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ORIGINAL ARTICLE

Adaptation and Validation of the Vietnamese Translated Diabetes Knowledge Questionnaire

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Abstract

Objectives. There is no existing Vietnamese diabetes knowledge questionnaire. This impedes assessment of patient knowledge that will be helpful in providing effective diabetes intervention. We aimed to validate the Vietnamese Translated Diabetes Knowledge Questionnaire (DKQ).

Methodology. Translation and adaptation strictly followed the guidelines of Beaton et al. Internal consistency was assessed by Cronbach's alpha coefficient, test-retest reliability was assessed by Fleiss' Kappa coefficient, and validity value was determined among type 2 diabetes patients in a general hospital.

Results. The Vietnamese version of the DKQ had good internal consistency (Cronbach's alpha for all items = 0.898) and stability (Kappa coefficient >0.600). The average score for all equivalence criteria was 1.00, demonstrating good equivalence to the original. The significant difference between knowledge score and education level (p <0.001) confirmed construct validity.

Conclusion. Our study provided a reliable Vietnamese version of the DKQ. Future studies may apply the version in different regions in Vietnam to determine external validity.

Key words: diabetes, diabetes knowledge questionnaire, translation, Vietnamese

INTRODUCTION

Diabetes is one of the most prevalent non-communicable diseases in the world.[1-3] In 2021, the International Diabetes Federation (IDF) estimated that there were 537 million people with diabetes worldwide, and this was predicted to increase to 783 million by 2045.[4] It was estimated that over 3.5 million Vietnamese people were living with diabetes in 2015, and this increased to approximately 5.76 million in 2020.[5,6] According to the World Health Organization (WHO), more than half of people with diabetes in Vietnam are unaware of their disease, delaying early diagnosis and management.[7]

Disease knowledge is considered the foundation for diabetes self-management. Patients with good disease knowledge have fewer misconceptions and better understanding of the consequences of diabetes, which improves adherence to medications and a better lifestyle.[8-12] Patients with diabetes (PWD) need lifelong self-management to prevent or delay acute and chronic complications. The American Diabetes Association guideline emphasizes that all patients should receive diabetes self-management and support.[13] Studies show that diabetes self-management interventions improved knowledge, self-care behavior, and reduced HBA1c.[13-16]

An appropriate diabetes knowledge assessment questionnaire is essential to conducting diabetes self-management support and intervention. However, most assessment questionnaires either consist of too many options or are too long, making it difficult to assess and manage diabetes patients in developing countries with low education levels, including Vietnam. For example, the Diabetes Self-Care Knowledge by Adibe et al., may be too long with 30 sentences; while the Michigan Diabetes Knowledge Test by Fitzgerald et al., may be difficult for Vietnamese to answer due to cultural differences.[17,18] To illustrate, one question about high-carbohydrate food is correctly answered with "baked chicken/Swiss cheese/baked potato/peanut butter," which are uncommon food in Vietnam.[18]

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In 2019, the proportion of collegiate or equivalent educational attainment of the population aged 25 years and above in Vietnam was 10.2%. This was relatively low compared to 15.6% in Thailand, 32.4% in Singapore and 46.6% in the United Arab Emirates.[19] The mean score of the English Proficiency Index of Vietnamese was 473/800 in 2020, listed under the low-proficiency category.[20] This suggests that most Vietnamese patients could merely engage in short and simple conversation, and may be unable to under-stand and complete a diabetes knowledge questionnaire in the English language. Thus, developing a simple, culturally suitable and valid knowledge questionnaire for Vietnamese patients with diabetes is crucial.

The Diabetes Knowledge Questionnaire (DKQ) developed by Garcia et al. is a set of questions that assess diabetes knowledge.[21] It consists of 24 questions answerable by one of three choices: "yes", "no" or "I don't know." Each correct answer is equivalent to one point. Overall, the Cronbach's alpha value of the 24 questions is 0.78. The structural value expressed through the mean knowledge score of patients participating in a diabetes education program is higher than that of patients not participating (p<0.001), and the relationship between knowledge score and education level is significant (p<0.001). The questionnaire has been translated and adjusted into many different languages.[22] The DKQ may be a more appropriate and effective questionnaire for use in Vietnam because its content about diabetes knowledge is adequate and suitable for all patients, including those with low education levels in developing countries. It is an easy and quick tool for assessing diabetes knowledge for clinical and research purposes.

The DKQ has not been translated and adapted for use in Vietnam. In this study, we conducted translation, cultural adaptation and validation of the first Vietnamese version DKQ for future assessment of patient knowledge on diabetes.

METHODOLOGY

Study design and population

We conducted a study on outpatients with type 2 diabetes mellitus consulting at Hau Giang General Hospital, Vietnam. A pilot study involving 30 participants was conducted from January 2 to 6, 2020, while questionnaire validation involving 87 participants was conducted from January 7 to February 29, 2020.

Eligible patients were 18 years old or older, and treated with at least one diabetes medicine for at least 6 months, to ensure that participants had similar baseline knowledge on diabetes.

Patients were excluded if they were pregnant, foreigners or they did not consent to participate in the study. We also excluded those who failed to complete at least one question set/study scale. Patients who participated in a diabetes knowledge study within the past year were also excluded because they may have higher baseline diabetes knowledge which may result in higher DKQ scores.

Ethics approval

The study was approved by the Ethical Council of Ho Chi Minh City Medicine and Pharmacy University. All information of study participants was encrypted, securely kept and used only for research purposes.

Translation, adaptation, and validation

We translated and adapted the DKQ according to a five-step process described by Beaton et al.[23,24]

Step 1: Initial translation

The DKQ was translated from English to Vietnamese by two independent Vietnamese translators who were fluent in English. The first had clinical background and knowledge about research concepts, while the second had no medical background and was not informed of the research objectives. We obtained two translations referred to as T1 and T2.

Step 2: Translation synthesis

The two translations were synthesized by another translator experienced in methodology, resulting in the T12 translation.

Step 3: Back-translation

Two translators without medical expertise who did not know the research objectives and the original questionnaire worked independently to translate the T12 translation into English, obtaining the BT1 and BT2 translations.

Step 4: Expert committee evaluation

A committee including eight members (five translators from the above steps, two doctors with research expertise, and an expert in research methods) worked independently to compare all the DKQ versions translated from the above stages with the original version. The evaluation criteria were: (a) semantic equivalence, pertaining to the equivalence of meaning or multiple meanings of the words, and grammar when translating; (b) idiomatic equivalence, defined as the equivalent expression when translating idioms; (c) experiential equivalence, relating to the equivalence of adjusting to adapt to the target culture when translating daily task expressions; and (d) conceptual equivalence, referring to the equivalence of adjusting to adapt the different meanings of specific word expressions of different cultures.

Experts gave 1 point if there was an equivalent and 0 if there was no equivalent for each item. Items that failed to

achieve absolute equivalence (8/8) for all four criteria were gathered and adjusted to increase equivalence. The consensus was reached when all experts agreed on the same point. Following discussion, the experts reached a consensus on the pre-final wording of the Vietnamese version.

Step 5: Tests of the adapted version

Stage 1: Pilot study

This step evaluated the clarity and comprehensibility of the DKQ. Thirty patients were recruited by convenience sampling method and were interviewed face-to-face. Participants evaluated the wording of each item of the pre-final version on a scale from 0 (very confusing expression) to 10 (very clearly and easily understandable expression). Items with a mean score of less than or equal to 9 were then adjusted by the expert committee.

Stage 2: Questionnaire validation study

We conducted a cross-sectional study on 87 patients. This was based on the recommendation of a sample size of at least 50 patients to evaluate a questionnaire from Terwee et al.[25] Each patient was interviewed twice, two weeks apart.

During the first interview, eligible patients were interviewed face-to-face at the Internal Medicine clinic of the Outpatient Department at Hau Giang General Hospital. The second interview was conducted via phone. The patients rated the wording of each item in the trial version on a scale of 0 (very difficult to understand) to 10 (very clear and easy to understand). The expert committee reviewed and adjusted items with an average score of ≤9 to form a complete version. The author of the study was in charge of conducting the interviews. The purpose of this step was to evaluate the reliability and validity of the questionnaire.

Statistical analysis

Data were collected and processed using IBM® SPSS® 20.0 and Microsoft Excel 2013 software. Continuous variables with a normal distribution were represented by mean and standard deviation.

Qualitative variables were represented by frequency and percentages. Mann-Whitney and Kruskal-Wallis tests were used to determine the differences in the median knowledge scores of gender, age group, insulin use, illness duration, comorbidities, and education level. A P value <0.05 was considered statistically significant.

We tested the reliability of the Vietnamese version through internal consistency and test-retest. Internal consistency was based on Cronbach's alpha coefficients. Test-retest was assessed by the Fleiss' kappa coefficient, based on the repeatability of the results of the first and second interviews.

The validity of the version was evaluated through content and construct validity. Content validity was measured based on the consensus of the experts on the equivalence between the translation and the original version. Construct validity was evaluated by identifying whether the relationship between the items and scale content was compatible with the hypothesis of the study about the score outcomes of different populations. The questionnaire would achieve construct validity if a significant difference between diabetes knowledge and patient characteristics was found. Construct validity was investigated based on the significant differences of first response questionnaire results according to different patient characteristics (gender, age, insulin use, illness duration, comorbidities and education level).

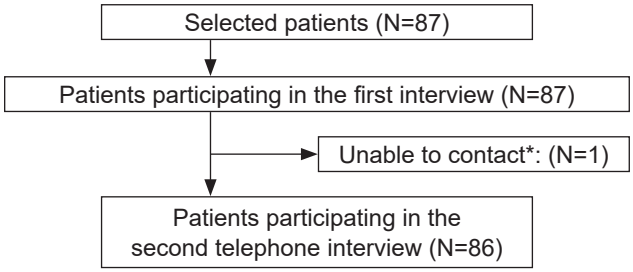

Figure 1. Study population flowchart.

* One patient was counted as "unable to contact" after seven failed contact attempts (first day, 3 times, 30 minutes apart; and 4 consecutive days thereafter, once daily).

RESULTS

Population characteristics

A total of 30 patients with mean age of 62.50 ± 11.77 years were included in the pilot study. Majority of the participants were male (n=19, 63.3%) and had comorbidities (86.6%) (Table 1).

We conducted two interviews for the questionnaire validation process,. The first interview had 87 participants with a mean age of 66.87 ± 9.93 years, 51.7% of whom were male (Table 2). The second interview had 86 participants (Figure 1).

Validity evaluation

Content validity is the ability to appropriately measure and comprehensively evaluate research issues, assessed by the consensus of experts. After the expert committee consensus, the equivalence assessment score was 1.00 for all four equivalence criteria, which was considered as high equivalence to the original (Table 3).

In the pilot study, the clarity and comprehension score of the 24 questions was 9.98 ± 0.03 (Table 4). The main discrepancies between the original and the Vietnamese version of the DKQ questionnaire from the initial translation (Step 1) to the pilot test of the adapted version (Stage 1 of Step 5) are presented in Table 5. After the pilot study, we formulated a complete Vietnamese version (Table 6).

Table 1. Patient characteristics of the pilot study

Patient characteristics	n (%) (N=30)
Gender	
Male	11 (36.7)
Female	19 (63.3)
Age, year	62.5 ± 11.77[a]
Age group	
<65 years	14 (46.7)
≥65 years	16 (53.3)
Illness duration	
<5 years	8 (26.7)
5-10 years	6 (20.0)
>10 years	16 (53.3)
Comorbidities	
0	4 (13.4)
1 disease	19 (63.3)
≥2 diseases	7 (23.3)
Educational level	
Primary school	15 (50.0)
Junior high school	8 (26.7)
High school and higher	7 (23.3)

[a]Age presented as mean ± standard deviation

Table 2. Patient characteristics of the validation study

Patient characteristics	n (%) (N=87)	*p* value
Gender		0.008
Male	42 (48.3)	
Female	45 (51.7)	
Age, year	66.87 ± 9.93[a]	
Age group		0.105
<65 years	33 (37.9)	
≥65 years	54 (62.1)	
Illness duration		0.552
<5 years	13 (14.9)	
5-10 years	24 (27.6)	
>10 years	50 (57.5)	
Comorbidities		0.175
0	11 (12.7)	
1 disease	57 (65.5)	
≥2 diseases	19 (21.8)	
Educational level		<0.001
Primary school	38 (43.7)	
Junior high school	33 (37.9)	
High school and higher	16 (18.4)	
Insulin use		0.255
Yes	29 (33.3)	
No	58 (66.7)	

[a]Age presented as mean ± standard deviation

Table 3. Equivalence assessment by the expert committee

Item	Semantic equivalence	Idiomatic equivalence	Experiential equivalence	Conceptual equivalence
A1*	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)
A2*	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)
1	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)
2	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)
3	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)
4	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)
5	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)
6	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)
7	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)
8	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)
9	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)
10	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)
11	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)
12	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)
13	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)
14	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)
15	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)
16	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)
17	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)
18	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)
19	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)
20	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)
21	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)
22	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)
23	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)
24	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)	1.0 (8/8)
Mean	1.0	1.0	1.0	1.0

*A1 and A2 are the instructions to answering the questionnaire.

Table 4. Comprehensive score of the items rated by participants in the pilot study

Item	Semantic equivalence
A1*	10.00 ± 0.00
A2*	10.00 ± 0.00
1	10.00 ± 0.00
2	10.00 ± 0.00
3	10.00 ± 0.00
4	10.00 ± 0.00
5	10.00 ± 0.00
6	10.00 ± 0.00
7	10.00 ± 0.00
8	10.00 ± 0.00
9	10.00 ± 0.00
10	10.00 ± 0.00
11	10.00 ± 0.00
12	9.53 ± 0.68
13	10.00 ± 0.00
14	10.00 ± 0.00
15	10.00 ± 0.00
16	10.00 ± 0.00
17	10.00 ± 0.00
18	10.00 ± 0.00
19	10.00 ± 0.00
20	10.00 ± 0.00
21	10.00 ± 0.00
22	10.00 ± 0.00
23	10.00 ± 0.00
24	10.00 ± 0.00
Mean Score	9.98 ± 0.03

[a] A1 and A2 are the instructions to answering the questionnaire.
[b] SD, standard deviation

Table 5. Main adjustments and discrepancies between the original and the Vietnamese versions

Item	Discrepancy	Solution
3. Diabetes is caused by failure of the kidneys to keep sugar out of the urine.	The expression of “failure of the kidneys” is unnatural in Vietnamese.	We translated “by failure of the kidneys to keep sugar out of the urine” into “due to decreased ability of the kidneys to retain sugar (made sugar migrate into urine)” in Vietnamese.
12. An insulin reaction is caused by too much food.	The expression of "insulin reaction" seems unnatural and academic in Vietnamese and made it difficult for participants to understand.	We translated “An insulin reaction is caused” into “Insulin is secreted” in Vietnamese.

Table 6. Original and Vietnamese diabetes knowledge questionnaires

Item	Original version	Vietnamese version
1	Eating too much sugar and other sweet foods is a cause of diabetes.	Ăn quá nhiều đường và các loại thực phẩm ngọt là nguyên nhân của bệnh đái tháo đường
2	The usual cause of diabetes is lack of effective insulin in the body.	Nguyên nhân thường gặp của đái tháo đường là insulin hoạt động không hiệu quả trong cơ thể
3	Diabetes is caused by failure of the kidneys to keep sugar out of the urine.	Bệnh đái tháo đường là do khả năng giữ lại đường của thận bị giảm (làm cho đường vào nước tiểu)
4	Kidneys produce insulin.	Thận sản xuất ra insulin
5	In untreated diabetes, the amount of sugar in the blood usually increases.	Khi bệnh đái tháo đường không được điều trị, đường huyết thường tăng
6	If I am diabetic, my children have a higher chance of being diabetic.	Nếu ông/bà mắc bệnh đái tháo đường, các con của ông/bà có nguy cơ mắc bệnh đái tháo đường cao so với bình thường
7	Diabetes can be cured.	Bệnh đái tháo đường có thể được chữa khỏi
8	A fasting blood sugar level of 210 is too high.	Mức đường huyết đói bằng 210 mg/dl (= 11,55 mmol/L) là quá cao
9	The best way to check my diabetes is by testing my urine.	Cách tốt nhất để kiểm tra bệnh đái tháo đường là xét nghiệm nước tiểu
10	Regular exercise will increase the need for insulin or other diabetic medication.	Tập thể dục thường xuyên sẽ làm tăng nhu cầu về insulin hoặc các thuốc điều trị đái tháo đường
11	There are two main types of diabetes: type 1 (insulin-dependent) and type 2 (non-insulin dependent).	Bệnh đái tháo đường có 2 type chính: type 1 (phụ thuộc insulin) và type 2 (không phụ thuộc insulin)
12	An insulin reaction is caused by too much food.	Insulin được tiết ra sau khi ăn quá nhiều
13	Medication is more important than diet and exercise to control my diabetes.	Để kiểm soát bệnh đái tháo đường thì việc dùng thuốc quan trọng hơn chế độ ăn uống và luyện tập
14	Diabetes often causes poor circulation.	Bệnh đái tháo đường thường dẫn đến tuần hoàn máu kém
15	Cuts and abrasions on diabetics heal more slowly.	Đối với các bệnh nhân bị đái tháo đường, các vết thương hay trầy xước lâu lành hơn
16	Diabetics should take extra care when cutting their toenails.	Bệnh nhân đái tháo đường nên cẩn thận hơn khi cắt móng tay chân
17	A person with diabetes should cleanse a cut with iodine and alcohol.	Người bị đái tháo đường nên rửa sạch vết thương bằng iốt và cồn
18	The way I prepare my food is as important as the foods I eat.	Cách ông/bà chế biến thức ăn cũng quan trọng như những thực phẩm ông/bà ăn
19	Diabetes can damage my kidneys.	Bệnh đái tháo đường có thể làm hỏng thận của ông/bà
20	Diabetes can cause loss of feeling in my hands, fingers, and feet.	Bệnh đái tháo đường có thể gây mất cảm giác ở tay, ngón tay và bàn chân của ông/bà
21	Shaking and sweating are signs of high blood sugar.	Run và đổ mồ hôi là dấu hiệu của đường huyết cao
22	Frequent urination and thirst are signs of low blood sugar.	Đi tiểu thường xuyên và hay khát nước là dấu hiệu của đường huyết thấp
23	Tight elastic hose or socks are not bad for diabetics.	Vớ/tất áp lực không gây hại cho bệnh nhân đái tháo đường
24	A diabetic diet consists mostly of special foods.	Một chế độ ăn kiêng cho bệnh nhân đái tháo đường chủ yếu bao gồm các loại thực phẩm đặc biệt

Table 7. Results of the DKQ questionnaire according to patient characteristics

Patient characteristics	n (%) (N=87)	Average questionnaire score	*p* value
Gender	66.87 ± 9.93		
Male			0.105[b]
Female	33 (37.9)	14.12 ± 5.92	
Age, year	54 (62.1)	12.30 ± 5.37	
Age group			0.008[b]
<65 years	42 (48.3)	14.55 ± 6.03	
≥65 years	45 (51.7)	11.53 ± 4.83	
Illness duration			0.175[c]
<5 years	11 (12.7)	14.45 ± 5.20	
5-10 years	57 (65.5)	13.39 ± 6.14	
>10 years	19 (21.8)	10.95 ± 3.52	
Comorbidities			0.552[c]
0	13 (14.9)	11.85 ± 6.07	
1 disease	24 (27.6)	13.42 ± 5.68	
≥2 diseases	50 (57.5)	13.08 ± 5.55	
Educational level			<0.001[c]
Primary school	38 (43.7)	7.97 ± 2.98	
Junior high school	33 (37.9)	14.76 ± 2.64	
High school and higher	16 (18.4)	21.25 ± 0.93	
Insulin use			0.255[b]
Yes	29 (33.3)	14.03 ± 6.15	
No	58 (66.7)	12.47 ± 5.31	

[a]Age presented as mean ± standard deviation
[b]Mann-Whitney test
[c]Kruskal-Wallis test

Construct validity, defined as the possibility of finding a difference between different population groups, was assessed by the differences in the median knowledge scores according to participants' characteristics in the first interview of the questionnaire validation study. The average patient knowledge score in the study was 12.99 ± 5.62 points. There was a significant difference in diabetes knowledge scores between different education levels. Patients who received high school or higher education had better diabetes knowledge than patients with lower education levels (p<0.001). There was a significant difference in the median knowledge scores between males and females. Male patients had higher knowledge scores compared to female patients (p=0.008) (Table 7).

Reliability validation

Cronbach's alpha coefficient of all questionnaire items was 0.898 was assessed in 87 patients. The total variable correlation coefficient of all items was >0.3 (Table 8).

We assessed questionnaire stability based on the repeatability of the first and second responses of 86 patients. All items of the Vietnamese version had a kappa coefficient greater than 0.600 (Table 9).

Table 8. Cronbach's alpha values of the questionnaire

Item	Total variable correlation coefficients	Cronbach's alpha coefficients if the item is removed
1	0.420	0.895
2	0.670	0.889
3	0.589	0.892
4	0.519	0.893
5	0.481	0.894
6	0.414	0.896
7	0.483	0.894
8	0.508	0.893
9	0.599	0.891
10	0.610	0.891
11	0.390	0.896
12	0.366	0.896
13	0.394	0.896
14	0.692	0.888
15	0.301	0.897
16	0.362	0.896
17	0.325	0.897
18	0.424	0.895
19	0.403	0.896
20	0.530	0.893
21	0.743	0.887
22	0.743	0.887
23	0.325	0.897
24	0.371	0.897
Cronbach's alpha coefficient of all items		0.898

Table 9. Kappa coefficient of the questionnaire

Item	Kappa coefficient	*p* value
1	0.945	<0.001
2	0.930	<0.001
3	1,000	<0.001
4	0.731	<0.001
5	0.849	<0.001
6	0.861	<0.001
7	0.728	<0.001
8	0.873	<0.001
9	0.782	<0.001
10	0.917	<0.001
11	0.639	<0.001
12	0.838	<0.001
13	0.858	<0.001
14	1.000	<0.001
15	0.845	<0.001
16	0.882	<0.001
17	0.829	<0.001
18	0.839	<0.001
19	1.000	<0.001
20	0.930	<0.001
21	1.000	<0.001
22	1.000	<0.001
23	0.830	<0.001
24	1.000	<0.001

Mean duration to complete the validated version

The mean time needed to complete the questionnaire was calculated in the first interview of 87 patients. The results showed that patients took 5 to 12 minutes, with an average of 9.43 ± 1.79 minutes, to complete the questionnaire.

DISCUSSION

The pilot survey's clarity and comprehension score for the 24 questions was 9.98 ± 0.03, demonstrating a clear and easily understandable question expression. Two items of the DKQ questionnaire were difficult to translate. The significant challenges were linguistic and expression differences. For example, the expression "failure of the kidney" in item 3 is translated as "the lack of success of the kidney" in Vietnamese, which made the information confusing.

Cronbach's alpha coefficient for all questions was 0.898, which indicated good consistency. The result was higher than the original (0.780).[21] The reason may be because Cronbach's alpha is specific to the survey population. Differences between patient characteristics, such as age, education level and comorbidities, in two studies conducted on two different countries and populations affected knowledge score results. Other questionnaire translation and validation studies also showed different Cronbach's alpha coefficients compared to the original. For example, Cronbach's alpha in Bukhsh et al's DKQ translation and adaptation into Urdu study was 0.702.[22]

The total variable correlation coefficients of the questionnaire ranged from 0.301 to 0.743, and all question values were above 0.3. This showed that all the questions contributed to assessing diabetes knowledge.[26]

All items of the Vietnamese version achieved a good kappa coefficient (>0.600), indicating questionnaire stability.[27] Four questions had good correlation between the first and second interviews (kappa coefficient ranged from 0.600 to 0.800,) and 14 questions had very good correlation between the 2 interviews (kappa coefficient >0.800). For questions number 3, 14, 19, 21, 22 and 24, the second-interview answers perfectly coincided with the first-interview answers (kappa coefficient = 1.000).

There was a relationship between educational level and knowledge score, showing the structural value of the questionnaire. Patients who received high school or higher education had better diabetes knowledge than patients with lower education levels (p<0.001). This result was similar to many other diabetes patient knowledge studies.[21,22] This result suggested that more attention should be given to providing disease information to patients, especially among those with low education levels, to improve their knowledge and achieve better treatment efficacy.

There was a difference in scores between the two genders. Male patients had higher knowledge scores than females (p=0.008) (Table 8). Bukhsh et al., reported different results: the scores of the two gender groups were not statistically significant (p=0.11), possibly due to differences in survey populations.[22] Additionally, outcomes may be influenced by educational levels between male and female patients. Almost 67% of male patients in our study received junior

high school or higher education, compared to only 46.7% of females, affecting knowledge scores.

Our study was pioneering in its translation of the DKQ into Vietnamese. To increase the reliability and validity value of the Vietnamese version, we conducted a translation and adaptation process that strictly followed the recommendations of Beaton et al.[23,24] This guideline comprehensively assesses the questionnaire translation and adaptation process, and is widely used and applied in research.[28-32] The translation phases consisted of multiple steps from forward to backward translation and obtaining expert committee evaluation. Our Vietnamese questionnaire version was also adjusted to be simple and easily understood to suit various patient characteristics in Vietnam, including those with low education levels.

Our study also had several limitations. Being the first to translate the DKQ into Vietnamese, there were no other Vietnamese versions for comparison and evaluation of criterion validity. Furthermore, bias from missing data in our validation study might affect internal validity results. To prevent bias from missing data, future studies should give clear instructions to respondents and emphasize the need to answer the questionnaire as completely as possible, get assistance from the investigators during data collection, and follow-up patients to complete the questionnaire. In addition, the DKQ author (Ms. Alexandra A. Garcia, RN, MS) could not participate in the expert committee in our study.

Our study aimed to develop a knowledge assessment tool for the majority of patients, excluding special population groups such as pregnant women and patients with dementia. Future studies should be conducted in these special population groups as well.

CONCLUSION

Our study created a validated Vietnamese version of the DKQ with high equivalence to the original. All questions are simple, easy to understand, and suitable for a survey on Vietnamese patients with a high average score of clarity and comprehension of all items. The Vietnamese questionnaire version can assess patient knowledge and may help identify the relationship between patient knowledge and medication adherence or treatment outcomes. It may also be used as a knowledge assessment tool to design appropriate diabetes self-management programs and interventions. Further studies could apply the questionnaire version in different regions and populations in Vietnam to verify consistency, stability and validity in these specific regions and populations.

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