 (77). For divergent validity, the ADL and sports domain of the original version and translated versions of FAAM had little relationship with mental health, energy/vitality, role emotional domains and mental component summary of the SF-36 (81-91). The Spanish version of FAAM was

correlated with the EuroQol-5 Dimension (EQ5D), the ADL and the sports domain of FAAM was demonstrated correlation's coefficients with the EQ5D at -0.60 and -0.47, respectively (90). The systematic review founded that there was no report on content validity and criterion validity due to poor quality evidence (18). Additionally, there was no evidence founded on discriminative validity.

2.6.4 Comparison among three foot-specific questionnaires

The finding from the recently systematic review demonstrated that the FAOS, FAAM and Foot Function Index (FFI) have been commonly used in foot and ankle related journals. Among these three questionnaires, there was a lack of evidence regarding the psychometric properties of the FFI. Although a number of studies reported the psychometric properties of the FAOS and FAAM for foot and ankle evaluation, most of them reported negative evidence for the measurement properties (107). These results were similar to Jia's study in 2017, the FFI was extensively studied but the psychometric properties were still unclear, while the MOXFQ has the best overall psychometric properties due to high-quality evidence supported (18). The summary of quality of measurement properties based on the level of evidence per measurement property for the MOXFQ, FAOS, and FAAM is showed in Table 8.

Table 8 Quality of measurement for the MOXFQ, FAOS, and FAAM Adapted from Jia et al. (18)

Instruments	Reliability			Validity					
	Internal consistency	Test-retest reliability	Measurement error	Content validity	Structural validity		Hypothesis testing		Responsiveness
					validity	Discriminative	Divergent	Discriminative	
MOXFQ	++	++	++	0	++	+++	++	0	++
FAOS	---	+/-	?	?	++	++	++	0	?
FAAM	---	++	++	0	+++	--	++	?	?

'+++’ or ‘---’ strong evidence for positive or negative result due to consistent findings in multiple studies of good methodological quality or one study of excellent methodological quality

'++’ or ‘+-’ moderate evidence for positive or negative result due to consistent findings in multiple studies of fair methodological quality or one study of good methodological quality,

'+' or '-' limited evidence for positive or negative result due to one study of fair methodological quality

'+/-’ conflicting findings

'?' unknown due to studies of poor methodological quality

2.7 The psychometric properties of Thai version of foot-specific questionnaires

2.7.1 Thai version of FAAM

The translation and cross-cultural adaptation process were performed and tested for reliability and validity on 60 patients with musculoskeletal foot and ankle problems (Deformity, osteoarthritis, sport injury, nerve-related problems, and Achilles tendinopathy). The overall results showed that the Thai-FAAM maintained the characteristic of reliability and validity compared with the original version. ICC of ADL and sport subscales were reported at 0.80 and 0.77, respectively. Cronbach alpha of ADL and sport subscales were reported at 0.94 and 0.88, respectively. Regarding validity, the Thai-FAAM ADL and sport subscales were reported good relationship compared with the physical functioning subscale ($r = 0.59$ for ADL and 0.50 for sport) and PCS ($r = 0.54$ for ADL and 0.50 for sport) of the SF-36. On the other hand, the Thai-FAAM ADL and sport subscale were a low relationship with the SF-36 mental health subscale ($r = 0.30$ for ADL and 0.19 for sport) and MCS ($r = 0.36$ for ADL and 0.26 for sport) (13). The data of psychometric properties is showed in Table 9

2.7.2 Thai version of FAOS

The Thai-FAOS was tested in 44 patients with foot and ankle arthritis (Ankle osteoarthritis, hallux rigidus, Lesser metatarsophalangeal osteoarthritis, midfoot and hindfoot osteoarthritis). Reliability and validity were explained via test-

retest reliability, internal consistency and correlation with the Thai SF-36. ICC of ADL was significant at 0.33, whereas ICC of other subscales was no significant. Internal consistency was reported in high level at pain, ADL, S/P, QOL (0.79-0.96) and moderate level at symptoms subscale (0.58). Construct validity of Thai-FAOS was reported via subscale correlation. Pain, symptoms, ADL, QOL subscales were reported acceptable level of relationship with physical and mental component except for general health and vitality subscales of the SF-36. The Thai-FAOS S/P subscale was low relationship with all SF-36 subscales due to different perceptions between Thai and original populations (12). The data of psychometric properties is showed in Table 9.

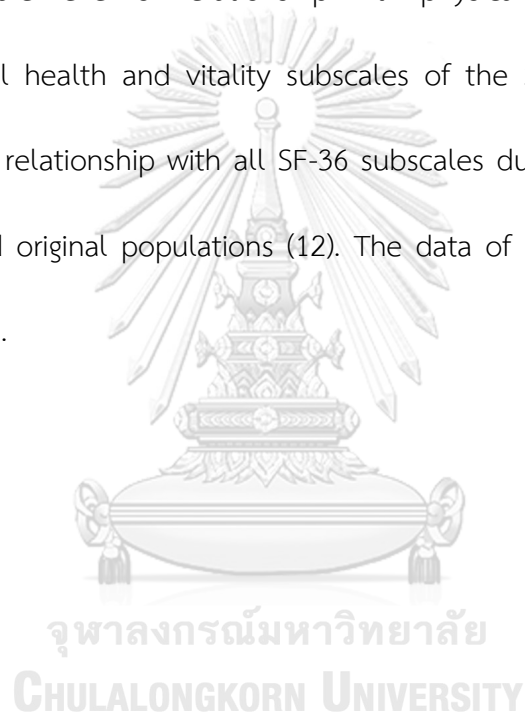


Table 9 The psychometric properties of Thai-FAOS and Thai-FAAM

Foot-specific questionnaire	Subscale	Reliability		Validity (Correlation with SF-36, r)			
		Test-retest ICC (95%CI)	Internal consistency (α)	Physical functioning	Mental health	PCS	MCS
Thai-FAOS (12)	Pain	0.16 (-0.14 to 0.43)	0.94	0.36	0.48	0.40	0.47
	Symptoms	-0.43 (-0.64 to -0.15)	0.58	0.40	0.41	0.40	0.47
	ADL	0.33 (0.04 to 0.57)	0.96	0.46	0.35	0.47	0.39
	Sport & Rec	0.10 (-0.20 to 0.38)	0.79	0.22	0.18	0.18	0.21
Thai-FAAM (13)	QOL	0.06 (-0.24 to 0.35)	0.93	0.40	0.21	0.39	0.30
	ADL	0.80 (0.66 to 0.88)	0.94	0.59	0.30	0.54	0.36
	Sport	0.77 (0.62 to 0.86)	0.88	0.53	0.19	0.50	0.26

Abbreviations: Thai-FAOS; Thai version of the Foot and Ankle Outcome Score, Thai-FAAM; Thai version of the Foot and Ankle Ability Measure, ADL; Activities of Daily Living, Sport & Rec; Sport and Recreational activities Statistical values: ICC; Intraclass Correlation Coefficient, 95%CI; 95% of confidence interval, α ; Cronbach's alpha coefficients, r; Pearson's correlation coefficients.

2.8 Cross-cultural adaptation of the health-related questionnaire

A health-related questionnaire is usually developed in the English language for English-speaking countries. In order to use a health-related questionnaire in non-English-speaking countries, the adaptation of the questionnaire is necessarily required. The researcher in non-English-speaking countries has two ways to apply the questionnaire to the target population, developing a new questionnaire and using a previous questionnaire (108). Using a previous questionnaire can save time and resources (109). The score from the completed questionnaire can then be compared with other studies that used the same questionnaire. The adaptation of the previous questionnaire has to concern about cultural and language differences between the original and target population. The term “cross-cultural adaptation” is referred to encompass a process that looks at both language (translation) and cultural adaptation issues in the process of preparing a questionnaire for use in another setting (110). The condition to use cross-cultural adaptation depends on the differences in culture, language, and country. There are four different scenarios about the requirement to use cross-cultural adaptation as showed in Table 10.

There are common guidelines of cross-cultural adaptation of the health-related questionnaire, including guideline from Guillemin (108), the American Association of Orthopaedic Surgeons (AAOS) (111), World Health Organization (WHO) guideline (112), and the International Society for Pharmacoeconomics and Outcomes

Research (ISPOR) guideline (113). The ISPOR guideline has been used by several studies, for example, the cross-cultural adaptation of the original version of the MOXFQ into Spanish version (100) and German version (104). The process and definition of each stage of ISPOR guideline are showed in Table 11. The definitions of the involved key actors are showed in Table 12.

Table 10 Requirement of cross-cultural adaptation in possible scenarios

Adapted from Guillemin et al, 1993 (108).

Wanting to use a questionnaire in a new population described as follows:	Results in a Change in . . .			Adaptation Required	
	Culture	Language	Country	Translation	Cultural Adaptation
Use in established immigrants in source country	✓	-	-	-	✓
Use in other country, same language	✓	-	✓	-	✓
Use in new immigrants, not English-speaking, but in same source country	✓	✓	-	✓	✓
Use in another country and another language	✓	✓	✓	✓	✓

Pharmacoeconomics and Outcomes Research (ISPOR) guideline was developed by the Translation and Cultural Adaptation (TCA) group which began at the ISPOR Third Annual European Congress in Antwerp in 1999. The TCA group consists of the pharmaceutical industry, academia, and contract research organizations. At the Third Congress, the TCA group conclude the problem of

methodological questions and definitions of translation and cross-cultural adaptation. In order to clarify the translation process and improve the quality of translation methodology, the TCA group decided to begin the new guideline development in 2001 (113).

The translation methodology of the ISPOR guideline consists of 10 stages that include preparation, forward translation, reconciliation, back translation, back translation review, harmonization, cognitive debriefing, review of cognitive debriefing results and finalization, proofreading, and final report, respectively (113).

Table 11 Explanation of the labels used to describe each step in the process

Adapted from Wild et al., 2005 (113)

Stages	Definitions
1) Preparation	Initial work carried out before the translation work begins.
2) Forward translation	Translation of the original language, also called source, version of the instrument into another language, often called the target language.
3) Reconciliation	Comparing and merging more than one forward translation into a single forward translation.
4) Back translation	Translation of the new language version back into the original language.
5) Back translation review	Comparison of the back-translated versions of the instrument with the original to highlight and investigate discrepancies between the original and the reconciled translation, which is then revised in the process of resolving the issues.
6) Harmonization	Comparison of back translations of multiple language versions with each other and the original instrument to highlight discrepancies between the original and its derivative translations, as well as to achieve a consistent approach to translation problems.

Table 11 Explanation of the labels used to describe each step in the process

Adapted from Wild et al., 2005 (113) (Continued)

Stages	Definitions
7) Cognitive debriefing	Testing the instrument on a small group of relevant patients or lay people in order to test alternative wording and to check the understandability, interpretation, and cultural relevance of the translation.
8) Review of cognitive debriefing results and finalization	Comparison of the patients' or lay persons' interpretation of the translation with the original version to highlight and amend discrepancies.
9) Proofreading	Final review of the translation to highlight and correct any typographic, grammatical or other errors.
10) Final report	Report is written at the end of the process documenting the development of each translation.

Table 12 Description of the key actors involved in the process

Adapted from Wild et al., 2005 (113)

Key actors	Definitions
1) Client	The person or group of people requiring or commissioning the translation of an instrument.
2) Instrument developer	Person or group of people who developed the original instrument being translated, and who may be responsible for the management of the instrument.
3) Project manager	The person coordinating the translation project, working at a CRO or other similar organization. He or she provides oversight at each stage of the process.

Table 12 Description of the key actors involved in the process

Adapted from Wild et al., 2005 (113) (Continued)

Key actors	Definitions
4) Key in-country consultant	The main contact person managing the process in the target country. This person is responsible (sometimes) for developing the first forward translation. He or she should be a native speaker of the target language, fluent in the source language, usually English, and should reside in the target country. He or she should come from a medical/health/psychology/social science background and have experience in translating/managing the translation of PRO measures.
5) Forward translators	The people who develop the second and subsequent forward translations. They should be professional translators, native speakers of the target language and fluent in the source language, usually English. Forward translators should reside in the target country and have experience in the translation of PRO measures.
6) Independent translator	A translator may be used to carry out the reconciliation. He or she should be a native speaker of the target language, be fluent in the source language, and reside in the target country, preferably with experience in the translation of PRO measures.
7) Back translators	The people who develop the translations from the target language back to the source language. They should be professional translators, native speakers of the language of the source measure, and fluent in the target language. They should have no prior knowledge of the measure and should not see the source or any other language version before or during back translation.
8) In-country consultant	An in-country person may be used to carry out the cognitive debriefing interviews. He or she should be a native speaker of the target language, be fluent in the source language, and reside in the target country, preferably with experience in qualitative interviewing and/or cognitive interviewing techniques.
9) Proofreaders	The people who check the final translation for typographic, grammatical, or other errors. They should be native speakers of the target language.

2.8.1 Preparation

The first stage of translation is preparation. The client or the project manager should complete this stage. In order to begin translation, the client or the project manager contact the developer to obtain permission to translate and use the original version of the questionnaire. This should be done before the translation begins. Then, the client or the project manager asks the developer to implicate in the translation process and provide the information about the conceptual basis for the items in the questionnaire (Concept elaboration document), this document should be required in forward translation stage. Furthermore, key in-country consultant should be recruited in this stage to work with the client or the project manager along the translation process.

2.8.2 Forward translation

In this stage, the original version of the questionnaire is translated into the target language at least two versions by two forward translators. One forward translator should be the key in-country consultant and the other one is the translator who is a native speaker in the target language and fluent in the source language. During the forward translation, two forward translators are informed about the concept elaboration document to improve understanding of the questionnaire.

2.8.3 Reconciliation

Two versions of the questionnaire are reconciled into a single forward translation that is called the “reconciled version” in this stage. Any discrepancies between two forward translations are resolved and applied to the reconciled version. The project manager should decide the decision at this stage. The reconciliation method should be performed under three approaches:

- 1) a translation panel consisting of the key in-country consultant, all of the forward translators, and the project manager
- 2) an independent native speaker of the target language who had not been involved in any of the forward translations
- 3) an appointed in-country investigator who may have prepared one of the forward translations, who will also conduct pilot testing and cognitive debriefing.

Furthermore, the key in-country consultant and the second forward translator should discuss providing the reconciled version. This stage has an objective to verify misinterpretation of the meaning and the biased translation from a single translator.

2.8.4 Back translation

The reconciled version of the questionnaire is translated into the source language, this should be completed by at least two translators who are called “back translator”. Two back translators have to be an individual translator which is a

native speaker in the source language and fluent in the target language. Each translator has to translate the questionnaire into the source language individually. The back translation stage has an objective to provide quality-control step among the meaning of the questionnaire when turned into the target language and back into the source language.

2.8.5 Back translation review

In order to ensure the conceptual equivalence, the project manager and the key in-country consultant review the back translation and the original version to identify any discrepancy. The project manager has to improve the reconciled version with the key in-country consultant. It may involve the developer to resolve the difficult problems.

2.8.6 Harmonization

The harmonization stage is a quality-control stage, this stage can be allocated in any stage of the translation process but have to communicate after the back translation review stage. All of the new translation and the original version are compared by the project manager and the key in-country consultant to identify and make a decision in any discrepancies. On the other hands, the harmonization can be completed by a group meeting that consists of the project manager and all back translators. Each back translator has to provide a verbal back translation with close attention of the project manager like interviewing to identify the discrepancies

between the original version, the back translation, and the verbal back translation. Then, the discrepancies are resolved and applied in the reconciled version of the questionnaire.

2.8.7 Cognitive debriefing

The reconciled version from the harmonization stage has evaluated the level of comprehensibility and cognitive equivalence of the translation on at least 10 respondents who is a similarity to the target population. The respondents should be native speakers of the target language. The respondents are asked to complete the reconciled version of the questionnaire by an in-country investigator who should be a native speaker of the target language, fluent in the source of language, and reside in the target country. The topic of interviews should consist of understanding of wording and sentence, wording suggestion for the improper word, and identifying the content of the questionnaire that confuses.

2.8.8 Review of cognitive debriefing results and finalization

As results of the cognitive debriefing stage, the respondent's comment is considered while comparing with the original version of the questionnaire by the project manager and the key in-country investigator. This can be ensured that the questionnaire in the target language has cultural relevance with the local culture. The respondent's comment should be regulated in the questionnaire under

consensus from the project manager and the key in-country investigator. At the end of this stage, the final version of the translated questionnaire should be obtained.

2.8.9 Proofreading

Although the final version of the questionnaire is translated and reviewed, it still has a risk of minor error. This stage has an objective to control the translation quality by correcting the mistake which has been overlooked in the previous stage. The project manager recruits the proofreader, who is a native speaker in the target language, to involve in the proofreading. The key in-country investigator and the proofreader have to recheck the final version of the questionnaire about typographic, spelling, diacritical, grammatical, and other errors.

2.8.10 Final report

The project manager writes a translation report that describes the definition of term and translation process, explain the methodology of translation, and represent wording decision along the translation process.

2.9 Conceptual framework

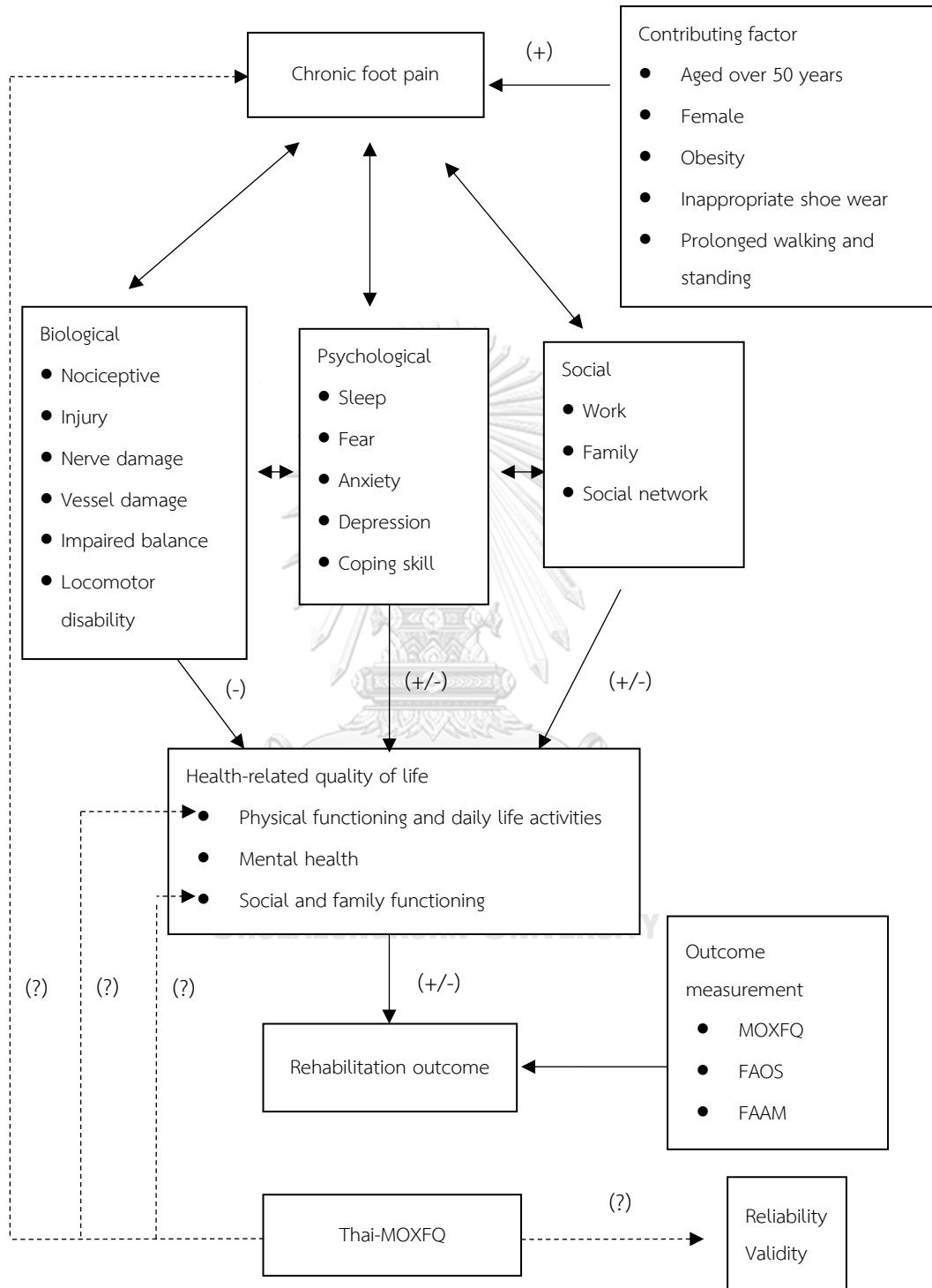


Figure 6 Conceptual framework of this study

Chapter 3

Research methodology

The methodology of research was divided into 3 studies. The first study was a translation and cross-cultural adaptation of the MOXFQ into Thai version. The second study was a study of the reliability of the Thai version of the MOXFQ. The third study was a study of the validity of the Thai version of the MOXFQ. The research methodology was approved by the Ethical Committee of Chulalongkorn University.

3.1 Translation and cross-cultural adaptation of the MOXFQ

To perform a cross-cultural adaptation of the MOXFQ from the original version into Thai version, the researcher obtained permission from the developer and agreed to apply the International Society for Pharmacoeconomics and Outcomes Research (ISPOR) guideline for the cross-cultural adaptation process (113). According to ISPOR guideline, there were be 10 stages in the cross-cultural adaptation process including preparation, forward translation, reconciliation, back translation, back translation review, harmonization, cognitive debriefing, review of cognitive debriefing results and finalization, and proofreading, respectively. This section was described each stage as participants and method. A summary of translation and cross-cultural adaptation of the MOXFQ is demonstrated in Figure 7.

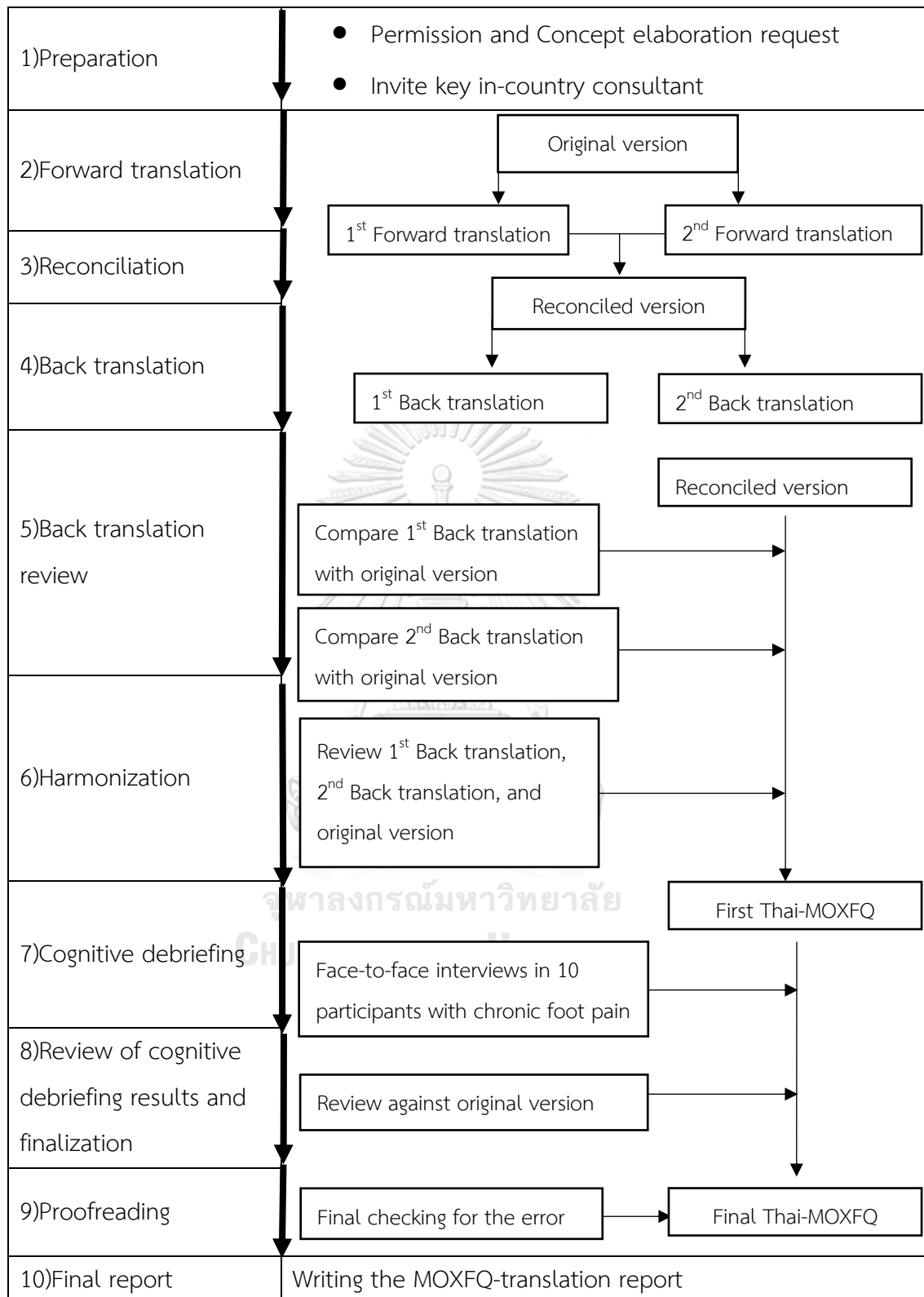


Figure 7 Translation and cross-cultural adaptation of the Thai-MOXFQ

3.1.1 Stage I: Preparation

1. Participants: the project manager (the main researcher), the key in-country consultant (Supervisor of the main researcher) and the developer (Dr. Matina Zakaria)
 - a. The project manager was a physical therapist in Thailand who had clinical experience about 2 years. The project manager was a native Thai speaker and fluent in the English language who had resided in Thailand.
 - b. The key in-country consultant was an academic researcher of the faculty of Allied Health Sciences at Chulalongkorn University who was a health professional in the field and fluent in the English language.
2. Method: The project manager contacted the developer for permission of using the original MOXFQ questionnaire and cross-culturally adapted it into the Thai version. The developer provided the concept elaboration, the document that described the conceptual explanation of sentences and wording of the original MOXFQ,
for using in the forward translation stage. Then, the project manager recruited the key in-country consultant for research collaboration during all of the translation processes.

3.1.2 Stage II: Forward translation

1. Participants: the key in-country consultant (from stage I), and one forward translator who had the following characteristics:
 - a. Native speaker of the Thai language (the target language)
 - b. Fluent in the English language (the source language)
 - c. Having experience in the translation of patient-reported outcome measure
 - d. No experience in completing the original version of the MOXFQ
2. Method: The key in-country consultant and the forward translator were asked for translating the original version of the MOXFQ into Thai version independently. To increase their understanding of the detail in the original questionnaire, the concept elaboration of the MOXFQ written by the developer was sent to both forward translators at the beginning of translation. The forward translations were developed by using the translation form. At the end of Stage II, two Thai-MOXFQ versions were obtained.

3.1.3 Stage III: Reconciliation

1. Participants: the key in-country consultant and the project manager
2. Method: The key in-country consultant reviewed the two Thai-MOXFQ versions obtained from Stage II and produced a reconciled version of the Thai-MOXFQ by discussion with the project manager. All of the comments were recorded and applied to the reconciled version of the Thai-MOXFQ.

3.1.4 Stage IV: Back translation

1. Participants: two back translators who had the following characteristics:
 - a. Native speaker of the English language
 - b. Fluent in the Thai language
 - c. No experience in completing the original version of the MOXFQ
2. Method: The reconciled version of the Thai-MOXFQ was sent to two back translators. Two back translators were asked to translate the reconciled version of the Thai-MOXFQ into the English language individually. At the end of Stage IV, two English-MOXFQ versions were obtained.

3.1.5 Stage V: Back translation review

1. Participants: The developer (Dr.Martina Zagaria), the project manager and the key in-country consultant (from stage I)
2. Method: Each English-MOXFQs version was reviewed and compared with the original version by the key in-country consultant and the project manager. Any discrepancies and questions in meaning and terminology were considered, and the project manager made resolutions. All of the comments were applied to Thai-MOXFQ version. Two English-MOXFQ versions were be referred to the developer to recheck the conceptual equivalence of the questionnaire. Discrepancies between the original version and each English-MOXFQ version were identified.

3.1.6 Stage VI: Harmonization

1. Participants: The project manager and the key in-country consultant
2. Method: The project manager and the key in-country consultant reviewed the all-new translation and the original version to identify the wording problems for all language. All of the comments were applied to refine the Thai-MOXFQ version.

3.1.7 Stage VII: Cognitive debriefing

1. Participants: The project manager and 10 patients with foot pain problems.
2. Method: Ten patients with foot pain problems were recruited by the following criteria Table 13. The project manager asked each patient with all items of the first Thai-MOXFQ using face-to-face interview process. The project manager gathered information about time to complete, understanding of wording and sentence, and wording suggestion for the improper words. All of the comments were recorded.

Table 13 Inclusion and exclusion criteria in the cognitive debriefing stage

Inclusion criteria	Exclusion criteria
<ul style="list-style-type: none"> ● Aged 18-60 years ● Able to read and write in Thai language ● Have foot and/or ankle pain(s) for at least 3 months ● Have pain intensity at foot more than 20 mm when measured by the Visual Analogue Scale (VAS) (114) ● Able to complete the questionnaires individually 	<ul style="list-style-type: none"> ● Have a diagnosis of mental problem(s) ● Have a diagnosis of neurological problem(s) ● Have pain(s) at other areas in lower limb except foot during weight-bearing (VAS more than 20 mm) (114) ● Have surgical experience at foot and/or ankle ● Have a diagnosis of underlying disease(s) including gout, rheumatoid arthritis and diabetes mellitus.

3.1.8 Stage VIII: Review of cognitive debriefing results and finalization

1. Participants: The project manager and the key in-country consultant
2. Method: The project manager and the key in-country consultant reviewed the report in the cognitive debriefing stage against the original version. Any comments were discussed until reaching a consensus. The revisions were applied to the first Thai-MOXFQ and the pre-final version of Thai-MOXFQ was finally available.

3.1.9 Stage IX: Proofreading

1. Participants: The key in-country consultant and a proofreader who had the following characteristics:
 - a. Native speaker of the Thai language
 - b. Having at least 3 years of Thai-English translation experience
 - c. Not related in the prior stage
2. Method: The pre-final version of Thai-MOXFQ, the original version of the MOXFQ, and the concept elaboration were sent to the key in-country consultant and the proofreader for checking any remaining spelling, diacritical, grammatical, or other errors. After the Stage IX, the final version of Thai-MOXFQ was obtained. Additionally, the report of the cross-cultural adaptation process plus an item-by-item representation of all translation decisions undertaken throughout the process was sent to the developer.

3.2 Reliability study of the Thai-MOXFQ

In this study, the reliability values were determined as test-retest reliability and internal consistency. The Thai-MOXFQ was tested in 100 individuals with chronic foot pain. There were two sessions of data collection that conducted together with validity study.

3.2.1 Study design

A measurement study design

3.2.2 Participants

This study recruited potential participants from physical therapy clinics and community-based settings located in Bangkok and suburb. Individuals with chronic foot pain were considered potential participants. Information of participant invitation and research details were distributed to the potential participants via research information sheets and consent forms, respectively. The project manager or research assistants made an appointment with the potential participants for screening and data collections.

3.2.3 Inclusion criteria

- 1) Aged 60-18 years
- 2) Able to read and write in Thai language
- 3) Have foot and/or ankle pain(s) for at least 3 months
- 4) Have pain intensity at foot more than 20 mm when measured by VAS (114)
- 5) Able to complete the questionnaires individually

3.2.4 Exclusion criteria

- 1) Have a diagnosis of mental problem(s)
- 2) Have a diagnosis of neurological problem(s) including Stroke, Parkinson's disease, Multiple sclerosis
- 3) Have pain(s) at lower back, hip, thigh, knee, and shin during weight-bearing (VAS more than 20 mm)
- 4) Have surgical experience at foot and/or ankle
- 5) Have a diagnosis of underlying disease(s) including Gout, Rheumatoid arthritis and Diabetes mellitus.

3.2.5 Sample size calculation

For the internal consistency study, the sample size was based on formula from Bonett (115). The power was set at 0.90 (Power = $1-\beta$) and probability of type I error (α) was set at 0.05. K-value was determined at 16 from the number of items in the MOXFQ. The value of Cronbach's alpha at null hypothesis (CA0) and the

expected value of Cronbach's alpha (CA1) were set at 0.0 and 0.7, respectively. The formula of sample size calculation was presented in Figure 8. The minimum sample size was determined at 18 participants for calculating Cronbach's alpha coefficient. However, this study was conducted with the validity study that required at least 100 participants. This study required 100 participants with chronic foot pain for internal consistency evaluation.

$$n = \left[\left\{ \left(\frac{2k}{k-1} \right) (Z_{\alpha/2} + Z_{\beta})^2 \right\} \div \ln(\delta)^2 \right] + 2$$

Where

$$\delta = \frac{1 - CA_0}{1 - CA_1}$$

Figure 8 Sample Size Calculation Based on Formula by Bonett

For the test-retest reliability study, the sample size was calculated from the minimum number of participants that reported in the test-retest reliability of the Persian version of MOXFQ. The data of 30 participants were analysed for ICC values and reported between 0.83-0.89 of ICC (20). Thus, this study recruited 30 participants for test-retest reliability study.

3.2.6 Instruments

- The Screening Form (Appendix F)

There were six items about inclusion/exclusion criteria. Potential participants answered this form before data collection. Each item was answered in the dichotomous data except for the VAS. The VAS item asked the participants to rate their pain intensity, i.e., “Do you have foot pain? If yes, please specify the pain level”. After the Screening form was completed, potential participants were considered for inclusion or exclusion criteria.

- The Demographic Form (Appendix G)

This form aimed to gather descriptive data. This form consisted of 4 questions that asked about age, sex, weight, and height.

- The Thai-MOXFQ (Appendix D)

A region-specific questionnaire contained 16 items asking information on foot pain, walking/standing, and social interaction subscales that can be responded to each item in 5 levels from none of the time to all of the time. This questionnaire was translated and cross-cultural adaptation from English to Thai version.

- The Screening Form for reliability study (Appendix H)

There were two items that evaluate the consistency of participant's condition. This form asked about foot pain intervention and foot pain symptom over

the last 48 hours. This Screening Form identified the participants with a stable condition that required in process.

3.2.7 Methods and measurements

The methodology of this study was approved by the Ethical committee of Chulalongkorn University prior to the study. Six research assistants were recruited from physical therapists with at least 3-year of clinical experience in three physical therapy clinics. They had roles for participant screening and data collection. They were practised about screening potential participants (using the consent letter, demographic form, screening form, and screening form for reliability study) and completing the Thai-MOXFQ.

The screening and data collection phases were performed three physical therapy clinics including:

- Physical therapy clinic at the National Stadium, Bangkok
- Physical therapy clinic at the Faculty of Allied Health Science, Chulalongkorn University, Bangkok
- Fixme Medical and Physio Clinic (Physical therapy clinic), Bangkok

There were two sessions in the reliability study: baseline and re-assessment. The baseline assessment was performed by the project manager or research assistants. The potential participants had to agree and sign the consent form before

the screening process. Then, potential participants were screened by screening and demographic forms. The participants who passed the screening were diagnosed as having foot problems by the research assistants. Then, the participants completed Thai-MOXFQ for the baseline assessment. The participants were asked to refrain from foot pain intervention before the reassessment. The interval time ranged 2-14 days during the two assessments. At the beginning of reassessment, each participant was asked to complete the Screening Form for reliability study. The screening form of reassessment consisted of two exclusion criteria following:

- Foot and/or ankle pain(s) intensity changed over time. (VAS change more than 8 mm.) (116)
- Receive any physical or medical interventions between the sessions.

Finally, the participants who passed the 2-item criteria were asked to complete the Thai-MOXFQ. The methodology of reliability study is showed in Figure 9.

3.2.8 Statistical analysis

Raw data from the Thai-MOXFQ were transformed into a spreadsheet of Microsoft Excel 365. Statistical analysis was calculated by SPSS version 22. A p-value < 0.05 was considered to statistically significant. The demographic data was calculated via descriptive statistic.

3.2.8.1 Test-retest reliability

A score of each dimension of the Thai-MOXFQ was assessed for test-retest reliability using the intraclass correlation coefficient (ICC). This study was identified the ICC model as ICC (3,1) and absolute agreement. Data analysis used the score of the Thai-MOXFQ at the 1st and 2nd sessions. ICC range from 0 to 1 was regarded as no reproducibility to perfect reproducibility, respectively. ICC values of above 0.7 to 1 were considered acceptable (96).

3.2.8.2 Internal consistency coefficient

Internal consistency was assessed by Cronbach's alpha coefficient for each dimension of the Thai-MOXFQ at the 1st session. A range of Cronbach's alpha coefficient was reported between 0 to 1. The acceptable level of Cronbach's alpha coefficient was over 0.7 and not more than 0.9. Cronbach's alpha coefficient over 0.9 was considered as redundancy (95).

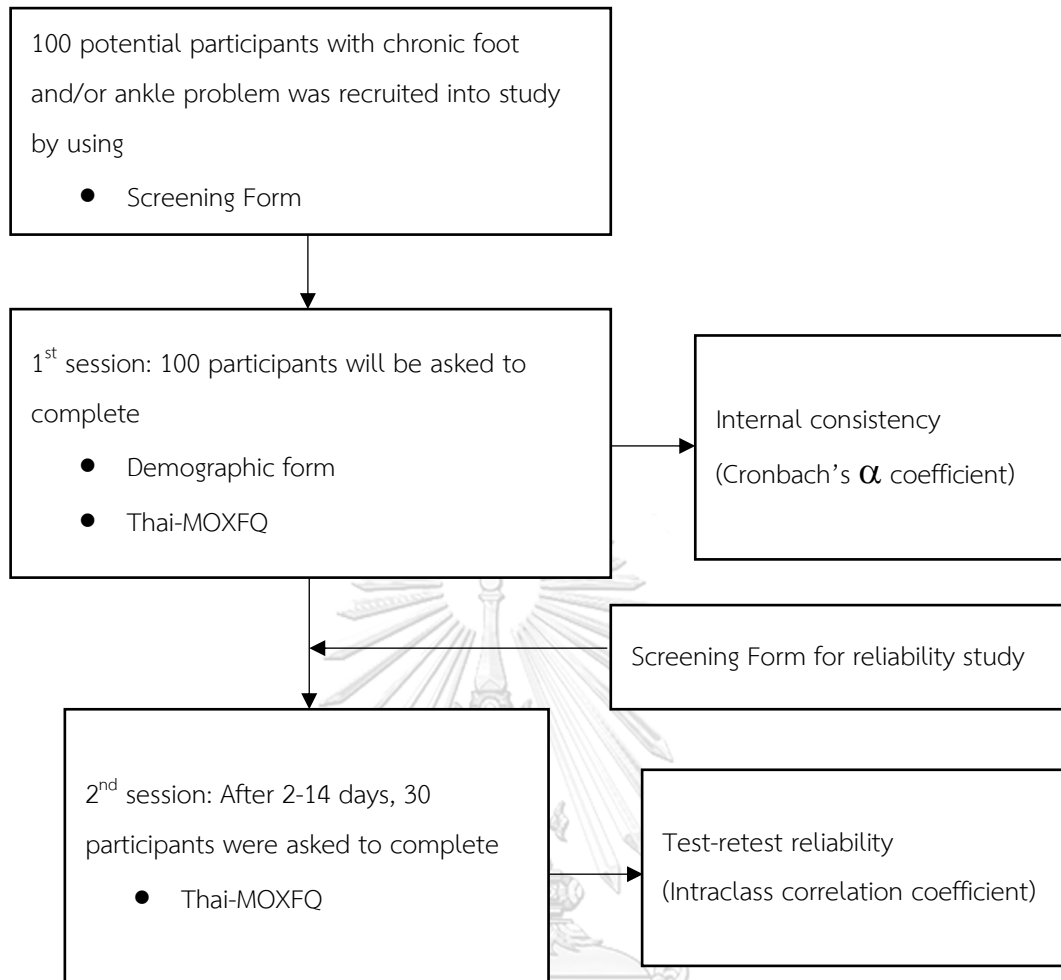


Figure 9 Reliability study of Thai-MOXFQ

3.3 Validity study of the Thai-MOXFQ

This study aimed to provide construct validity of the Thai-MOXFQ in individuals with chronic foot pain. Three subscales of the Thai-MOXFQ, i.e., pain, walking/standing, and social interaction were determined in correlation with the VAS, Thai-FAAM, and SF-36, respectively. As showed in Table 9, the psychometric property of Thai-FAAM shows higher correlation with SF-36 than the Thai-FAOS. Therefore, the present study selected the Thai-FAAM for the investigation of the validity of walking/standing subscale in the Thai MOXFQ.

3.3.1 Study design

A measurement study design

3.3.2 Participants

This study recruited potential participants with chronic foot pain in community-based settings, for example, health clubs, sports centres, and rehabilitation centres located in Bangkok and suburb. Information on participant invitation and research details were distributed to the potential participants via the chiefs of the community-based settings. The project manager made an appointment with the potential participants for screening and data collections. A total of 100 participants took part in the validity study.

3.3.3 Inclusion criteria

The inclusion criteria were the same as the reliability study of the Thai-MOXFQ as follow

- 1) Aged 18-60 years
- 2) Able to read and write in Thai language
- 3) Have foot and/or ankle pain(s) for at least 3 months
- 4) Have pain intensity at foot more than 20 mm when measured by the Visual Analogue Scale (VAS) (114)
- 5) Able to complete the questionnaires individually

3.3.4 Exclusion criteria

The exclusion criteria were the same as the 1st session exclusion criteria of the reliability study of the Thai-MOXFQ as follow

- 1) Have a diagnosis of mental problem(s)
- 2) Have a diagnosis of neurological problem(s) including Stroke, Parkinson's disease, Multiple sclerosis
- 3) Have pain(s) at lower back, hip, thigh, knee, and shin during weight-bearing (VAS more than 20 mm) (114)
- 4) Have surgical experience at foot and/or ankle
- 5) Have a diagnosis of underlying disease(s) including Gout, Rheumatoid arthritis and Diabetes mellitus

3.3.5 Sample size calculation

The sample size was calculated based on the previous study that reported 92% of patient-reported outcome measure articles had the ratio of subject to items was 2 and 90% of the article had at least 100 participants or greater (117). Therefore, this study was recruited 100 participants with chronic foot pain.

3.3.6 Instrument

- Thai-MOXFQ, as adapted by the present study
- Thai-FAAM (Appendix I)

The Thai-FAAM is a 29-item questionnaire that is divided into 21 items of activities of daily living and 8 items of sport activities. Each item can be scored with five choices that defines level of difficulty from 4 (no difficulty) to 0 (unable to do) and non-applicable choice (scores are not be calculated in a total score of each subscale). The actual score is transformed into 100 percentage by the highest potential score. A missing item is considered as non-applicable.

- Thai SF-36 (Appendix J)

A general questionnaire with 36 items that is frequently used in clinical practice and research. This questionnaire intends to assess the general health and quality of life with eight subscales (physical functioning, role physical, role emotional, social functioning, mental health, energy/vitality, bodily pain, and general health

perception). A raw score of each subscale is converted to a metric of 0-100 with higher score represents higher quality of life. Additionally, all subscales can be divided into the physical and mental summary components. The score of missing items is calculated from the average score from other items in same subscale.

3.3.7 Methods and measurements

The screening and data collection of validity study were performed at 3 physical therapy clinics same as the reliability study. The research assistants were the same persons as the reliability study. They had the same roles for participants screening and data collection. They were given information about how to screen the potential participants (using the consent letter, demographic form, and screening form) and how to complete each questionnaire in the validity study.

The validity study of the Thai-MOXFQ was conducted together with the reliability study. The consent letter, screening form, demographic form, and the Thai-MOXFQ were used the same as in the reliability study at the baseline assessment. The participants were passed physical diagnosed before completing the Thai-MOXFQ, Thai-FAAM and Thai SF-36 individually. If participants had any problems, the researcher team provided the information until the SF-36 and the Thai-FAAM were completed. These questionnaires were rechecked for missing items after completion. The methodology of the validity study is showed in Figure 10.

3.3.8 Statistical analysis

Raw data from the questionnaire were transformed into a spreadsheet of Microsoft Excel 365. Statistical analysis was calculated by SPSS version 22. A p-value < 0.05 considered to statistically significant. The data of VAS was gathered from the Screening Form. The data of Thai-MOXFQ at the first session in the reliability study was correlated with the Thai-FAAM, Thai SF-36, and VAS.

3.3.8.1 Construct validity

Spearman's rank correlation coefficient was calculated to examine the construct validity among the Thai-MOXFQ, Thai-FAAM, Thai SF-36, and VAS. The score from pain, walking/standing, and social interaction subscales of Thai-MOXFQ were analysed with the VAS, all SF-36 subscales (physical functioning, role physical, role emotional, social functioning, mental health, energy/vitality, bodily pain, and general health perception), and all Thai-FAAM subscales (ADL and sport subscale). The correlation coefficient value was interpreted in the direction and magnitude of relationship. The positive and negative values were defined in the correlative direction in the same way and opposite way, respectively. The negative value was presented in relationship when compare Thai-MOXFQ with Thai SF-36 and Thai-FAAM. The positive value was presented in relationship between Thai-MOXFQ and the VAS. The range of value from 0 to 1 was defined as the

magnitude of relationship. A value above 0.5 was considered an acceptable level of relationship (32).

In the present study, the Thai-MOXFQ was expected to maintain characteristic of the original version. The walking/standing subscale of Thai-MOXFQ was expected to demonstrate good relationship with the activities of daily living subscale of the Thai-FAAM, physical functioning and role physical subscale of SF-36. The pain subscale of the Thai-MOXFQ was expected to demonstrate good relationship with the VAS, bodily pain of the Thai SF-36. The social interaction subscale of the Thai-MOXFQ was expected to demonstrate fair to poor relationship with Thai SF-36 in all subscale

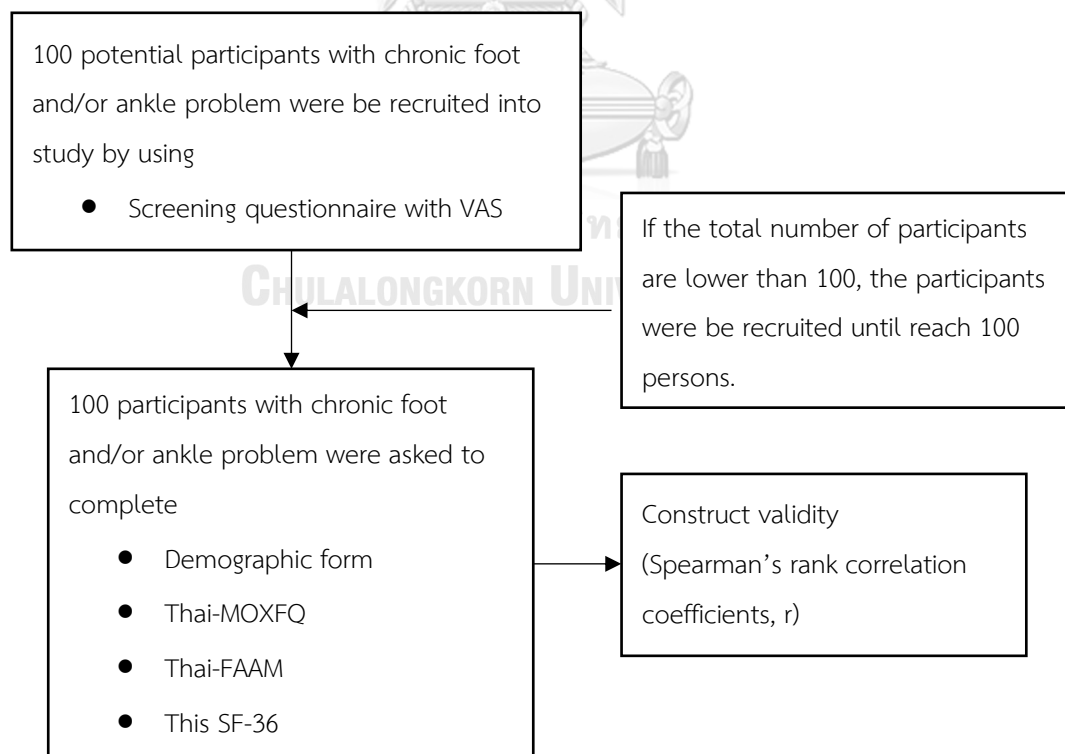


Figure 10 Validity study of the Thai-MOXFQ

CHAPTER 4

Results

4.1 Cross-cultural adaptation of the Thai-MOXFQ

The translation and cross-cultural adaptation were performed in August 2019 and finished in October 2019. The researcher translated the MOXFQ into Thai version with the ISPOR guideline. In the preparation (Stage I), the permission to use MOXFQ was allowed by the developer. The key in-country consultant, Praneet Pensri, agreed to provide supervision during each translation stage. In stage II, two forward translators were recruited to translate the original MOXFQ individually. The first forward translator (Stage II) was the key in-country consultant while the second forward translator was a lecturer from Chulalongkorn University Language Institute. They were native Thai speaker who experienced the English-Thai translation. Then, the two Thai versions of MOXFQ was reconciled by the key in-country consultant and researcher in stage III. Regarding back translation (Stage IV) the Thai reconciled version was back translated to English via two back translators. Two native English translators who fluent in Thai was recruited in this stage. The first back translator was a lecturer from Chulalongkorn University Language Institute. The second back translator was the bilingual lecturer who has experienced in Thai-English teaching and translation for more than 5 years. The second translator was recruited from an

outsourced unit. They were blinded to the original version of MOXFQ. The back translation review, Stage V, was performed by comparing the original version of MOXFQ with two back translations with developer supervision. All instructions, questions, and choices were approved by the developers. The harmonization, Stage VI, was performed via the key in-country consultant and researcher. The original version, two forward versions, reconciled version, back versions were compared with each other to identify wording errors and misunderstandings. In cognitive debriefing (Stage VII), the first Thai-MOXFQ was obtained and tested in 10 individuals with chronic foot pain. The face-to-face interview was performed via the project manager that focuses on wording and understanding. Next, review of cognitive debriefing results and finalization (Stage VIII), all comments from the previous stage were discussed and applied in the first Thai-MOXFQ. The first Thai-MOXFQ was reviewed via the proofreader, a Thai physiotherapist who experienced in English-Thai translation before the finalization (Stage IX). The Thai-MOXFQ was successfully translated with minor changes due to cultural differences. No MOXFQ items were removed during the translation. The time to complete Thai-MOXFQ ranged from 3 to 7 minutes. There were some items that were adapted during translation. Considering item 8, I catch the bus or use the car instead of walking, because of pain in my foot/ankle, the bus and car were adapted to vehicle. In items 9-10, the word "Self-conscious" was changed to worried and anxiety in Thai language. The word "Shooting pain",

suddenly onset of pain, was adapted in to “Sharp pain”. The results of this study were reported in APPENDIX E.

4.2 Reliability study

The data collection was performed during February to November of 2020. In order to assess test-retest reliability, this study recruited 50 participants with chronic foot pain via convenience sampling. 13 participants were excluded due to having low back pain, knee pain, duration of foot pain lower than three months, diagnosis of diabetes mellitus. 37 participants completed Thai-MOXFQ at the baseline. At the reassessment, 37 participants were required to retest the Thai-MOXFQ. However, seven participants were excluded due to getting intervention and having decreased pain level. Finally, there were 30 participants who completed baseline assessment and reassessment.

4.2.1 Participant's characteristics of test-retest reliability

A group of 30 participants with chronic foot pain were included in this study. The mean age of the group was 40.17 ± 13.72 years. The mean value of BMI was 26.05 ± 5.12 kg/m². The participants were received physical examination performed by experienced physical therapists and classified into 4 groups including plantar fasciitis, tendinopathy, hallux valgus, and ankle instability. A summary of participant's characteristics of test-retest reliability is reported in Table 14.

Table 14 Participant's characteristics of test-retest reliability (n=30)

Variables	Participants with Chronic Foot Pain	
	n	Mean (SD)
Gender		
Female	18	-
Male	12	-
Age (year)	-	40.17 ± 13.72
Weight (kg)	-	71.23 ± 20.57
Height (cm)	-	164.80 ± 10.37
Body mass Index (kg/m ²)	-	26.05 ± 5.12
Physical therapy diagnosis		
Plantar fasciitis	18	-
Tendinopathy	8	-
Hallux valgus	2	-
Ankle instability	2	-

4.2.2 Test-retest reliability of the Thai-MOXFQ

The score of Pain, Walking/Standing, Social interaction subscales, and total score of Thai-MOXFQ were compared between baseline and reassessment. Test-retest reliability was evaluated via ICC_{3,1}. The ICC of the Thai-MOXFQ subscales ranged from 0.763 to 0.833 while the ICC of the total score was 0.823. All MOXFQ subscales and total score demonstrated high level of test-retest reliability (ICC > 0.75). These results are reported in Table 15.

4.2.3 Internal consistency

The internal consistency of the Thai-MOXFQ was conducted together with the validity study. The data of 100 participants who passed eligibility criteria and took part in the validity study were calculated for the internal consistency item-by-item to represent internal consistency of the Thai-MOXFQ. Cronbach's alpha coefficients of the Thai-MOXFQ varied from 0.738-0.871. All subscales demonstrated high level of internal consistency ($0.7 < \alpha < 0.9$). Three MOXFQ's subscales were considered as acceptable level and no redundancy. Table 16 shows Cronbach's alpha coefficients of Thai-MOXFQ.

Table 15 Test-retest reliability of the Thai-MOXFQ (n = 30)

	Mean (SD)		ICC (95% CI)	p-value
	Baseline	Reassessment		
Thai-MOXFQ				
Walking/Standing	54.05 ± 21.22	50.37 ± 19.60	0.833 (0.677-0.917)	<0.001
Pain	55.50 ± 17.29	53.42 ± 15.92	0.763 (0.550-0.881)	<0.001
Social Interaction	49.17 ± 18.62	46.60 ± 21.29	0.779 (0.589-0.888)	<0.001
Total	53.28 ± 16.53	49.47 ± 16.52	0.823 (0.645-0.914)	<0.001
VAS	49.80 ± 17.02	47.17 ± 15.20	0.941 (0.880-0.972)	<0.001

Table 16 Internal consistency of Thai-MOXFQ (n = 100)

Thai-MOXFQ	Cronbach's alpha coefficients; α
Walking/Standing	0.871
Pain	0.738
Social Interaction	0.748

4.3 Validity study

The data collection of this validity study was conducted during August to October 2019. This study recruited 100 participants with chronic foot pain. Chronic foot pain was reported 38 on left foot and 62 on right foot. The mean age of the 100 participants was 40.26 ± 12.13 years. The participants were diagnosed into plantar fasciitis (n = 63), tendinopathy (n = 18), ankle instability (n = 9), tarsal tunnel syndrome (n = 4), ankle impingement (n = 3), hallux valgus (n = 2), and metatarsalgia (n = 1). Participant's characteristics are demonstrated in Table 17.

Table 17 Participant's characteristics of validity study

Variables	Participants with Chronic Foot Pain	
	n	Mean (SD)
Gender		
Female	56	-
Male	44	-
Age (year)	-	40.26 ± 12.13
Weight (kg)	-	67.94 ± 15.44
Height (cm)	-	164.80 ± 9.08
Body mass Index (kg/m^2)	-	24.85 ± 4.17
Physical therapy diagnosis		
Plantar fasciitis	63	-
Tendinopathy	18	-
Ankle instability	9	-
Tarsal tunnel syndrome	4	-
Ankle impingement	3	-
Hallux valgus	2	-
Metatarsalgia	1	-

Table 18 Mean score of Thai-MOXFQ, Thai-FAAM, SF-36, and VAS in Validity study

Questionnaires	Mean score (SD)
Thai-MOXFQ	
Walking/Standing	54.65 ± 18.24
Pain	59.40 ± 15.01
Social interaction	52.25 ± 18.30
Total	55.41 ± 14.83
Thai-FAAM	
ADL	73.52 ± 18.77
Sport	60.00 ± 24.31
Thai SF-36	
Physical component summary	60.81 ± 18.45
Mental component summary	67.33 ± 17.60
VAS	54.45 ± 16.29

Table 18 demonstrated mean scores of Thai-MOXFQ, Thai-FAAM, SF-36, and VAS reported by 100 participants with chronic foot pain. The mean value of Thai-MOXFQ was 55.41 ± 14.83. The mean of VAS was 54.45 ± 16.29 that same level as Thai-MOXFQ. The higher score of Thai-MOXFQ and VAS refer higher severity that opposite to the Thai-FAAM and Thai-SF36. Mean of Thai-FAAM ADL and sport subscales were reported as 73.52 ± 18.77 and 60.00 ± 24.31, respectively. Thai SF-36 was reported mean of PCS as 60.81 ± 18.45 and MCS as 67.33 ± 17.60.

Construct validity of Thai-MOXFQ, Thai-FAAM, VAS, and SF-36 is reported in Table 19. Spearman's correlation coefficient was performed to examine correlation coefficients (r). Correlation of the Thai-MOXFQ was positive direction with the VAS while negative direction was reported in the Thai-FAAM and the Thai SF-36.

Correlation coefficients of the Thai-MOXFQ demonstrated moderate level when compared with the Thai-FAAM sport, the VAS, and the Thai SF-36 MCS. This study found good relationship of the Thai-MOXFQ with the Thai-FAAM ADL (-0.711), Sport (-0.543), VAS (0.598), Thai SF-36 PCS (-0.681) and MCS (-0.594).

The Spearman's rank correlation coefficients between subscales were calculated, as seen in Table 20. Thai-MOXFQ walking/standing subscale showed moderate relationship with FAAM activities daily life and physical function, role physical, bodily pain, and social functioning domain of SF-36. Pain subscale demonstrated moderate relationship with FAAM activities daily life, SF-36 bodily pain and social functioning, and VAS. Social interaction subscale showed correlated with SF-36 bodily pain and social functioning domains. The results of plantar fasciitis group were in line with all participants results. Considering all groups, walking/standing subscale showed moderate to good relationship with Thai-FAAM ADL and SF-36 physical function. The Thai-MOXFQ pain showed moderate to good relationship with Thai-FAAM ADL, VAS, and SD-36 bodily pain in every groups.

Table 19 Construct validity of Thai-MOXFQ in total score

	Thai-FAAM		VAS	Thai SF-36	
	ADL	Sport		PCS	MCS
Thai-MOXFQ	-0.711*	-0.543*	0.598*	-0.681*	-0.594*

Spearman's rank correlation, * Correlation is significant at the 0.05 level (2-tailed).

Table 20 Construct validity of Thai-MOXFQ in subscale

Thai-MOXFQ subscales	Thai-FAAM		Thai SF-36									
			Physical Component Summary					Mental Component Summary				
	ADL	Sport	Physical function	Role physical	Bodily pain	General health	Role emotional	Social functioning	Mental health	Vitality		
Walking/Standing	-0.614*	-0.535*	0.484*	-0.573*	-0.505*	-0.543*	-0.467*	-0.418*	-0.526*	-0.425*	-0.378*	
Pain	-0.592*	-0.358*	0.582*	-0.490*	-0.483*	-0.636*	-0.456*	-0.432*	-0.533*	-0.360*	-0.366*	
Social Interaction	-0.607*	-0.511*	0.518*	-0.438*	-0.461*	-0.568*	-0.415*	-0.466*	-0.575*	-0.418*	-0.393*	

Spearman's rank correlation, * Correlation is significant at the 0.05 level (2-tailed).

CHAPTER 5

Discussion

The MOXFQ was developed from the previous version for assessing patient undergoing hallux valgus surgery. Each item was developed from interviewing participants with a wide range of foot conditions. In the first phase, the MOXFQ was reported to be reliable, valid and responsive in patients undergoing foot and ankle surgery (15). The MOXFQ was suggested to use in patient with foot and ankle conditions with supporting overall psychometric properties (18). The advantages of MOXFQ are short and simple to complete. The MOXFQ also contains social interaction subscales that specified on cosmesis and self-consciousness of foot and shoes.

This study translated the MOXFQ from original into Thai version by cross-cultural adaptation. The cross-cultural adaptation processes were carried out according to the International Society for Pharmacoeconomics and Outcomes Research (ISPOR) (29). The results showed that Thai-MOXFQ was successfully translated with minor change. The Thai-MOXFQ was tested in participants with chronic foot pain to prove that it could be measured in Thai populations. The Thai-MOXFQ demonstrated good level of reliability. The construct validity

showed moderate level of relationship when compared Thai-MOXFQ with FAAM, SF-36, and VAS.

Our study supported good level of test-retest reliability of Thai-MOXFQ. The ICC of Thai-MOXFQ subscales were reported from 0.83 of walking/standing, 0.76 of pain, 0.78 of social interaction, and 0.82 of Total score. These were similar to the results from the Italian (19), Persian (20), and Korean (25) versions of MOXFQ. The original version reported higher ICC ranges from 0.92 to 0.96 that related with the Spanish (21), Dutch (23), German (24), and Chinese (28) versions. In this study, the test-retest reliability was examined in individuals with chronic foot pain while the original version was examined in patients undergoing hallux surgery. The difference in participants might result in lower ICC values. The interval time ranges were stated at 2-14 day between baseline and reassessment. The 19 ± 4 days of interval time was reported in Chinese version. The screening criteria of reassessment was not reported in another version. This study used VAS to detect changes between baseline assessment and reassessment. The participants who VAS changed more than 8 mm were excluded. This could be bias in test-retest reliability results.

The internal consistency was confirmed in all subscales of Thai-MOXFQ that Cronbach's alpha (α) was reported at 0.871 of walking/standing, 0.738 of pain, and 0.748 of social interaction subscales. The Total score showed good internal consistency at 0.897. There was no item's redundancy for Thai-MOXFQ. Compared to

the original version, pain and social interaction subscales of Thai-MOXFQ were similar results. Walking/standing of original MOXFQ was reported Cronbach's alpha over 0.9 which similar to Korean (25) and Spanish versions(21). Our results were in line with the Italian (19), Persian (20), Dutch (23), and Spanish (21) ($0.7 < r < 0.9$). Chinese version reported the highest internal consistency that r ranges 0.98-0.99 of all subscales (28). There was no removed item in all versions of MOXFQ.

Regarding validity study, this study recruited participants with chronic foot pain whereas the participants undergoing hallux valgus surgery were recruited in the original version. This study also identified the participants as overweight conditions (BMI 24.85 ± 4.17 kg/m²). The diagnosis classified by a physical therapist showed that 61% of participants were identified as having plantar fasciitis. This difference in medical condition and BMI might alter in construct validity when compared with the original version.

The Thai-MOXFQ pain subscale and VAS showed an acceptable level of construct validity ($r = 0.65$). The level of relationship was lower than the Korean version ($r = 0.86$) (25). The Korean version recruited participants with hallux valgus that specifically when compared with this study. The Thai-MOXFQ could be responded by frequency of symptoms that different from level of pain intensity in the VAS. These might result in moderate positive relationship between the pain subscale of Thai-MOXFQ and the VAS. The previous study correlated MOXFQ with

another pain measurement, the numerical rating scale (NRS), reported acceptable level of relationship ($r = 0.578$) (118). In this study, the Thai-MOXFQ pain subscale and bodily pain of SF-36 showed similar results to the original version as hypothesis. The study of original version reported a negative relationship that reported of r at -0.53 and -0.64 (15, 119). In SF-36, pain was asked about intensity and activity limitation aspects that was different from frequency of pain in Thai-MOXFQ.

Regarding walking/standing subscale, the Thai-MOXFQ showed moderate relationship with ADL and sport subscales of FAAM. FAAM could be respond by difficulties while MOXFQ could be answer in a form of frequency of pain that affected on each activity. When compared with SF-36, bodily pain, physical functioning, role physical, and social functioning were reached an acceptable level with Thai-MOXFQ walking/standing subscale. These results supported construct validity of the Thai-MOXFQ. These were in line with the original version that compared MOXFQ with SF-36. The MOXFQ showed good relationship with corresponding subscales of other foot-specific questionnaires. MOXFQ showed good correlated with the American Orthopaedic Foot and Ankle Society Scale (AOFAS) in the original and Spanish versions (15, 21, 119). The German version compared MOXFQ with the FAOS that showed good relationship with activity of daily living subscale (ADL) of FAOS (24). The MOXFQ was correlated with FAOS and Self-Reported Foot and Ankle Outcome Score (SEFAS) that reported good relationship

with FAOS-ADL and functional limitation of SEFAS (118). MOXFQ walking/standing had been correlated with other foot-specific questionnaire that reached acceptable level of correlation.

This study found acceptable relationship between MOXFQ social interaction with SF-36 bodily pain and social functioning. These results were similar to the Italian version which demonstrated that participants were female more than male (19). Our study reported that there were no different between male and female. The original MOXFQ showed low relationship between social interaction subscale and all SF-36 domains (r of -0.038 to -0.367)(15). Later, the MOXFQ was correlated with physical component of SF-36 in participants undergoing foot and ankle surgery. The relationship was reported at moderate level (r of -0.538 to -0.541) (119). This study recruited participants with chronic foot pain that did not involve surgery. Our participants may concern regarding their participation in work and recreational activities more than foot and shoes cosmesis compared to patients undergoing surgery. The ADL items of FAAM were asked about difficulty of standing, walking even/uneven surface, step climbing, and simple activities. This could be related with item 13 in Thai-MOXFQ that was “Foot pain prevents me from working or handling everyday tasks”. Although, FAAM sport subscale included running, jumping, landing, cutting movement, and recreational activities. These movement could be associated with item 14 of Thai-MOXFQ that asked for the limitation of social events or

recreational activities by foot pain. These explained the relationship between Thai-MOXFQ social interaction and FAAM subscales.

Limitations

There are several limitations of this study that need to be stated. Our participants were referred from physical therapy clinic and social platform. Their characteristics were reported in this study. Generalization should be performed with cautions. This study defined the time interval as 2-14 days. The participants conditions could be changed during this interval. This study detected change of pain intensity with VAS between baseline and reassessment in test-retest reliability. This criterion might provide a good level of test-retest reliability. The researcher recommended reducing time interval and removed exclusion criteria of VAS different in further study. This study examined only convergent validity of Thai-MOXFQ. Further study should examine other aspects of validity of the Thai-MOXFQ questionnaire.

The responsiveness of Thai-MOXFQ is not available in this study. Minimal detectable change (MDC) and minimal clinical importance difference (MCID) was reported in the original version. The German and Spanish versions also reported responsiveness by MDC investigated in participants undergoing foot and ankle surgery that difference from this study (21, 24). The responsiveness of Thai-MOXFQ needs to be evaluated in further study before using in Thai populations. Moreover, this current

study includes participants with chronic foot pain especially in musculoskeletal conditions while the original version is developed and tested in participants undergoing hallux valgus surgery. The difference between foot conditions may affect the reliability and validity of the Thai-MOXFQ. This current study is the first study of Thai-MOXFQ. Further study should focus on assessing the responsiveness of the questionnaire which will be important for the clinical implication. Additionally, we recommend investigating the Thai-MOXFQ in other foot conditions.

Conclusion

The original version of the MOXFQ can be successfully translated into the Thai version with minor changes. The Thai-MOXFQ is reliable and valid for Thai people with chronic foot pain. Our results supported the usefulness of the Thai-MOXFQ for using with individuals with obesity, plantar fasciitis, and moderate foot pain intensity. This questionnaire is simple and can be applied in clinical trials and research setting that can be easily completed within seven minutes. The assessment of social interaction is an advantage of the Thai-MOXFQ.

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APPENDIX A

ETHICAL APPROVED

AF 02-12



คณะกรรมการพิจารณาจริยธรรมการวิจัยในคน กลุ่มสถาบัน ชุดที่ 1 จุฬาลงกรณ์มหาวิทยาลัย
254 อาคารจามจุรี 1 ชั้น 2 ถนนพญาไท เขตปทุมวัน กรุงเทพฯ 10330
โทรศัพท์: 0-2218-3202, 0-2218-3049 E-mail: eccu@chula.ac.th

COA No. 012/2563

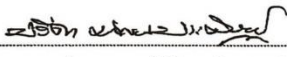
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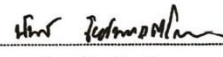
โครงการวิจัยที่ 199.1/62 : การปรับข้ามวัฒนธรรมและการศึกษาความเที่ยงและความตรงของแบบ
ประเมินเท้าแมนเชสเตอร์ออกพอร์ดฉบับภาษาไทยในผู้ที่มีอาการปวดเท้า
เรื้อรัง

ผู้วิจัยหลัก : นายปรมศักดิ์ กุลอึ้ง

หน่วยงาน : คณะสหเวชศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

คณะกรรมการพิจารณาจริยธรรมการวิจัยในคน กลุ่มสถาบัน ชุดที่ 1 จุฬาลงกรณ์มหาวิทยาลัย
ได้พิจารณา โดยใช้หลัก ของ Belmont Report 1979, Declaration of Helsinki 2013, Council for
International Organizations of Medical Sciences (CIOM) 2016, มาตรฐานคณะกรรมการจริยธรรมการวิจัย
ในคน (มคอจ.) 2556, นโยบายแห่งชาติและแนวทางปฏิบัติการวิจัยในมนุษย์ 2558 อนุมัติให้ดำเนินการศึกษาวิจัย
เรื่องดังกล่าวได้

ลงนาม 
(รองศาสตราจารย์ นายแพทย์ปริศา ทิศนประดิษฐ์)
ประธาน

ลงนาม 
(รองศาสตราจารย์ ดร.นันทรี ชัยชนวงศาโรจน์)
กรรมการและเลขานุการ

วันที่รับรอง : 9 มกราคม 2563

วันหมดอายุ : 8 มกราคม 2564

เอกสารที่คณะกรรมการรับรอง

- 1) โครงการวิจัย
- 2) เอกสารข้อมูลสำหรับผู้มีส่วนร่วมในการวิจัยและหนังสือแสดงความยินยอมของผู้มีส่วนร่วมในการวิจัย
- 3) ผู้วิจัย
- 4) แบบสอบถาม
- 5) ใบประชาสัมพันธ์



ชุดที่โครงการวิจัย 199.1/62
วันที่รับรอง - 9 ม.ค. 2563
วันหมดอายุ - 8 ม.ค. 2564

เงื่อนไข

1. ข้าพเจ้ารับทราบว่าเป็นการศึกษาระยะยาว หากดำเนินการเก็บข้อมูลการวิจัยก่อนได้รับการอนุมัติจากคณะกรรมการพิจารณาจริยธรรมการวิจัย
2. หากใบรับรองโครงการวิจัยหมดอายุ การดำเนินการวิจัยต้องยุติ เมื่อต้องการต่ออายุต้องขออนุมัติใหม่ล่วงหน้าไม่ต่ำกว่า 1 เดือน พร้อมส่งรายงานความก้าวหน้าการวิจัย
3. ต้องดำเนินการวิจัยตามที่ระบุไว้ในโครงการวิจัยอย่างเคร่งครัด
4. ใช้เอกสารข้อมูลสำหรับกลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัย ใบยินยอมของกลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัย และเอกสารเชิญเข้าร่วมวิจัย (ถ้ามี) เฉพาะที่ประทับตราคณะกรรมการเท่านั้น
5. หากเกิดเหตุการณ์ไม่พึงประสงค์ร้ายแรงในสถานที่เก็บข้อมูลที่ขออนุมัติจากคณะกรรมการ ต้องรายงานคณะกรรมการภายใน 5 วันทำการ
6. หากมีการเปลี่ยนแปลงการดำเนินการวิจัย ให้ส่งคณะกรรมการพิจารณารับรองก่อนดำเนินการ
7. โครงการวิจัยไม่เกิน 1 ปี ส่งแบบรายงานสิ้นสุดโครงการวิจัย (AF 02-14) และบทคัดย่อผลการวิจัยภายใน 30 วัน เมื่อโครงการวิจัยเสร็จสิ้น สำหรับโครงการวิจัยที่เป็นวิทยานิพนธ์ให้ส่งบทคัดย่อผลการวิจัย ภายใน 30 วัน เมื่อโครงการวิจัยเสร็จสิ้น

APPENDIX B
PERMISSION LETTER

8/30/2021

Gmail - Permission to use Manchester-Oxford foot questionnaire (MOXFQ)



Tar Poramat Kul-eung <kul.poramat@gmail.com>

Permission to use Manchester-Oxford foot questionnaire (MOXFQ)

Martina Zagaria

Fri, Oct 12, 2018 at 7:31

<Martina.Zagaria@innovation.ox.ac.uk>

PM

To: "kul.poramat@gmail.com" <kul.poramat@gmail.com>

Cc: David Churchman <David.Churchman@innovation.ox.ac.uk>, Jill Dawson <jill.dawson@dph.ox.ac.uk>, HealthOutcomes

<healthoutcomes@innovation.ox.ac.uk>, Alison Amoss

<Alison.Amoss@innovation.ox.ac.uk>

Dear Poramat

Thanks for your interest in translating the MOXFQ into Thai.

As you know, the translations of our measures are carried out in strict adherence to ISPOR standards <https://www.ncbi.nlm.nih.gov/pubmed/15804318> and we expect the methodology detailed in the file attached to be followed as closely as possible.

Please read these items carefully and confirm to us you feel able to undertake the translation and linguistic validation of the measure.

In order to start this process could you please apply for a free of charge licence to use the English version for your work?

Please go to our website <https://process.innovation.ox.ac.uk/clinical> and select MOXFQ, English for UK version (please try on Monday as our system is under maintenance today).

If you encounter any problems do let me know and I will help you.

Once your order is complete, the system will send you the English version to work from. I also attach the Concept Elaboration Document that is very helpful when approaching a new translation.

8/30/2021

Gmail - Permission to use Manchester-Oxford foot questionnaire (MOXFQ)

Thanks

Martina Zagaria

Project Manager

Oxford University Innovation Ltd.



Clinical Outcomes

Buxton Court, 3 West Way, Oxford OX2 0JB

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Company No 02199542 VAT No 490 7988 85



[@OxUInnovation](#) [linkedin.com/company/oxford-university-innovation](https://www.linkedin.com/company/oxford-university-innovation)

We have updated our [Privacy Policy](#), please refer to this for details of how to amend your communications preferences.

This communication is confidential. If you are not the intended recipient, you should not copy or disclose the message to anyone, but should kindly notify the sender and delete the message.

8/30/2021

Gmail - Permission to use Manchester-Oxford foot questionnaire (MOXFQ)

From: Jill Dawson <jill.dawson@dph.ox.ac.uk>
Sent: 12 October 2018 12:18
To: Prm Ke <kul.poramat@gmail.com>
Cc: David Churchman <David.Churchman@innovation.ox.ac.uk>
Subject: Re: Permission to use Manchester-Oxford foot questionnaire (MOXFQ)

Dear Poramat, I am copying Dr David Churchman (at Oxford Innovation) into my response. His department owns the copyright of the MOXFQ and they can assist you.

sincerely

Jill Dawson DPhil
Nuffield Department of Population Health (HSRU)
Richard Doll Building
Old Road Campus
University Of Oxford
OX3 7LF

From: Prm Ke <kul.poramat@gmail.com>
Sent: 12 October 2018 11:04
To: Jill Dawson
Subject: Permission to use Manchester-Oxford foot questionnaire (MOXFQ)

Dear Associate Professor Jill Dawson.

My name is Poramat Kul-eung, a student of the Master of Science program of Department of Physical therapy, Faculty of Allied Health Sciences, Chulalongkorn University, Thailand. I have been supervised by Dr. Praneet Pensiri, PT, PhD.

8/30/2021

Gmail - Permission to use Manchester-Oxford foot questionnaire (MOXFQ)

According to my literature review, we have found your study and other relating studies demonstrating the importance and usefulness of the Manchester-Oxford foot questionnaire (MOXFQ). The MOXFQ has been shown to have good reliability and validity in patients with foot problems. Moreover, there were several studies about MOXFQ cross-cultural adaptation that translated the original version into 6 languages including Italian, Persian, Dutch, Spanish, German and Korean. We would like to translate MOXFQ to Thai version and investigate the psychometric properties of the Thai version questionnaire. So, it would be our pleasure if we could get your permission to cross-culturally adapt your English version of MOXFQ into Thai version. We would greatly appreciate your consideration of permissions request. If you require any additional information, please do not hesitate to contact us. We can be reached at kul.poramat@gmail.com

If you had other suggestions or information about MOXFQ, please reply via e-mail and it will be thankful for your recommendation.

Sincerely,

Poramat Kul-eung

2 attachments

-  **Clinical Outcomes at Oxford University Innovation - Translation and Linguistic Validation Process_June2016.doc**
368K
-  **Concept Elaboration of the MOXFQ.docx**
32K

APPENDIX C
ORIGINAL VERSION OF MOXFQ

MANCHESTER-OXFORD FOOT QUESTIONNAIRE (MOXFQ)

<i>Circle as appropriate:</i> RIGHT / LEFT <i>During the past 4 weeks this has applied to me:</i>	<i>Please tick ✓ one box for each statement</i>				
	None of the time	Rarely	Some of the time	Most of the time	All of the time
1. I have pain in my foot/ankle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. I avoid walking long distances because of pain in my foot/ankle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I change the way I walk due to pain in my foot/ankle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I walk slowly because of pain in my foot/ankle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I have to stop and rest my foot/ankle because of pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I avoid some hard or rough surfaces because of pain in my foot/ankle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I avoid standing for a long time because of pain in my foot/ankle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. I catch the bus or use the car instead of walking, because of pain in my foot/ankle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I feel self-conscious about my foot/ankle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. I feel self-conscious about the shoes I have to wear	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please turn to next page

MOXFQ/ foot continued

<i>During the past 4 weeks this has applied to me:</i>	<i>Please tick ✓ one box for each statement</i>				
	None of the time	Rarely	Some of the time	Most of the time	All of the time
11. The pain in my foot/ankle is more painful in the evening	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. I get shooting pains in my foot/ankle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. The pain in my foot/ankle prevents me from carrying out my work/everyday activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. I am <u>unable</u> to do all my social or recreational activities because of pain in my foot/ankle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. During the past 4 weeks how would you describe the pain you <u>usually</u> have in your foot/ankle? <i>(please tick one box)</i>					
None	Very mild	Mild	Moderate	Severe	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
16. During the past 4 weeks have you been troubled by <u>pain from your foot/ankle</u> in bed at night? <i>(please tick one box)</i>					
No nights	Only 1 or 2 nights	Some nights	Most nights	Every night	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Finally, please check that you have answered every question

Thank you very much

APPENDIX D

THAI VERSION OF MOXFQ

แบบประเมินเท้าแมนเชสเตอร์ออกซฟอร์ด (Manchester-Oxford Foot Questionnaire)

วงกลมข้างที่มีอาการปวดเท้ามากที่สุด

ขวา / ซ้าย

โปรดทำเครื่องหมาย (✓) ในกล่องหน้าข้อความ
แต่ละข้อความ

ในช่วง 4 สัปดาห์ที่ผ่านมาข้อความต่อไปนี้

บรรยายตัวของข้าพเจ้าได้ตรงที่สุด

	ไม่เคย เลย	แทบจะ ไม่เคย	บางครั้ง	เกือบ ตลอด เวลา	ตลอด เวลา
1. ข้าพเจ้ามีอาการปวดเท้า	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. ข้าพเจ้าหลีกเลี่ยงการเดินระยะไกล ๆ เพราะปวดเท้า	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. ข้าพเจ้าเปลี่ยนวิธีการเดินเพราะปวดเท้า	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. ข้าพเจ้าเดินช้าลงเพราะปวดเท้า	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. ข้าพเจ้าต้องหยุดเดินและพักเท้าเพราะ ความปวด	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. ข้าพเจ้าหลีกเลี่ยงพื้นผิวที่แข็งหรือขรุขระ เพราะปวดเท้า	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. ข้าพเจ้าหลีกเลี่ยงการยืนนาน ๆ เพราะ ปวดเท้า	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. ข้าพเจ้าเดินทางโดยยานพาหนะแทนการ เดินเพราะปวดเท้า	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. ข้าพเจ้ารู้สึกกังวลเกี่ยวกับเท้าของตนเอง	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. ข้าพเจ้ารู้สึกกังวลเกี่ยวกับรองเท้าที่ ตนเองต้องใส่	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

ในช่วง 4 สัปดาห์ที่ผ่านมาข้อความต่อไปนี้ บรรยายตัวของข้าพเจ้าได้ตรงที่สุด:	โปรดทำเครื่องหมาย (✓) ในกล่องหน้าข้อความแต่ละข้อความ				
	ไม่เคย เลย	แทบจะ ไม่เคย	บางครั้ง	เกือบ ตลอด เวลา	ตลอด เวลา
11. อาการปวดที่เท้าของข้าพเจ้ามากขึ้นใน ตอนเย็น	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. ข้าพเจ้ารู้สึกปวดแปลบที่เท้า	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. อาการปวดเท้าทำให้ข้าพเจ้าไม่สามารถ ทำงานหรือทำกิจกรรมประจำวันได้	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. ข้าพเจ้าไม่สามารถทำกิจกรรมทางสังคม หรือกิจกรรมนันทนาการทั้งหมดได้ เพราะปวดเท้า	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. ในช่วง 4 สัปดาห์ที่ผ่านมา ท่านจะบรรยายความปวดที่มักเกิดขึ้นที่เท้าของท่านอย่างไร (โปรดทำเครื่องหมาย ✓ ในกล่องเพียงคำตอบเดียว)	ไม่มี <input type="checkbox"/>	น้อยมาก <input type="checkbox"/>	น้อย <input type="checkbox"/>	ปานกลาง <input type="checkbox"/>	รุนแรง <input type="checkbox"/>
16. ในช่วง 4 สัปดาห์ที่ผ่านมา ท่านถูกรบกวนด้วยอาการปวดเท้าขณะนอนในตอนกลางคืนไหม (โปรดทำเครื่องหมาย ✓ ในกล่องเพียงคำตอบเดียว)	ไม่มีเลย <input type="checkbox"/>	เพียง 1 หรือ 2 คืน <input type="checkbox"/>	บางคืน <input type="checkbox"/>	หลายคืน <input type="checkbox"/>	ทุกคืน <input type="checkbox"/>

APPENDIX E
TRANSLATION SHEET

Forward translation and Reconciled version (Stage II and III)

Forward translation and Reconciled version				
Items	Original	The first backward translator	The second backward translator	Reconciled version
Introduction1	Circle as appropriate: RIGHT / LEFT During the past 4 weeks this has applied to me:	โปรดวงกลมข้างที่เหมาะสม: ขวา/ซ้าย ในช่วง 4 สัปดาห์ที่ผ่านมา มีสิ่งเหล่านี้เกิดขึ้นกับฉัน	วงกลมล้อมรอบคำที่ท่านคิดว่าเหมาะสม: ขวา / ซ้าย ในช่วง 4 สัปดาห์ที่ผ่านมา ข้อความต่อไปนี้ บรรยายตัวของข้าพเจ้าได้ตรงที่สุด:	วงกลมคำที่คิดว่าเหมาะสม: ขวา/ซ้าย ในช่วง 4 สัปดาห์ที่ผ่านมา ข้อความต่อไปนี้ บรรยายตัวของข้าพเจ้าได้ตรงที่สุด:
Introduction2	Please tick (✓) one box for each statement	โปรดทำเครื่องหมาย (✓) เพียงหนึ่งของของแต่ละประโยค	โปรดทำเครื่องหมาย (✓) ในกล่อง หนึ่งข้อความแต่ละข้อความ	โปรดทำเครื่องหมาย (✓) ในกล่อง หนึ่งข้อความแต่ละข้อความ
Item 1-14 choices	None of the time Rarely Some of the time Most of the time All of the time	ไม่มีเลย แทบจะไม่มี มีบางครั้ง มีส่วนใหญ่ มีเกือบตลอดเวลา	ไม่เลย แทบจะไม่มี บางครั้ง เกือบตลอดเวลา ตลอดเวลา	ไม่เลย แทบจะไม่มี บางครั้ง เกือบตลอดเวลา ตลอดเวลา
Item 1	I have pain in my foot/ankle	ฉันมีอาการปวดเท้า	ข้าพเจ้ารู้สึกปวดเท้า	ข้าพเจ้ามีอาการปวดเท้า
Item 2	I avoid walking long distances because of pain in my foot/ankle	ฉันหลีกเลี่ยงการเดินทางที่ไกล เนื่องจากอาการปวดที่เท้าของฉัน	ข้าพเจ้าหลีกเลี่ยงการเดินทางระยะไกล ๆ เพราะเจ็บเท้า	ข้าพเจ้าหลีกเลี่ยงการเดินทางระยะไกล ๆ เพราะเจ็บเท้า
Item 3	I change the way I walk due to pain in my foot/ankle	ฉันเปลี่ยนเส้นทางที่ฉันเดินเนื่องจากอาการปวดที่เท้าของฉัน	ข้าพเจ้าเปลี่ยนวิธีการเดินเพราะเจ็บเท้า	ข้าพเจ้าเปลี่ยนวิธีการเดินเพราะเจ็บเท้า

Forward translation and Reconciled version					
Items	Original	The first backward translator	The second backward translator	Reconciled version	
Item 4	I walk slowly because of pain in my foot/ankle	ฉันเดินช้าลงเนื่องจากอาการปวดที่เท้าของฉัน	ข้าพเจ้าเดินช้าเพราะเจ็บเท้า	ข้าพเจ้าเดินช้าลงเพราะเจ็บเท้า	
Item 5	I have to stop and rest my foot/ankle because of pain	ฉันจำเป็นต้องหยุดและพักการใช้งานเท้าเนื่องจากอาการปวดที่เท้าของฉัน	ข้าพเจ้าต้องหยุดเดินและพักเท้าเพราะความเจ็บ	ข้าพเจ้าต้องหยุดเดินและพักเท้าเพราะความเจ็บ	
Item 6	I avoid some hard or rough surfaces because of pain in my foot/ankle	ฉันหลีกเลี่ยงบางพื้นผิวที่แข็งและขรุขระเนื่องจากอาการปวดที่เท้าของฉัน	ข้าพเจ้าหลีกเลี่ยงพื้นผิวที่แข็งหรือขรุขระเพราะเจ็บเท้า	ข้าพเจ้าหลีกเลี่ยงพื้นผิวที่แข็งหรือขรุขระเพราะเจ็บเท้า	
Item 7	I avoid standing for a long time because of pain in my foot/ankle	ฉันหลีกเลี่ยงการยืนเป็นเวลานานเนื่องจากอาการปวดที่เท้าของฉัน	ข้าพเจ้าหลีกเลี่ยงการยืนนาน ๆ เพราะเจ็บเท้า	ข้าพเจ้าหลีกเลี่ยงการยืนนาน ๆ เพราะเจ็บเท้า	
Item 8	I catch the bus or use the car instead of walking, because of pain in my foot/ankle	ฉันโดยสารรถประจำทางหรือรถยนต์ส่วนตัวแทนการเดินเนื่องจากอาการปวดที่เท้าของฉัน	ข้าพเจ้าเดินทางโดยรถโดยสารหรือรถยนต์แทนการเดินเพราะเจ็บเท้า	ข้าพเจ้าเดินทางโดยรถโดยสารหรือรถยนต์แทนการเดินเพราะเจ็บเท้า	
Item 9	I feel self-conscious about my foot/ankle	ฉันรู้สึกประหม่าเกี่ยวกับเท้าของฉัน	ข้าพเจ้ากังวลเกี่ยวกับเท้าของตนเอง	ข้าพเจ้ารู้สึกกังวลเกี่ยวกับเท้าของตนเอง	
Item 10	I feel self-conscious about the shoes I have to wear	ฉันรู้สึกประหม่าเกี่ยวกับรองเท้าที่ฉันต้องสวมใส่	ข้าพเจ้ากังวลเกี่ยวกับรองเท้าที่ฉันเองจะต้องใส่	ข้าพเจ้ารู้สึกกังวลเกี่ยวกับรองเท้าที่ฉันเองจะต้องใส่	

Forward translation and Reconciled version					
Items	Original	The first backward translator	The second backward translator	Reconciled version	
Item 11	The pain in my foot/ankle is more painful in the evening	อาการปวดที่เท้าของฉันทันทีในตอนเย็น	ข้าพเจ้าเจ็บเท้ามากขึ้นในตอนเย็น	อาการปวดที่เท้าของข้าพเจ้ามากขึ้นในตอนเย็น	
Item 12	I get shooting pains in my foot/ankle	ฉันมีอาการปวดแปลบๆ ที่เท้าของฉันทันที	ข้าพเจ้ารู้สึกเจ็บแปลบที่เท้า	ข้าพเจ้ารู้สึกเจ็บแปลบที่เท้า	
Item 13	The pain in my foot/ankle prevents me from carrying out my work/everyday activities	อาการปวดที่เท้าของฉันททำให้ฉันหลีกเลี่ยงการทำงาน/การที่กิจวัตรประจำวัน	อาการเจ็บเท้า ทำให้ข้าพเจ้าไม่สามารถทำงานหรือทำกิจกรรมประจำวันได้	อาการเจ็บเท้าทำให้ข้าพเจ้าไม่สามารถทำงานหรือทำกิจกรรมประจำวันได้	
Item 14	I am unable to do all my social or recreational activities because of pain in my foot/ankle	ฉันไม่สามารถทำกิจกรรมทางสังคมหรือกิจกรรมสันทนาการทั้งหมดเนื่องจากอาการปวดที่เท้าของฉันท	ข้าพเจ้าไม่สามารถทำกิจกรรมทางสังคมหรือกิจกรรมสันทนาการทั้งหมดได้เพราะเจ็บเท้า	ข้าพเจ้าไม่สามารถทำกิจกรรมทางสังคมหรือกิจกรรมสันทนาการทั้งหมดได้เพราะเจ็บเท้า	
Item 15	During the past 4 weeks, how would you describe the pain you usually have in your foot/ankle? (please tick <input checked="" type="checkbox"/> one box)	ในช่วง 4 สัปดาห์ที่ผ่านมา คุณจะบรรยายลักษณะอาการปวดที่เกิดขึ้นเป็นประจำที่เท้าของคุณว่าอย่างไร โปรดทำเครื่องหมาย (<input checked="" type="checkbox"/>) เพียงหนึ่งช่อง	ในช่วง 4 สัปดาห์ที่ผ่านมา ท่านจะบรรยายความเจ็บที่มักจะเกิดขึ้นที่เท้าของท่านอย่างไร (โปรดทำเครื่องหมาย <input checked="" type="checkbox"/> ในกล่องเพียงคำตอบเดียว)	ในช่วง 4 สัปดาห์ที่ผ่านมา ท่านจะบรรยายความเจ็บที่มักจะเกิดขึ้นที่เท้าของท่านอย่างไร (โปรดทำเครื่องหมาย <input checked="" type="checkbox"/> ในกล่องเพียงคำตอบเดียว)	
Item 15 choices	None Very mild Mild Moderate Severe	ไม่มี น้อยมาก น้อย ปานกลาง รุนแรง	ไม่มี เจ็บน้อยมาก เจ็บเล็กน้อย เจ็บปานกลาง เจ็บมาก	ไม่มี น้อยมาก น้อย ปานกลาง รุนแรง	

Forward translation and Reconciled version				
Items	Original	The first backward translator	The second backward translator	Reconciled version
Item 16	During the past 4 weeks, have you been troubled by pain from your foot/ankle in bed at night? (please tick ✓ one box)	ในช่วง 4 สัปดาห์ที่ผ่านมาคุณเคยมีปัญหาปวดที่เท้าของคุณขณะนอนตอนกลางคืนหรือไม่ (โปรดเลือกตอบ ✓ เพียงหนึ่งช่อง)	ในช่วง 4 สัปดาห์ที่ผ่านมา อาการเจ็บเท้า รมภวณทงนตอนนอนในเวลากลางคืน (โปรดทำเครื่องหมาย ✓ ในกล่องเพียงคำตอบเดียว)	ในช่วง 4 สัปดาห์ที่ผ่านมา อาการเจ็บเท้า รมภวณทงนตอนนอนในเวลากลางคืน (โปรดทำเครื่องหมาย ✓ ในกล่องเพียงคำตอบเดียว)
Item 16 choices	No nights Only 1 or 2 nights Some nights Most nights Every night	ไม่มีเลย มีเพียง 1 หรือ 2 คืน มีบางคืน มีเกือบทุกคืน มีทุกคืน	ไม่มีเลย เพียง 1 หรือ 2 คืน บางคืน หลายคืน ทุกคืน	ไม่มีเลย เพียง 1 หรือ 2 คืน บางคืน หลายคืน ทุกคืน
Ending	Finally, please check that you have answered every question Thank you very much	ท้ายที่สุด โปรดตรวจทานว่าคุณได้ตอบ คำถามครบทุกคำถาม ขอขอบคุณเป็นอย่างสูง	สุดท้ายนี้ กรุณาตรวจสอบว่าท่านได้ตอบ คำถามครบทุกคำถาม ขอขอบคุณอย่างยิ่งที่ท่านกรุณาใช้เวลาตอบ แบบสอบถามนี้	สุดท้ายนี้ กรุณาตรวจสอบว่าท่านได้ตอบ คำถามครบทุกคำถาม ขอขอบคุณอย่างยิ่งที่ท่านกรุณาใช้เวลาตอบ แบบสอบถามนี้

Backward translation and reviewing (Stage IV and V)

Backward translation			
Items	Reconciled version	The first backward translator	The second backward translator
Introduction1	วงกลมคำที่คิดว่าเหมาะสม: ขวา/ซ้าย ในช่วง 4 สัปดาห์ที่ผ่านมา ข้อความต่อไปนี้บรรยายตัวของ ข้าพเจ้าได้ตรงที่สุด:	Circle the word that you think the most appropriate: right/left In the past four weeks, the following statement specifically describes myself.	Circle the suitable word: right / left. During the past 4 weeks, the following statements best describe my condition:
Introduction2	โปรดทำเครื่องหมาย (✓) ในกล่องหน้าข้อความแต่ละ ข้อความ	Please tick (✓) the box in front of each statement.	Please check (✓) in the box in front of each statement
Item 1-14 choices	ไม่เคย แทบจะไม่ บางครั้ง เกือบตลอดเวลา ตลอดเวลา	Not at all Rarely Occasionally Almost always Always	Never Hardly Sometimes Almost all the time All the time
Item 1	ข้าพเจ้ามีอาการปวดเท้า	I have foot pain.	I have foot pain.
Item 2	ข้าพเจ้าหลีกเลี่ยงการเดินระยะไกล ๆ เพราะเจ็บเท้า	I avoid walking long distances due to foot pain.	I avoid walking long distances because of foot pain.
Item 3	ข้าพเจ้าเปลี่ยนวิธีการเดินเพราะเจ็บเท้า	I have changed my usual way of walking due to foot pain.	I change how I walk because of foot pain.
Item 4	ข้าพเจ้าเดินช้าลงเพราะเจ็บเท้า	I walk more slowly owing to foot pain.	I walk slower because of foot pain.

Backward translation			
Items	Reconciled version	The first backward translator	The second backward translator
Item 5	ข้าพเจ้าต้องหยุดเดินและพักเท้าเพราะความเจ็บ	I must stop walking and rest my feet as a result of foot pain.	I have to stop walking and rest my foot because of the pain.
Item 6	ข้าพเจ้าหลีกเลี่ยงพื้นผิวที่แข็งหรือขรุขระเพราะเจ็บเท้า	I avoid hard or rough surfaces due to foot pain.	I avoid walking on hard or rough surfaces because of foot pain.
Item 7	ข้าพเจ้าหลีกเลี่ยงการยืนนาน ๆ เพราะเจ็บเท้า	I try not to stand for long periods of time because of foot pain	I avoid standing for long periods of time because of foot pain.
Item 8	ข้าพเจ้าเดินทางโดยรถโดยสารหรือรถยนต์แทนการเดินเพราะเจ็บเท้า	I commute by bus or car rather than walking due to my foot pain.	I take a public transportation or a car instead of walking because of foot pain.
Item 9	ข้าพเจ้ารู้สึกกังวลเกี่ยวกับเท้าของตนเอง	I am worried about my foot pain.	I am worried about my foot.
Item 10	ข้าพเจ้ารู้สึกกังวลเกี่ยวกับรองเท้าที่ตนเองจะต้องใส่	I am anxious about shoes that I will have to wear.	I am worried about the type of shoes that I have to wear.
Item 11	อาการปวดที่เท้าของข้าพเจ้ามากขึ้นในตอนเย็น	My foot pain gets aggravated in the evening.	I have growing pains in my foot, especially in the evening.
Item 12	ข้าพเจ้ารู้สึกเจ็บแปลบที่เท้า	I feel a sharp pain in my feet.	I have sharp pain in my foot.
Item 13	อาการเจ็บเท้าทำให้ข้าพเจ้าไม่สามารถทำงานหรือทำกิจกรรมประจำวันได้	My foot pain blocks me from doing work or daily activities.	Foot pain prevents me from working or handling everyday tasks.
Item 14	ข้าพเจ้าไม่สามารถทำกิจกรรมทางสังคมหรือกิจกรรมนันทนาการทั้งหมดได้เพราะเจ็บเท้า	I cannot do all social or recreational activities owing to my foot pain.	I cannot participate in all social events or recreational activities because of foot pain.

Backward translation			
Items	Reconciled version	The first backward translator	The second backward translator
Item 15	ในช่วง 4 สัปดาห์ที่ผ่านมา ท่านจะบรรยายความเจ็บที่มักจะเกิดขึ้นที่เท้าของท่านอย่างไร (โปรดทำเครื่องหมาย ✓ ในกล่องเพียงคำตอบเดียว) ไม่มี น้อยมาก น้อย ปานกลาง รุนแรง	During the past 4 weeks, how can you describe pain that generally occurs in your feet? (Please tick (✓) only one box in front of answers.) None Very little Little Moderate Severe	During the last 4 weeks, how would you describe the pain in your foot? (Please check (✓) in the box for only one answer) None Very little Little Moderate Severe
Item 16	ในช่วง 4 สัปดาห์ที่ผ่านมา อาการเจ็บที่กรบกวนท่านตอนนอนในเวลากลางคืน (โปรดทำเครื่องหมาย ✓ ในกล่องเพียงคำตอบเดียว) ไม่มีเลย เพียง 1 หรือ 2 คืน บางคืน หลายคืน ทุกคืน	During the past 4 weeks, Your foot pain disturbs you during your sleep at night: (Please tick (✓) only one box in front of answers.) None/Only 1 or 2 nights/Some nights/Most nights/Every night	During the last 4 weeks, foot pain disturbs your sleep at night: (Please check (✓) in the box for only one answer) None / Just 1 or 2 nights / Some nights / Many nights / Every night
Ending	สุดท้ายนี้ กรุณาตรวจสอบว่าท่านได้ตอบคำถามครบทุกคำถาม ขอบคุณอย่างยิ่งที่ท่านกรุณาใช้เวลาตอบแบบสอบถามนี้	Lastly, please check if you have answered all the questions. Thank you very much for dedicating your time to responding to this questionnaire.	Finally, please check that you have answered all the questions. Thank you for taking the time to answer this questionnaire.

APPENDIX F
SCREENING FORM

คำชี้แจง กรุณาอ่านคำถามและกรอกข้อมูลของตัวท่านตามความเป็นจริง โดยเลือกคำตอบเพียงคำตอบเดียว หรือใส่ข้อความที่ตรงกับตัวท่านมากที่สุด

1. ท่านมีโรคประจำตัวหรือไม่

ใช่ ระบุ..... ไม่

2. ท่านเคยได้รับการวินิจฉัยจากแพทย์หรือทันตแพทย์เกี่ยวกับปัญหาสุขภาพจิตหรือไม่

ใช่ ไม่

3. ท่านเคยได้รับการผ่าตัดที่บริเวณเท้าหรือข้อเท้าหรือไม่

ใช่ ไม่

4. โปรดระบุเท้าข้างที่มีอาการปวด (หากปวดทั้งสองข้างกรุณาระบุ ข้างที่ปวดมากที่สุด)

ซ้าย ขวา

5. ท่านมีอาการปวดเท้าเป็นระยะเวลานานกว่า 3 เดือนหรือไม่

(หากท่านมีอาการปวด กรุณา ขีดเส้น ระบุระดับความปวดบนเส้นด้านล่าง เพียงเส้นเดียว)

ใช่ ไม่

ไม่ปวดเลย

ปวดมากจนทนไม่ได้

6. ขณะยืนหรือเดินลงน้ำหนัก ท่านมีอาการปวดที่ หลังส่วนล่าง หรือสะโพก หรือต้นขา หรือหัวเข่า หรือไม่

(หากท่านมีอาการปวด กรุณา ขีดเส้น ระบุระดับความปวดบนเส้นด้านล่าง เพียงเส้นเดียว)

ใช่ ระบุ..... ไม่

ไม่ปวดเลย

ปวดมากจนทนไม่ได้

APPENDIX G
DEMOGRAPHIC FORM

แบบบันทึกข้อมูลทั่วไป (Demographic form)

คำชี้แจง กรุณาตอบคำถามทุกข้อตามความเป็นจริง โดยใส่ข้อความลงในช่องว่าง หรือเลือกคำตอบที่สอดคล้อง
กับความคิดเห็นของท่านมากที่สุด โดยใส่เครื่องหมาย ลงในช่อง หน้าข้อความ

ข้อมูลทั่วไป

1. ชื่อ-นามสกุล.....
2. อายุ.....ปี
3. เพศ ชาย หญิง
4. เบอร์โทรศัพท์ที่สามารถติดต่อได้.....
5. น้ำหนัก.....กิโลกรัม ส่วนสูง.....เซนติเมตร

APPENDIX H

SCREENING FORM FOR RELIABILITY STUDY

คำชี้แจง กรุณาอ่านคำถามและเติมข้อมูลของตัวท่านตามความเป็นจริง โดยเลือกคำตอบเพียงคำตอบเดียว หรือใส่ข้อความที่ตรงกับตัวท่านมากที่สุด

1. ในระยะเวลา 2 ถึง 14 วันที่ผ่านมา ท่านได้รับการรักษาเกี่ยวกับอาการปวดเท้าหรือไม่

รับ ไม่ได้รับ

2. ปัจจุบัน ท่านมีอาการปวดเท้าใช่หรือไม่

(หากท่านมีอาการปวด กรุณา ขีดเส้น ระดับความปวดบนเส้นด้านล่าง เพียงเส้นเดียว)

ใช่ ไม่

ไม่ปวดเลย

ปวดมากจนทนไม่ได้

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

APPENDIX I

THAI-FAAM

ตัววัดย่อยสำหรับกิจวัตรประจำวัน

กรุณาตอบทุกคำถามโดยเลือกเพียงคำตอบเดียวที่ใกล้เคียงกับอาการของท่านในช่วงสัปดาห์ที่ผ่านมาที่สุด

ถ้ากิจกรรมใดที่ท่านทำไม่ได้เนื่องจากมีข้อจำกัดอื่นให้ระบุว่า "ไม่ทราบ/ไม่แน่ใจ"

กิจกรรม	ไม่ยาก	ยากเล็กน้อย	ยากปานกลาง	ยากมาก	ทำไม่ได้	ไม่แน่ใจ
ยืนเฉย ๆ						
เดินบนพื้นราบ						
เดินบนพื้นราบโดยไม่สวมรองเท้า						
เดินขึ้นเนินหรือทางลาด						
เดินลงเนินหรือทางลาด						
เดินขึ้นบันได						
เดินลงบันได						
เดินบนพื้นไม่เรียบ						
ก้าวขึ้นลงขั้นบันไดหรือขอบถนน						
นั่งยอง ๆ						
ยืนเขย่งปลายเท้า						
เดินระยะใกล้ ๆ						
เดินไม่เกิน 5 นาที						
เดินประมาณ 10 นาที						
เดินมากกว่าหรือเท่ากับ 15 นาที						

ปัญหาเรื่องเท้าและข้อเท้าของท่าน ทำให้ท่านทำกิจกรรมต่อไปนี้ได้

	ไม่ยาก	ยากเล็กน้อย	ยากปานกลาง	ยากมาก	ทำไม่ได้	ไม่แน่ใจ
ทำงานทั่วไปในบ้าน						
กิจวัตรประจำวัน						
ความสามารถในการช่วยเหลือตนเอง						
ทำงานเบาๆ (เดินหรือยืนเฉยๆ)						
ทำงานหนัก (ลากหรือเข็นของ ยกหรือแบกของ)						
กิจกรรมสันทนาการ (เดินป่า ปีนเขา)						

ท่านคิดว่า ท่านมีระดับความสามารถในการประกอบกิจวัตรประจำวันได้.....เปอร์เซ็นต์

(ระหว่าง 0-100 เปอร์เซ็นต์)

โดย 100 คือ ระดับความสามารถปกติของท่าน ก่อนที่จะมีปัญหาเรื่องเท้า

0 คือ ท่านไม่สามารถทำกิจวัตรประจำวันได้เลย

ตัววัดย่อยสำหรับการเล่นกีฬา

จากปัญหาเรื่องเท้าและข้อเท้าของท่าน ท่านมีความยากลำบากในการทำกิจกรรมต่อไปนี้มากหรือน้อยอย่างไร

กิจกรรม	ไม่ยาก	ยากเล็กน้อย	ยากปานกลาง	ยากมาก	ทำไม่ได้	ไม่แน่ใจ
วิ่ง						
กระโดด						
การลงสู่พื้นดินระหว่างเล่นกีฬา						
ขึ้น ลงบันได						
เริ่มต้นและหยุดได้อย่างรวดเร็ว						
การเคลื่อนไหวตัดหรือด้านข้าง						
ความสามารถในการดำเนินกิจกรรมด้วยเทคนิคปกติของท่าน						
ความสามารถในการมีส่วนร่วมในกีฬาที่ท่านชอบได้นานเท่าที่ต้องการ						

ท่านคิดว่า ขณะนี้ท่านมีระดับความสามารถในการทำกิจกรรมที่เกี่ยวข้องกับการกีฬา.....เปอร์เซ็นต์

(ระหว่าง 0-100 เปอร์เซ็นต์)

โดย 100 คือ ระดับความสามารถปกติของท่าน ก่อนที่จะมีปัญหาเรื่องเท้า

0 คือ ท่านไม่สามารถทำกิจกรรมประจำวันได้เลย

APPENDIX J

THAI SF-36

แบบสอบถามเอสเอฟ-36(SF-36)

คำชี้แจง กรุณาตอบแบบสอบถามให้ครบทุกข้อ คำถามบางข้ออาจมีความคล้ายคลึงกันแต่มีความแตกต่างกัน โปรดใช้เวลาประมาณ 10 นาทีอ่านและตอบคำถามแต่ละข้อให้ถูกต้องตามความเป็นจริงโดยขีดเครื่องหมายถูก “✓” ในวงกลม “○” ที่ท่านเห็นว่าตรงกับลักษณะของท่านมากที่สุด

1. ในภาพรวม ท่านคิดว่าสุขภาพของท่าน

ดีเยี่ยม ดีมาก ดี ปานกลาง เลว

○ ○ ○ ○ ○

2. เมื่อเปรียบเทียบกับ 1 ปีก่อน ท่านคิดว่าสุขภาพของท่านในปัจจุบันเป็นอย่างไร

ปัจจุบันดีกว่า ปัจจุบันดีกว่า เท่าๆกับ ปัจจุบันเลวกว่า ปัจจุบันเลวกว่า

ปีที่แล้วมาก เล็กน้อย ปีที่แล้ว ปีที่แล้วเล็กน้อย ปีที่แล้วมาก

○ ○ ○ ○ ○

3. ท่านคิดว่าสุขภาพของท่านในปัจจุบันมีผลให้ท่านทำกิจกรรมต่าง ๆ ต่อไปนี้ลดลงหรือไม่เพียงใด

กิจกรรม	ลดลงมาก	ลดลงเล็กน้อย	ไม่ลดลงเลย
3.1 กิจกรรมที่ออกแรงมากขึ้น วิ่ง ยกของหนัก เล่นกีฬาที่ต้องใช้แรงมาก	○	○	○
3.2 กิจกรรมที่ออกแรงปานกลางเช่น เลื่อนโต๊ะ กวาดดูบ้าน เล่นกีฬาเบา	○	○	○
3.3 ยกถือของเวลาไปซื้อของในห้างสรรพสินค้า	○	○	○
3.4 ขึ้นบันไดหลายชั้น (จากชั้น 1 ไปชั้น 3 หรือมากกว่า)	○	○	○
3.5 ขึ้นบันได 1 ชั้น (จากชั้น 1 ไปชั้น 2)	○	○	○
3.6 ก้มลงเก็บของ കു๋กเข้า งอตัว	○	○	○
3.7 เดินเป็นระยะทางมากกว่า 1 กิโลเมตร	○	○	○
3.8 เดินเป็นระยะทางหลายร้อยเมตร	○	○	○
3.9 เดินประมาณ 100 เมตร	○	○	○
3.10 อาน้ำหรือแต่งตัว	○	○	○

4. ในช่วง 4 สัปดาห์ที่ผ่านมาท่านมีปัญหาการทำงานหรือทำกิจวัตรประจำวันซึ่งเป็นผลเนื่องจากสุขภาพร่างกายของท่านหรือไม่?

	ตลอดเวลา	ส่วนใหญ่	บางเวลา	ส่วนน้อย	ไม่ใช่
4.1 ต้องลดเวลาในการทำงานหรือทำกิจวัตร	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4.2 ทำงานหรือทำกิจวัตรได้น้อยกว่าที่ต้องการ	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4.3 ทำงานหรือทำกิจวัตรบางอย่างไม่ได้	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4.4 ทำงานหรือทำกิจวัตรได้ลำบากกว่าเดิม	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. ในช่วง 4 สัปดาห์ที่ผ่านมาท่านประสบปัญหาในการทำงานหรือทำกิจวัตรประจำวันซึ่งเป็นผลสืบเนื่องมาจากปัญหาทางอารมณ์หรือจิตใจ (เช่น รู้สึกซึมเศร้าหรือวิตกกังวล) หรือไม่?

	ตลอดเวลา	ส่วนใหญ่	บางเวลา	ส่วนน้อย	ไม่ใช่
5.1 ต้องลดเวลาในการทำงานหรือทำกิจวัตร	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5.2 ทำได้น้อยกว่าที่ต้องการ	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5.3 ไม่สามารถทำได้อย่างระมัดระวังเหมือนปกติ	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. ในช่วง 4 สัปดาห์ที่ผ่านมาปัญหาสุขภาพหรืออารมณ์ความรู้สึกของท่านมีผลรบกวนต่อการมีกิจกรรมทางสังคมของท่านกับครอบครัว เพื่อน เพื่อนบ้าน หรือกลุ่มอย่างน้อยเพียงใด?

ไม่รบกวนเลย รบกวนเล็กน้อย รบกวนปานกลาง รบกวนค่อนข้างมาก รบกวนมาก

7. ท่านมีอาการปวดมากน้อยเพียงใด ในช่วง 4 สัปดาห์ที่ผ่านมา

ไม่ปวดเลย ปวดน้อยมาก ปวดน้อย ปวดปานกลาง ปวดรุนแรง ปวดรุนแรงมาก

8. ในช่วง 4 สัปดาห์ที่ผ่านมาการปวดรบกวนการทำงาน (ทั้งที่ทำงานและที่บ้าน) มากน้อยเพียงใด?

ไม่รบกวนเลย รบกวนเล็กน้อย รบกวนปานกลาง รบกวนค่อนข้างมาก รบกวนมาก

9. คำถามต่อไปนี้เกี่ยวข้องกับอารมณ์ความรู้สึกที่เกิดขึ้นกับท่าน ในช่วง 4 สัปดาห์ที่ผ่านมา กรุณาให้คำตอบ
ที่ตรงกับความรู้สึกของท่านมากที่สุดในแต่ละคำถามเกิดขึ้นบ่อยเพียงใด ในช่วง 4 สัปดาห์ที่ผ่านมา

	ตลอดเวลา	ส่วนใหญ่	บางเวลา	ส่วนน้อย	ไม่ใช่
9.1 รู้สึกกระปรี้กระเปร่ามาก	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9.2 รู้สึกหงุดหงิดกังวลมาก	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9.3 ซึมเศร้าไม่ร่าเริง	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9.4 รู้สึกสงบ	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9.5 รู้สึกเต็มไปด้วยพลัง	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9.6 รู้สึกหมดกำลังใจ ซึมเศร้า	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9.7 รู้สึกอ่อนเพลีย ไม่มีกำลัง	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9.8 รู้สึกมีความสุขดี	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9.9 รู้สึกเบื่อหน่าย	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. ในช่วง 4 สัปดาห์ที่ผ่านมา ปัญหาสุขภาพหรืออารมณ์ความรู้สึกของท่านมีผลรบกวนต่อเวลาการมี
กิจกรรมทางสังคมของท่าน (เช่น ไปเยี่ยมญาติหรือเพื่อน) มากน้อยเพียงใด ?

ตลอดเวลา ส่วนใหญ่ บางเวลา ส่วนน้อย ไม่มีเลย

11. ข้อความต่อไปนี้ตรงกับสุขภาพของท่านหรือไม่

	ถูกต้อง ที่สุด	ส่วนใหญ่ ถูกต้อง	ไม่ทราบ	ส่วนใหญ่ ไม่ถูกต้อง	ไม่ถูกต้อง
11.1 ไม่สบายหรือเจ็บป่วยง่ายกว่าคนทั่วไป	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11.2 มีสุขภาพดีเท่ากับคนอื่น ๆ	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11.3 คิดว่าสุขภาพจะเลวลง	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11.4 มีสุขภาพดีเยี่ยม	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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