

Reliability and validity of the Vietnamese version of the FOSQ-10 questionnaire in patients with obstructive sleep apnea

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ABSTRACT

Background: Obstructive Sleep Apnea (OSA) significantly impacts the functional outcomes and daily quality of life (QoL) of affected individuals. This study aims to evaluate the clinical and polysomnographic features of individuals with obstructive sleep apnea (OSA) and to validate the psychometric aspects of the Vietnamese version of the Functional Outcomes of Sleep Questionnaire (FOSQ-10).

Methods: A cross-sectional study was performed on 112 patients, including 84 OSA and 28 snoring, at the University Medical Center. The FOSQ-10 and the Pittsburgh Sleep Quality Index (PSQI) were used as research tools. Validation methods included assessing content validity (I-CVI), face validity, internal consistency (Cronbach's alpha), and construct validity through Exploratory Factor Analysis (EFA).

Results: The OSA group was mostly male (71%) and had an average age of 52.62 ± 14.47 years. Polysomnography showed that 58.3% of patients had severe OSA, with a median AHI of 36.3 (IQR: 18.35–56.48) events/hour and a median nadir SpO₂ of 75% (IQR: 68–80%).

The Vietnamese FOSQ-10 demonstrated excellent content validity (I-CVI = kappa = 1.00) and strong face validity, as patients found the questionnaire easy to understand and relevant to their condition. The internal consistency was high (Cronbach's alpha = 0.782), and test-retest reliability reached an excellent level (0.969). EFA found a structure with three factors: Productivity, Social Interference, and Activity Level/Social Outcome. All ten items had factor loadings greater than 0.55.

Concurrent validity was confirmed by a statistically significant correlation with the PSQI ($r_s = -0.352$). Additionally, the FOSQ-10 successfully discriminated between patients with poor sleep quality (PSQI ≥ 5) and those with good sleep quality. The median total FOSQ-10 score was 15.31 (IQR: 12.67–17.70), and the "Intimacy and Sexual Relationships" domain had the lowest score, with a median of 2.0.

Conclusion: The Vietnamese validation of the FOSQ-10 is a reliable and valid instrument for assessing the impact of OSA on functional outcomes. The study highlights that a majority of OSA patients present with severe disease and significant impairment across multiple quality-of-life domains.

Keywords: Obstructive Sleep Apnea, FOSQ-10, Quality of Life, Validation, Vietnam.

THE VIETNAMESE VALIDATION OF THE FOSQ-10 QUESTIONNAIRE

Vài người trong số chúng ta gặp khó khăn trong việc thực hiện những hoạt động hàng ngày do cảm thấy mệt mỏi hoặc buồn ngủ. Mục đích của bản câu hỏi dưới đây là để tìm hiểu liệu ông (bà) có gặp khó khăn khi thực hiện các hoạt động do ông (bà) quá buồn ngủ hoặc mệt mỏi. Trong bản câu hỏi, khi từ “buồn ngủ” hoặc “mệt mỏi” được sử dụng, chúng có nghĩa chỉ trạng thái khi mắt ông (bà) không thể mở, đầu ông (bà) nặng trĩu và muốn gục xuống ngủ thiếp đi, hoặc khi ông (bà) cảm thấy thôi thúc phải ngủ một giấc. Những từ nêu trên không chỉ trạng thái mệt mỏi hoặc kiệt sức sau khi tập thể thao.

HƯỚNG DẪN: Vui lòng đánh dấu (x) vào ô vuông tương ứng với câu trả lời ông (bà) chọn cho mỗi câu hỏi. Vui lòng chỉ chọn một câu trả lời cho từng câu hỏi và trả lời chính xác nhất có thể. Mọi thông tin cung cấp sẽ được bảo mật.

(0) Tôi không làm việc này vì các lí do khác	(4) Không gặp khó khăn nào	(3) Có, khó khăn một chút	(2) Có, khó khăn mức trung bình	(1) Có, khó khăn rất nhiều
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1. Ông (Bà) có gặp khó khăn trong việc tập trung khi làm một việc nào đó vì ông (bà) bị buồn ngủ hoặc mệt mỏi?

☐☐☐☐

2. Nhìn chung ông (bà) có gặp khó khăn để ghi nhớ thứ này thứ kia vì ông (bà) bị buồn ngủ hoặc mệt mỏi?

☐☐☐☐

3. Ông (Bà) có gặp khó khăn khi lái xe trong cự li ngắn (dưới 100km) vì ông (bà) bị buồn ngủ hoặc mệt mỏi?

☐☐☐☐☐

4. Ông (Bà) có gặp khó khăn khi lái xe trong cự li dài (trên 100km) vì ông (bà) bị buồn ngủ hoặc mệt mỏi?

☐☐☐☐☐

(0) Tôi không làm việc này vì các lí do khác	(4) Không gặp khó khăn nào	(3) Có, khó khăn một chút	(2) Có, khó khăn mức trung bình	(1) Có, khó khăn rất nhiều
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5. Ông (Bà) có gặp khó khăn khi đến thăm người thân hoặc bạn bè tại nhà của họ vì ông (bà) bị buồn ngủ hoặc mệt mỏi?

0

4

3

2

1

	(4) Không	(3) Có, một chút	(2) Có, mức trung bình	(1) Có, rất nhiều
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6. Mối quan hệ của ông (bà) với gia đình, bạn bè hoặc đồng nghiệp có bị ảnh hưởng vì ông (bà) bị buồn ngủ hoặc mệt mỏi?

4

3

2

1

(0) Tôi không làm việc này vì các lí do khác	(4) Không gặp khó khăn nào	(3) Có, khó khăn một chút	(2) Có, khó khăn mức trung bình	(1) Có, khó khăn rất nhiều
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7. Ông (Bà) có gặp khó khăn khi xem một bộ phim hoặc một cuộn băng vì ông (bà) bị buồn ngủ hoặc mệt mỏi?

0

4

3

2

1

8. Ông (Bà) có gặp khó khăn để hoạt động hiệu quả như ông (bà) muốn vào buổi chiều tối vì ông (bà) bị buồn ngủ hoặc mệt mỏi?

4

3

2

1

9. Ông (Bà) có gặp khó khăn để hoạt động hiệu quả như ông (bà) muốn vào buổi sáng vì ông (bà) bị buồn ngủ hoặc mệt mỏi?

4

3

2

1

(0) Tôi không tham gia hoạt động tình dục vì các lí do khác	(4) Không	(3) Có, một chút	(2) Có, ở mức trung bình	(1) Có, rất nhiều
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10. Ham muốn tình dục và gần gũi của ông (bà) có bị ảnh hưởng vì ông (bà) bị buồn ngủ hoặc mệt mỏi?

0

4

3

2

1

THE ORIGINAL FOSQ-10 (ENGLISH)

FUNCTIONAL OUTCOMES OF SLEEP QUESTIONNAIRE (FOSQ)

Some people have difficulty performing everyday activities when they feel tired or sleepy. The purpose of this questionnaire is to find out if you generally have difficulty carrying out certain activities because you are too sleepy or tired. In this questionnaire, when the words “sleepy” or “tired” are used, it means the feeling that you can’t keep your eyes open, your head is droopy, that you want to “nod off”, or that you feel the urge to take a nap. These words do not refer to the tired or fatigued feeling you may have after you have exercised.

DIRECTIONS: Please put a (x) in the box for your answer to each question. Select only **one** answer for each question. Please try to be as accurate as possible. All information will be kept confidential.

(0) I don't do this activity for other reasons	(4) No difficulty	(3) Yes, a little difficulty	(2) Yes, moderate difficulty	(1) Yes, extreme difficulty
	☐	☐	☐	☐
	☐	☐	☐	☐
	☐	☐	☐	☐
	☐	☐	☐	☐

1. Do you have difficulty concentrating on the things you do because you are sleepy or tired?
2. Do you generally have difficulty remembering things, because you are sleepy or tired?
3. Do you have difficulty operating a motor vehicle for short distances (less than 100 miles) because you become sleepy or tired?
4. Do you have difficulty operating a motor vehicle for long distances (greater than 100 miles) because you become sleepy or tired?

(0) I don't do this activity for other reasons	(4) No difficulty	(3) Yes, a little difficulty	(2) Yes, moderate difficulty	(1) Yes, extreme difficulty
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5. Do you have difficulty visiting with your family or friends in their home because you become sleepy or tired?

☐	☐	☐	☐	☐
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(4) No	(3) Yes, a little	(2) Yes, moderately	(1) Yes, extremely	
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6. Has your relationship with family, friends or work colleagues been affected because you are sleepy or tired?

☐	☐	☐	☐
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(0) I don't do this activity for other reasons	(4) No difficulty	(3) Yes, a little difficulty	(2) Yes, moderate difficulty	(1) Yes, extreme difficulty
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7. Do you have difficulty watching a movie or videotape because you become sleepy or tired?

☐	☐	☐	☐	☐
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8. Do you have difficulty being as active as you want to be in the evening because you are sleepy or tired?

☐	☐	☐	☐
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9. Do you have difficulty being as active as you want to be in the morning because you are sleepy or tired?

☐	☐	☐	☐
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(0) I don't engage in sexual activity for other reasons	(4) No	(3) Yes, a little	(2) Yes, moderately	(1) Yes, extremely
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10. Has your desire for intimacy or sex been affected because you are sleepy or tired?

☐	☐	☐	☐	☐
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Thank you for completing this questionnaire.

INFORMATION ABOUT TRANSLATORS AND EXPERTS

A. Translators

Translators	Degree
Pham Le Xuan Quynh	Bachelor of Science in Finance, University of Fairleigh Dickinson, New Jersey, USA.
Trinh Nhu Hau	Bachelor of Finance and Accounting, University of Bath, School of Management, Bath, United Kingdom.
Le My Linh	Bachelor of Mathematics, Purdue University, Fort Wayne, College of Arts and Sciences, Indiana, USA.
Le Thuy Phuong Uyen	Bachelor of Commerce in Operations and Supply Chain Management, University of British Columbia – Sauder School of Business, Vancouver, Canada.

B. Experts

❖ Experts assess the accuracy of the meaning

Experts	Degree, Affiliation
Dao Thi Thanh Hien	Master of English Language, Lecturer Head of the Foreign Language Department, University of Medicine and Pharmacy at Ho Chi Minh City
Do Thi Minh Chau	Master of English Pedagogy, Lecturer in Foreign Languages, University of Medicine and Pharmacy at Ho Chi Minh City.
Nguyen Thanh Phong	Master of English Pedagogy, Lecturer in Foreign Languages, University of Medicine and Pharmacy at Ho Chi Minh City.
Nguyen Van Sa	Bachelor of English Education, Lecturer Head of Foreign Languages Department, FPT University, Ho Chi Minh City.

❖ **Clarity assessment experts**

Experts	Field of expertise
A.Prof. Le Thi Tuyet Lan, MD., PhD.	Respiratory – Sleep disorders
Le Thuong Vu, MD., PhD.	Respiratory
Nguyen Van Tho, MD., PhD.	Tuberculosis and lung diseases
Hoang Dinh Huu Hanh, MD., MSc.	Respiratory – Sleep disorders
Bui Diem Khue, MD., MSc.	Respiratory – Sleep disorders

**LETTER OF CONSENT TO CONDUCT RESEARCH AND
TRANSLATION OF THE FOSQ-10 QUESTIONNAIRE INTO
VIETNAMESE**

From: Quan Vu Tran Thien [mailto:vutranthienquan@gmail.com] **Sent:** Monday, September 03, 2018 9:06 AM **To:** Weaver, Terri E <teweaver@uic.edu> **Subject:** FOSQ-10: ask for permission

Dear Prof. Terri Weaver,

I'm Dr Vu Tran Thien Quan from University of Medicine and Pharmacy at Ho Chi Minh, Vietnam. I'm writing this email to ask for permission for translating and validating short version of Functional Outcomes of Sleep Questionnaire (FOSQ- 10). We already have the Vietnamese version of Epworth Sleep Questionnaire and Pittsburgh Sleep Quality Questionnaire but those are not designed to specifically use for assess OSA patients. We really need a tool to assess those patients and we think the FOSQ-10 may be a good tool for that.

We are honored if you could grant us permission to translate the FOSQ-10 into Vietnamese. The validation process will be follow current consensus on translating and validating questionnaire.

I look forward to receiving your reply soon,

Regards,

Vu Tran Thien Quan

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Vu Tran Thien Quan, MD, M.Sc.

Department of Physiology

University of Medicine and Pharmacy at Ho Chi Minh City

From: Weaver, Terri E <teweaver@uic.edu>

Date: Wed, Sep 5, 2018, 7:43 AM

Subject: RE: FOSQ-10: ask for permission

To: Quan Vu Tran Thien <vutranthienquan@gmail.com>

Vu Tran Thien Quan,

You have my permission to translate the FOSQ10 into Vietnamese. I have attached the FOSQ10 and a letter of agreement. There is no cost for using the instrument. Once I receive the signed letter, I will send you the scoring Excel file for scoring. Regarding the translation, please perform both forward and backward translations

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and send me the backward translation for review and approval. All translations are covered under my copyright. Please let me know if you have any questions.

Take care,

Terri E. Weaver, PhD, RN, FAAN, ATSF

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AUTHOR'S PERMISSION LETTER REGARDING THE CONVERSION OF DISTANCE UNITS

From: Quan Vu Tran Thien <vutranthienquan@gmail.com> **To:** Terri Weaver
<teweaver@uic.edu> **Subject:** Re: FOSQ-10: ask for permission

Dear Prof Wearer,

We are translating FOSQ-10 into Vietnamese but there is a problem.

Question no.4 and 5 use miles to estimate distance. (Eg: Do you have difficulty operating a motor vehicle for long distances (greater than 100 miles) because you become sleepy or tired?). In Vietnamese, we use metric system for distance (eg: meter, Km) so it would be difficult for patients to estimate distance in mile.

We would like to change mile into kilometer and modify as below:

Question no 3: Do you have difficulty operating a motor vehicle for short distances (less than 100 **kilometers** because you become sleepy or tired?

Question no 4: Do you have difficulty operating a motor vehicle for long distances (greater than 100 **kilometers**) because you become sleepy or tired? (although 100 miles = 160 kilometers).

We would like to change these as we think the concept of 160 kilometers instead of 100 kilometers does not make sense while you estimate distance.

Please advice us if we can change as mentioned above.

Thank you so much.

Regards,

Quan

From: **Weaver, Terri E** <teweaver@uic.edu> Subject: Re: FOSQ-10: ask for permission To: Quan Vu Tran Thien <vutranthienquan@gmail.com>

Quan, I have encountered this problem with other translations. OK, I approve the change. I was going to suggest 160, but I agree with your rationale of not doing so. It is just an estimate of driving distance so it does not have to be exact.

Take care,
Terri

CONTENT ASSESSMENT FINAL BACKWARD TRANSLATION AGAINST ORIGINAL SCALE

From: Quan Vu Tran Thien <vutranthienquan@gmail.com> **To:** Terri Weaver <teweaver@uic.edu> **Subject:** Re: FOSQ-10: ask for permission

Dear Prof Weaver,

I hope this email finds you well. It's a long time since our last contact. Thank you so much for approving us to translate FOSQ-10 into Vietnamese.

We have finished our backward translation. Please check my attachments for the condition agreement and backward translation of FOSQ-10.

Are there anythings we need to complete before you send us your scoring for FOSQ-10?

Looking forward to hearing from you,

Best,

Quan

From: **Weaver, Terri E** <teweaver@uic.edu> Subject: Re: FOSQ-10: ask for permission To: Quan Vu Tran Thien <vutranthienquan@gmail.com>

Quan, the backward translation is fine. Can you please send me the questionnaire in Vietnamese? I have attached the scoring instructions and Excel file that will score individual questionnaires. Please let me know if you have any questions.

Take care,
Terri