

Reliability of the Thai Version of the Fagerstrom Test for Nicotine Dependence (FTND)

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Objective: To evaluate the test-retest reliability and internal consistency of the Thai version of Fagerstrom Test for Nicotine Dependence (FTND).

Material and Method: The FTND was translated into Thai. Afterward, participants completed the questionnaire two times, at baseline and seven days after. The intraclass correlation coefficient (ICC) and Cronbach's alpha were calculated for the test-retest reliability and internal consistency, respectively.

Results: The average age of the 130 participants was 32.4 years, and 45.4% finished secondary education. Participants smoked an average of 11.0 cigarettes per day over an average period of 11.3 years. The ICC of FTND was 0.83. Cronbach's alpha was 0.52.

Conclusion: Overall, the ICC and Cronbach's alpha of the Thai version was close to the original version in English. Therefore, the Thai FTND could be used in the clinic and in research.

Keywords: The Fagerström Test for Nicotine Dependence, FTND, Nicotine dependence level, Reliability

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Smoking is one of the causes of high mortality rate. Nearly six million people die from illness each year. More than five million of these deaths are the direct result of smoking and more than 600,000 people die as the result of second-hand smoke. This is a serious situation that requires urgent action, otherwise the annual death toll could rise to more than eight million by 2030⁽¹⁾. In Thailand, The Tobacco Atlas reported that 37.4% of males and 2.2% of females are smokers. In addition, more than 74,600 die from tobacco-related diseases each year⁽²⁾. Evidence suggests that quitting smoking reduces mortality risk⁽³⁾. In the smoking cessation process, nicotine dependence level should be assessed because nicotine withdrawal symptoms, smoking craving, and successful smoking cessation correlate with nicotine dependence level⁽⁴⁻⁶⁾. Thus, assessment of nicotine dependence level before starting the cessation program may help in treatment planning.

In 1991, Heatherton et al⁽⁷⁾ developed the Fagerstrom Test for Nicotine Dependence (FTND) in English language. The FTND is a self-report questionnaire consisting of six items to evaluate

nicotine dependence level. The FTND has been widely used in many clinical treatment and research settings⁽⁷⁾. Up until now, the FTND has been translated into many languages such as French^(8,9), Spanish^(10,11), Chinese⁽¹²⁾, and Japanese⁽¹³⁾. In Thailand, the FTND is commonly used in clinical treatment and research settings too. However, there are many Thai versions of the FTND with no report on the psychometric properties of such versions. Thus, the lack of a standardized version of the questionnaire leads to poor assessment and comparability. Therefore, the aims of the present study were to translate the FTND into the Thai language by using the standard method according to the cross-cultural adaptation process, and to evaluate the test-retest reliability and internal consistency of the Thai version of the FTND.

Material and Method

Participants

The present study recruited a convenience sample of adult smokers from the Bangkok Metropolitan area. The inclusion criteria were adult smokers aged over 18 years old, smoke at least one cigarette per day, and have smoked for at least one year. Participants were screened by interview using a standardized form. The present study was approved by the Chulalongkorn University Human Ethics Committee (COA No. 101/2559).

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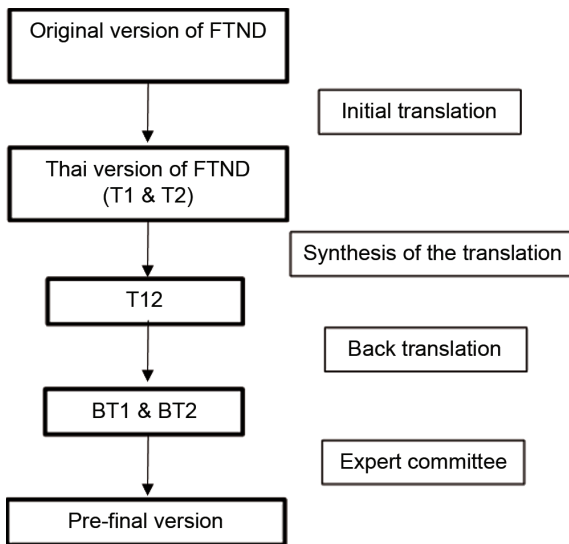


Fig. 1 Flowchart of the stage of cross-cultural adaptation.

Procedure

The FTND was translated into Thai version according to the cross-cultural adaptation process⁽¹⁴⁾. The cross-cultural adaptation process consists of five stages, 1) initial translation, 2) synthesis of the translation, 3) back translation, 4) expert committee review, and 5) test of the pre-final version of the questionnaire (Fig. 1).

Initial translation

Two independent bilingual translators participated in this stage. The native language of the two translators was Thai. The first translator was the main researcher who had knowledge of all of the process proposed and the concept being examined in the questionnaire (T1). The second translator was not aware or informed about the process proposed and the concept being examined in the questionnaire. However, this translator was aware of the language appropriate for the general Thai population (T2).

Synthesis of the translations

At this stage, both translators synthesized the results of the translations (T1 and T2). The two translators compared and resolved any discrepancies. A synthesis of the translations produced the first consensus version of the questionnaire (T12).

Back translation

After the first version of the Thai FTND was completed (T12), the process of back translation

into English began. In this stage, the back translation (BT1 and BT2) was carried out by two native English speakers, who could read and understand Thai language. These two translators were totally blinded to the original English version, and were not aware of the process proposed, and did not have any medical background.

Expert committee review

The expert committee consisted of three persons, 1) one senior academic pharmacologist, 2) one senior academic physiotherapist, and 3) the main researcher. In this stage, the committee reviewed all the translations derived from the previous stages (T1, T2, T12, BT1, and BT2). In addition, the committee also considered the original version. Finally, the pre-final version of the Thai FTND was developed in response to the committees' feedback and recommendations. The pre-final version of the Thai FTND was tested by five twelve-year-old children to check their understanding of the words and phrases.

Test of the pre-final version of the questionnaire

The pre-final version of the Thai FTND was tested among 10 smokers. Each participant was given an explanation regarding the purpose and scope of the questionnaire as well as instructions on how to fill the questionnaire prior to start testing. In addition, these participants were asked to provide comments on the questionnaire and identify word(s) or phrase(s) that were difficult to understand. Then, the main researcher collected all the information and comments and developed the final version of the Thai questionnaire.

Reliability study

The test-retest reliability and internal consistency of the Thai FTND was investigated. As regards to the test-retest reliability, each participant was asked to complete the questionnaire, unassisted twice with at least a 7-day interval. An intraclass correlation coefficient ($ICC_{(3,1)}$) was calculated for the test-retest reliability. An ICC value of greater than 0.70 was accepted as a reliable tool⁽¹⁵⁾.

Statistical analysis

Statistical analysis was performed using the Statistical Package for Social Sciences (SPSS Release 17.0 for Windows). The demographic data of the participants were described in percentages, means, and standard deviations of variable values. The $ICC_{(3,1)}$ was used to evaluate the test-retest reliability. Cronbach's

alpha was used to assess internal consistency. A test was accepted as having good internal consistency if Cronbach's alpha was greater than 0.70⁽¹⁵⁾.

Results

One hundred thirty smokers enrolled to participate in the present study. The average age of the participants was 32.4±9.7 years (ranging from 18 to 62 years old, 96.9% male, 63.1% single). Most of the participants finished primary and secondary education (56.9%) and the others 43.1% held Bachelor degree or higher. The average number of cigarettes smoked per day was 11.0±6.4 (1 to 40 cigarettes/day). The average years of continuous smoking was 11.3±7.9 (1 to 40 years). Most of the participants (88%) reported that they had previously attempted to quit. The characteristic of participants is presented in Table 1.

All participants completed the questionnaire twice, at baseline and seven days after. The participants were generally able to complete the questionnaire by themselves. At the baseline assessment, the mean Thai FTND score was 3.1±2.0 from 10, and at the second assessment, the mean Thai FTND score was 2.9±2.0 from 10. The mean Thai FTND difference score between the baseline and second assessment was 0.2±1.2 (Fig. 2). The ICC_(3,1) was computed to assess the test-retest reliability. The ICC_(3,1) value of the Thai FTND was 0.83 ($p < 0.001$, 95% confidence interval 0.77 to 0.88). There was no significant difference between the baseline and second assessment. Whereas, the internal consistency evaluated by Cronbach's alpha

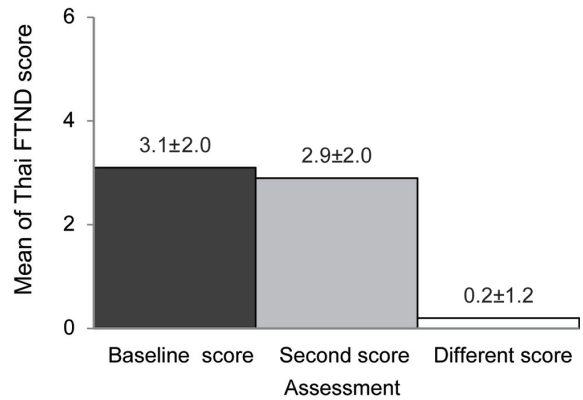


Fig. 2 Mean of Thai FTND score at baseline and second assessment.

was 0.52 indicating that each item had poor correlation among the items and the total score.

Discussion

The purposes of the present study were to translate the FTND into the Thai language by using the standard method according to the cross-cultural adaptation process and to evaluate the test-retest reliability and internal consistency of the Thai version of the FTND. The findings suggest that the Thai version of the FTND possessed good test-retest reliability but poor internal consistency. However, it can be used in both clinical treatment and research settings for evaluating nicotine dependence level in Thai smokers.

With the increasing multinational and multi-cultural research projects, adaptation and translation of the source language questionnaire is needed. The term "cross-cultural adaptation" refers to the process of preparing a questionnaire to use in another setting, which addresses the language and cultural adaptation. This process tries to achieve equivalence between the source and target questionnaire in four areas, the semantic, idiomatic, experienced, and conceptual. The current study followed standard protocol as suggested by Beaton et al (2000)⁽¹⁴⁾. The results of the current study showed that it is possible to translate and culturally adapt the FTND into the Thai language without modifying the structure and content of the questionnaire. The FTND was translated into Thai with no difficulty, and it was adapted to suit Thai culture.

In the analysis of the reliability of the Thai FTND, a seven-day test-retest reliability between two sets of scores was good, with an ICC_(3,1) of 0.83. This result was in line with a previous study of another version. Previous studies showed that the ICC of FTND

Table 1. Characteristic of participants (n = 130)

Variables	mean ± SD or n (%)
Age	32.4±9.7
Gender	
Male	126 (96.9)
Female	4 (3.1)
Marital status	
Single	82 (63.1)
Married	45 (34.6)
Divorced/separated	3 (2.3)
Education	
Primary school	15 (11.5)
Secondary school	59 (45.4)
Bachelor's degree	50 (38.5)
Higher than Bachelor's degree	6 (4.6)
Number of cigarette/day	11.0±6.4
Years smoking continuously	11.3±7.9
Previous quit attempts	
Yes	88 (67.7)
No	42 (32.3)

ranged from 0.65 to 0.91⁽¹⁶⁾ and varied in the time intervals of test-retest and populations such as the ICC of the French version = 0.85⁽⁸⁾, Japanese version = 0.75⁽¹³⁾, English version = 0.82⁽¹⁷⁾, and Dutch version = 0.70⁽¹⁸⁾. The ICC of the Thai FTND in the present study demonstrated that this Thai FTND had good and acceptable test-retest reliability.

The present study showed poor internal consistency (Cronbach's alpha = 0.52), which indicated a poor correlation among the items and the total score. Cronbach's alpha is affected by the number of items on the scale. Thus, the relatively low number of the FTND might have caused the low Cronbach's alpha. To improve internal consistency, revision of some items in the questionnaire is required. However, the result of the current study was consistent with previous studies in which the internal consistency of the FTND ranged from 0.55 to 0.74⁽¹⁶⁾, such as that of the French version = 0.68⁽⁸⁾, Japanese version = 0.66⁽¹³⁾, Dutch version = 0.65⁽¹⁸⁾, and English version = 0.56⁽¹⁹⁾. Finally, this Thai FTND could be used in clinical treatment and research settings due to the ICC and Cronbach's alpha being close to the original version in English, which is widely used at present.

This is the first study to translate the FTND into Thai following the cross-cultural adaptation process and to examine the test-retest reliability and internal consistency. Nevertheless, there are some limitations in the present study. First, 96.9% of the participants were male as is the common characteristic of smokers in Thailand. The Tobacco Atlas reported that only 2.2% of females in Thailand were smokers. A larger female sample may be needed for evaluation in the future. Second, other important psychometric properties of the Thai FTND such as validity were not reported in the present study. In a previous study, the validity of the FTND was tested by evaluating the correlation between the FTND score and biological marker. The result showed weak to moderate correlation between the original version of the FTND score and the biological marker⁽¹⁶⁾. Therefore, further research is needed to identify their other psychometric properties.

In conclusion, the test-retest reliability and internal consistency of the Thai version of the FTND was in line with the original version. This finding suggests that it is possible to translate the FTND into Thai language. The ICC_(3,1) of the Thai FTND was 0.83 and Cronbach's alpha was 0.52. Thus, it can be used in both clinical treatment and research settings for evaluating nicotine dependence level in Thai smokers.

What is already known on this topic?

There are many Thai versions of the FTND with no report on the psychometric properties. The lack of a standardized version of the questionnaire leads to poor assessment and comparability.

What this study adds?

This study translated the FTND into the Thai language by using the standard method according to the cross-cultural adaptation process and evaluated the test-retest reliability and internal consistency of the Thai version of the FTND. The results revealed the test-retest reliability and internal consistency of the Thai version was in line with the original version. Therefore, this Thai FTND could be used in clinical treatment and research settings.

Acknowledgement

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Potential conflicts of interest

None.

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การตรวจสอบความแม่นยำในการทดสอบซ้ำ และความสอดคล้องภายใน ของแบบสอบถาม Fagerstrom Test for Nicotine Dependence ฉบับภาษาไทย

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วัตถุประสงค์: ตรวจสอบความแม่นยำในการทดสอบซ้ำ และความสอดคล้องภายในของแบบสอบถาม Fagerstrom Test for Nicotine Dependence (FTND) ฉบับภาษาไทย

วัสดุและวิธีการ: ดำเนินการแปลแบบสอบถาม FTND เป็นภาษาไทยด้วยวิธีการแปลภาษาตามแนวทางการปรับข้ามวัฒนธรรม หลังจากนั้นดำเนินการตรวจสอบความน่าเชื่อถือในผู้สูบบุหรี่ โดยให้ผู้เข้าร่วมการศึกษาทำแบบสอบถามด้วยตนเอง 2 ครั้ง ห่างกัน 7 วัน

ผลการศึกษา: ผู้เข้าร่วมการศึกษามีจำนวน 130 คน มีอายุเฉลี่ย 32.4 ปี ซึ่งร้อยละ 45.4 สำเร็จการศึกษาระดับมัธยมศึกษา ผู้เข้าร่วมการศึกษามีอายุเฉลี่ยวันละ 11.0 มวน โดยสูบบุหรี่มาแล้วเฉลี่ย 11.3 ปี การทดสอบความน่าเชื่อถือของแบบประเมินด้วยวิธีการทดสอบซ้ำ พบว่ามีค่า ICC เท่ากับ 0.83 และมีค่าความสอดคล้องภายใน Cronbach's alpha เท่ากับ 0.52

สรุป: ค่า ICC และ Cronbach's alpha ของแบบสอบถาม FTND ฉบับภาษาไทยนี้มีค่าใกล้เคียงกับต้นฉบับ ดังนั้นจึงสามารถนำแบบสอบถาม FTND ฉบับภาษาไทยไปใช้ในทางคลินิก และการศึกษาได้
