Title

Psychometric evaluation of the culturally and linguistically translated Vietnamese Chronic Kidney Disease Self-Management Instrument

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ABSTRACT

Aims: To translate and psychometrically test the modified Chronic Kidney Disease Self-Management instrument in Vietnamese language.

Background: Research on chronic kidney disease self-management is increasing although few patient-reported outcome measures are available in other languages.

Design: This study involved instrument modification, translation and cultural adaptation into Vietnamese followed by psychometric evaluation in a target population.

Methods: Following modification the instrument was translated by bilingual independent translators and then an expert panel assessed content face validity. Reliability of the instrument was assessed by internal consistency and test-retest reliability in a sample of 293 people with chronic kidney disease. Then exploratory factor analysis was used to evaluate construct validity of the Vietnamese version.

Results: The Vietnamese chronic kidney disease self-management instrument demonstrated excellent content face validity and internal consistency. The test-retest indicated good stability of the instrument over a two-week period. Four factors were identified using exploratory factor analysis and were named understanding my kidney disease, taking action to manage my kidney disease, seeking social support, and adhering to a healthy diet.

Conclusions: The translated and modified version is a valid, reliable and feasible patient-reported outcome measure of self-management behaviour in Vietnamese-speaking populations.

SUMMARY STATEMENT

What is already known about this topic?

- Globally chronic kidney disease affects 10–16% of the population and is rapidly rising in both developed and developing countries.
- Active involvement in self-management can prevent further deterioration of kidney function and slow the progression of chronic kidney disease.
- There are few patient-reported outcome measures in chronic kidney disease.

What this paper adds?

- The Vietnamese version of the Chronic Kidney Disease Self-Management instrument is a useful, valid and reliable measure to assess patients.
- The translated instrument can be used to evaluate the implementation of self-management programs in Vietnamese-speaking populations in other countries.

The implications of this paper:

- Nurses can use this instrument prior to and following patient education about chronic kidney disease to identify areas where additional support is needed.
- This instrument can be used in future research in countries where there are Vietnamese-speaking people, enabling further comparisons between studies.

KEYWORDS

Chronic kidney disease, instrument, nurses, renal failure, self-management, patient-reported outcome measure.

INTRODUCTION

Chronic kidney disease (CKD) is on rise in both developed and developing nations with an estimated prevalence of 10% to 16% globally (Dienemann et al., 2016; WHO, 2015). In Vietnam, the incidence of CKD is increasing rapidly due to the growing burden of diabetes and hypertension (Hyodo et al., 2017). There are also Vietnamese-speaking populations in many countries including the USA, Australia and Canada who are also at higher risk of developing CKD or who have CKD. CKD is classified into five stages based on estimated glomerular filtration rate (eGFR) with stage five also called end-stage kidney disease (ESKD) when kidney replacement therapy is required to sustain life (Webster, Nagler, Morton, & Masson, 2017). Having CKD is burdensome for both individuals as well as their families because of its effects on daily life and the extensive and long-term healthcare required (Almutary, Douglas, & Bonner, 2017). In addition, the growing number of people with CKD is creating more pressure on the healthcare system although there is evidence that active involvement in self-management can improve health and well-being (Lee, Wu, Hsieh, & Tsai, 2016; Lin, Liu, Hsu, & Tsai, 2017).

The healthcare system in Vietnam is complicated by the administrative structure, regulations, and a lack of coordination among different sectors and, as a consequence, the majority of people do not seek care from any formal healthcare source (Thuan, Lofgren, Lindholm, & Chuc, 2008). The healthcare system has an almost non-existent primary healthcare service (i.e. very few general practitioners) which means that people must attend an outpatient clinic even for a prescription of medications to treat chronic diseases such as hypertension or diabetes. Hospitals are also extremely overcrowded where it is common that hospital beds accommodate two or more patients in the same bed. In addition, discharge planning is not provided, and only very limited patient education occurs (Pron et al., 2008).

Background

People with chronic disease need to have skills to perform health-related tasks to manage and control their illness. These skills include both self-care and self-management although there are differences between these concepts (Kralik, Price, & Telford, 2010; Wilde & Garvin, 2007). Self-care refers to the everyday activities that an individual undertakes to maintain their physical and mental health. The everyday activities are focused on maintaining good health by preventing illness rather than managing an existing illness (Barlow, Wright, Sheasby, Turner, & Hainsworth, 2002; Clark et al., 1991). Self-care is therefore something that all people do or ought to do. Self-management in chronic disease refers to the positive efforts of individuals to actively manage their healthcare so as to optimise health, prevent complications, control symptoms, and to follow treatment regimens (Novak, Costantini, Schneider, & Beanlands, 2013; Von Korff, Gruman, Schaefer, Curry, & Wagner, 1997). In other words, self-management is about activities that are needed in addition to self-care to control an existing chronic disease.

The components of chronic disease self-management include self-integration, problem-solving, social support, and taking action (Audulv, Asplund, & Norbergh, 2012; Brooks, Andrade, Middleton, & Wallen, 2014; Hill-Briggs, 2003; Lin, Anderson, Chang, Hagerty, & Loveland-Cherry, 2008; Lorig & Holman, 2003). First, self-integration refers to a process of adjustment to living with chronic illness, balancing self-management practices within the context of everyday life (Audulv et al., 2012; Lin et al., 2008). For example, how a person incorporates positive changes related to diet, medications, lifestyle modifications or other treatments to fit their daily life. Second, problem-solving refers to the process of using self-management skills and activities to find solutions to difficult or complex situations (Hill-Briggs, 2003; Lorig & Holman, 2003). In other words, a person is able to identify a problem and generate possible

solutions to manage their disease or its treatment. Third, social support refers to a person's actions to seek resources or support from significant others to cope with their kidney disease and the psychosocial impact of their illness (Lin, Wu, Wu, Chen, & Chang, 2012). In the context of chronic disease, high social support can help people maintain their confidence to adhere to treatment plans and perform healthy behaviours (DiMatteo, 2004; Gopinath, Harris, Burlutsky, & Mitchell, 2013). Taking action, the final component, reflects a person's adherence to recommended treatment plans to control kidney disease (Lorig & Holman, 2003; Novak et al., 2013). It includes active self-management behaviour such as managing medications, healthy eating, smoking cessation and being more physically active to prevent complications and improve quality of life.

In CKD, regardless of the stage of the disease or whether a person is receiving dialysis, education can improve self-management behaviours and clinical outcomes (Bonner et al., 2014; Joboshi & Oka, 2016; Lee et al., 2016; Lin et al., 2017; Lopez-Vargas, Tong, Howell, & Craig, 2016; Welch et al., 2014) yet there are few suitable patient-reported outcome measures (PROMs) for this population. The Perceived Kidney/Dialysis Self-management Scale (PKDSMS) has been used to measure perceived competence in self-management behaviour in those receiving haemodialysis (Wild et al., 2017). However, this PROM was modified from a previous instrument designed to measure self-management in patients with specific medical condition such as diabetes and HIV. Only the Chronic Kidney Disease Self-Management (CKD-SM) instrument (Lin et al., 2012) measures the components of self-management: self-integration, problem-solving, seeking social support, and adherence to recommended treatment regimen. This 29-item PROM has been used to measure self-management behaviour across all stages of CKD (Chen et al., 2018; Lin, Tsai, Lin, Hwang, & Chen, 2013) and demonstrates good reliability (Cronbach's $\alpha = .95$ with the four subscales ranging from .77 to .93; Lin et

al., 2012). The CKD-SM instrument was initially developed in Mandarin and tested in Taiwan, although the authors published the instrument in English language (Lin et al., 2012). Recently it has been tested in an English-speaking country (Australia; Wembenyui, 2017), but it has not been translated and validated into other languages.

The CKD-SM instrument is needed in other languages such as Vietnamese for several reasons. First, translation of instruments allows for different language populations to be studied and then compared with others (Hilton & Skrutkowski, 2002; Willgerodt, Kataoka-Yahiro, Kim, & Ceria, 2005). Second, simple translation such as word for word into another language is not sufficient to account for linguistic and cultural differences between groups because colloquial phrases or expressions may vary (Hilton & Skrutkowski, 2002). Third, a sound translation process is needed to ensure the conceptual equivalence occurs so that the instrument measures the same theoretical construct in different language-populations (Hilton & Skrutkowski, 2002; Willgerodt et al., 2005). Lastly, clinicians can also use translated instruments to assess patients as part of routine care. The purpose of this study was to translate the CKD-SM instrument from English into Vietnamese and to test its psychometric properties in a Vietnamese-speaking CKD population.

METHODS

Aims

The purpose of the study was to modify and translate the Chronic Kidney Disease Self-Management instrument into Vietnamese language and to evaluate its psychometric properties.

Design

This study involved two phases. First the Chronic Kidney Disease Self-Management instrument was modified then a forward and backwards translation technique was used followed by an expert panel review. Next the translated instrument was subjected to a test-retest study.

Setting

The instrument modification and translation as well as the psychometric testing were conducted in Vietnam, in collaboration with renal clinics at Bach Mai Hospital. The hospital has an important role in the healthcare system of Vietnam and is one of three highly specialised hospitals for internal medicine. The hospital provides treatment for people who live in Hanoi City as well as other provinces in the north of Vietnam.

Phase one: Instrument translation

Based on guidelines from Sousa and Rojjanasrirat (2011), the CKD-SM instrument was translated into Vietnamese using a four-step process (see Figure 1). First, forward translation of the CKD-SM from English (source language [SL]) into Vietnamese (translated language [TL]) occurred. Then the instrument was blind back-translation (BT) into English which was then followed by a comparison of the SL and BT versions of the instrument. The last step was review of the translated and modified instrument by an expert panel. This Vietnamese version of the CKD-SM instrument is referred to as the V.CKD-SM in the remainder of this article.

Four independent bilingual nurse academics who had many years of teaching experience in Vietnam, certified English language proficiency, and previous translation experience were employed to complete the translation processes (steps 1–3). Step 4 aimed to assess the content face validity of the translated instrument including content validity and readability by a group

of ten expert members. Content validity was assessed by six clinical experts including a renal medical practitioner, two renal nurses, a general medical practitioner, and two general nurses. Readability was assessed by two primary school level teachers and two older adults to ensure that the language could be easily understood by an older population who are often less literate. Each panel member separately assessed the items in the Vietnamese version using a four-point Likert scale for relevance (from 1 'not relevant' to 4 'very relevant'), clarity (from 1 'not clear' to 4 'very clear'), and appropriateness (from 1 'not appropriate' to 4 'very appropriate'). Comprehensiveness was assessed as either 'should be deleted' or 'should be retained'. Additionally, panel members were also asked to provide their comments on any item that they thought should be revised to be made clearer, simpler, or easier for people with low literacy levels.

Based on expert review, three items were added because the original CKD-SM instrument did not include these aspects of self-management: one item about medication [I still take my medications even when I am not at home] and two items about problem-solving [I take action when my early warning signs and symptoms get worse; When I have questions about my kidney disease, I discuss what to do with my doctors or nurses]. Therefore, the final translated and modified V.CKD-SM instrument had 32 items for testing with people with CKD.

Phase two: Psychometric evaluation

A test-retest design is needed to assess the stability of the translated and modified instrument over time in a stable population when evaluating psychometric properties.

Participants

Eligible participants who had been diagnosed with CKD (any stage) from renal clinics at Bach Mai Hospital, aged ≥ 18 years, and able to speak, read and understand Vietnamese language were invited to assess the V.CKD-SM. Exclusion criteria consisted of participants who were unwilling to participate, had cognitive impairment or were seriously unwell (both determined by a medical practitioner).

Measurements

The 32-item V.CKD-SM was administered after obtaining permission from the original instrument developer. The original CKD-SM has four factors: self-integration, problem-solving, seeking social support, and adherence to recommended treatment regimen (Lin et al., 2012). Participants indicate how often they perform each behavioural statement on a scale of 1 to 4 (1 = never, 2 = sometimes, 3 = usually, 4 = always). Possible scores of the V.CKD-SM range from 32 to 128 and higher scores indicate better CKD self-management behaviour.

In this phase participant characteristics were also collected including age, gender, marital status, level of education, and occupation. Clinical data were collected from patient charts including CKD stage, blood pressure (BP) and body mass index (BMI). The CKD stages were classified according to eGFR.

Sample size

According to Kline (2013), the sample size for test-retest reliability and to measure internal consistency reliability should be at least 100 participants with at least 20% retested to minimise statistical error. A larger sample between 200–300 participants is required for factor analysis (Tabachnick & Fidell, 2013).

Data collection and procedures

Eligible participants with CKD were selected by convenience sampling and provided with a verbal and written explanation of the study prior to consenting. Participants were assured that they had the right to refuse to participate or to withdraw from the study at any time. The V.CKD-SM was evaluated in person for the initial testing while the participant was attending the renal clinic. In the retest, participants indicated on their consent form whether or not they agreed to complete the V.CKD-SM again. For those who indicated their willingness to do the retest, the V.CKD-SM was distributed by post one to two weeks after the completion of the first survey. The V.CKD-SM was completed at home and sent back, using another pre-paid envelope to the (de-identified for review).

Ethical considerations

This study was approved by the (de-identified university) Human Research Ethics Committee and the hospital in which the study was conducted (Approval No. 1400000667 and 1500000678).

Data analysis

Phase one: Content face validity

The data generated from the panel review of the V.CKD-SM were analysed using Microsoft Excel 2010. The data were then used to assess the scale and item content validity average scores (S-CVI/Ave) of the V.CKD-SM. The S-CVI/Ave was calculated as an average of the item-level content validity (I-CVI) by summing the rating and dividing the number of items (Polit & Yang, 2016).

Phase two: Psychometric evaluation

Data were analysed using IBM SPSS Statistics version 22 (IBM Corporation, NY, USA). Demographic and renal clinical data are reported descriptively as number (*n*), percentage (%), mean and standard deviation (*SD*). Cronbach's alpha (α) was used to assess the internal reliability of the V.CKD-SM. An intra-class correlation coefficient (ICC) assessed the stability of the V.CKD-SM instrument. We replicated Lin et al.'s (2012) method of exploratory factor analysis (EFA) to examine the construct validity of the V.CKD-SM, using principal component analysis (PCA) and oblique promax rotation method. Oblique rotation was used because the factors of the CKD-SM are theoretically correlated with each other. The number of factors to be retained was determined by having eigenvalues above 1, the scree plot, and interpreting the resulting factor structure. Items were selected when factor loadings $\geq .40$, were not cross-loaded and conceptually fit with the individual factor (Polit & Yang, 2016). The internal consistency of these factors was then calculated.

RESULTS

Description of translation

During the forward-translated some problematic words and phrases were identified. In the instrument title, "self-management" was translated into Vietnamese as "tự quản lý [self-management]" by one translator and the other translator used "tự chăm sóc [self-care]". However, the phrase "tự quản lý [self-management]" was retained. Other problematic words were dietitian, pharmacist, and health professional were replaced with the phrase doctors or nurses ("bác sĩ và điều dưỡng") because only doctors or nurses provide this care for patients. Lastly the word "church [nhà thờ]" was deleted because the majority of people in Vietnam do not attend church. In Vietnam, people believe in ancestors-worship and almost all Vietnamese homes have an ancestors' altar. Ancestor-worship, while not a religion, is a belief embedded in

the historical and cultural traditions of Vietnam which has been respected and acknowledged by the communist government (Thuy & Hong, 2017). Regarding back translation, one translator used a singular verb form for almost all of the items while the other translator used a plural verb form. However, all the differences in word use, tense, and phrase were then adjusted to achieve meanings close to those of the original version. The modified, translated and cultural adapted V.CKD-SM was then provided to the expert panel.

Content validity and readability

The expert panel scores of the V.CKD-SM instrument produced a calculated overall S-CVI/Ave of .99. The V.CKD-SM achieved good content face validity in regard to relevance (.99), clarity (.99) and appropriateness to measure self-management behaviour (.99). The readability of the V.CKD-SM was also good in regard to relevance (1.0), clarity (.99) and appropriateness (.98). With the addition of three items for comprehensiveness, the V.CKD-SM was ready to test in a target sample of Vietnamese speaking people with CKD.

Psychometric evaluation

Participant characteristics

A total of 293 participants completed the initial test and, of these, 70 participants agreed to complete the retest with 52 returning the V.CKD-SM instrument. It is unknown why the instrument was not completed by the remaining 18 participants as it was not possible to follow-up non-responders.

Participant ages ranged from 18 to 84 years with a mean of 46.8 ($SD = 15.3$) with about half being female ($n = 148$). The majority of the participants (86.3%, $n = 253$) were married. Less than half of the participants were educated to a high school level (46.7%, $n = 137$) and a third

were farmers (33.4%, $n = 98$). More than half of the participants were in CKD stages 4 or 5 (55.3%, $n = 162$). Participants' characteristics are summarised in Table 1.

Test-retest reliability

The intra-class correlation (ICC) and Pearson correlation coefficients were used to assess the test-retest reliability of the 32-item V.CKD-SM with a subset of 52 participants. Polit and Yang (2016) recommend that these correlation values should be $\geq .80$. The ICC was .84 (95% Confidence Interval [CI] = .78–.89) and Pearson correlation was .98 for one to two week interval. These results demonstrated that there was not much variability between the test-retest of the V.CKD-SM. Although participants were not informed of their scores after completing the first test, their responses in the retest seem to be related and consistent.

Construct validity

The 32-item V.CKD-SM was used to examine construct validity. Kaiser-Meyer-Olkin (KMO) and Bartlett's test of sphericity were used to assess the appropriateness of performing factor extraction. The results showed that the KMO test of sampling adequacy was .89 and the Bartlett's test of sphericity was 4741.81, $df = 496$, $p < .001$, indicating suitability for factor analysis. Following PCA, factors were extracted if eigenvalues were > 1 . The factor loadings ranged from .40–.90, demonstrating actual correlation between each item and factor scores. A four-factor structure was extracted explaining 52% of the total variance. This result was also confirmed by the scree plot that showed marked discontinuity after the fourth factor. Two items were deleted [I keep my kidney healthy by keeping my general health condition; I integrate closely my treatment of kidney disease into my daily life] because of cross-loading.

A total of 30 of the original 32 items loaded onto four factors. The first factor named ‘understanding my kidney disease’ includes 11 items with factor loadings ranging from .52–.91 and accounted for 30.97% of the variance. This factor reflects the patient’s ability to search for information, ask questions and discuss with renal medical practitioners and nurses to understand their kidney disease. The second factor ‘taking action to manage my kidney disease’ has 11 items with factor loadings ranging from .41–.79, accounting for 8.42% of the variance. This factor brings together items from the original self-integration and adherence to recommended regimen subscales; it reflects the performance and maintenance of key self-management skills in a range of contexts. The third factor ‘seeking social support’ has 5 items with factor loadings ranging from .51–.89 and accounted for 7.16% of the variance. This factor replicated Lin et al.’s (2012) social support subscale, and focuses on the patient’s actions to seek support from families, friends or significant others. The fourth factor named ‘adhering to a healthy diet’ consists of 3 items with factor loadings ranging from .82–.85, accounting for 5.26% of the variance. This factor represents how patients follow recommendations for eating an appropriate diet in the context of CKD. Cronbach’s alpha of the 30-item V.CKD-SM was .91 and the four factors ranged from .77 to .90 (Table 2). The supplementary file contains the new 30-item V.CKD-SM.

DISCUSSION

The translated version of the CKD-SM instrument demonstrated good validity and reliability in a Vietnamese-speaking population. The content of the V.CKD-SM measures a variety of everyday activities and skills important for self-management. The language of the V.CKD-SM was also suitable for those with a low reading ability which makes it readily understood by an older population. It was also simple to administer, taking 10-15 minutes for a patient to complete.

Robust adherence to the forward and back-translation procedure using independent bilingual translators found only minor differences in linguistic usage between the source and target languages. Only minimal grammatical and cultural changes were made, which did not change the meaning of the items in the Vietnamese version compared to the English language version. In previous studies involving translation of instruments from English to Vietnamese, minor linguistic changes have been reported (Dao-Tran, Anderson, Chang, Seib, & Hurst, 2016; Dinh, 2016). We also demonstrated excellent content face validity for the V.CKD-SM which may have been due to the selection of content experts (nephrologist and renal nurses) who had experience in caring for people with CKD and who were familiar with the language used in this field of healthcare. Inclusion of other panel members who had differing experiences also found the content could be readily understood, increasing the likelihood that the target population would also be able to understand and complete the instrument.

Good test-retest reliability of the V.CKD-SM was demonstrated which were higher than the original version of Lin et al. (2012) and an Australian study (Wembenyui, 2017). The correlation result of the V.CKD-SM was high although this may have been due to the short interval of the test-retest period.

There was a sufficient sample size to conduct exploratory factor analysis, and we found four factors which, while aligning with Lorig and Holman's components of self-management, differed to Lin et al.'s original instrument. For instance, the 11 items in Factor 1 were about understanding of CKD rather than the original 'problem-solving' factor. The original instrument's factors of self-integration and adherence to recommended regimen were combined into one factor in our sample, which we renamed as 'taking action to manage my kidney disease' (Factor 2). Patients self-manage CKD by integrating the care of their disease, adhering

to their treatment regimens, as well as maintaining lifestyle modifications. Factor 3 ‘seeking social support’ contained the same five items as the original English version. Interestingly Factor 4 was composed of three items related to ‘adhering to a healthy diet.’ In this study, these items were strongly correlated with each other and highly loaded on a separate factor. This factor could reflect the cultural importance of food preparation and family eating practices as a dimension of self-management, although further research about CKD and dietary restrictions in the Vietnamese culture is warranted. Cronbach’s alpha coefficients of the four factors achieved acceptable levels which support that all the factors of the V.CKD-SM are reasonably reliable to measure self-management behaviour in Vietnamese-speaking populations.

The V.CKD-SM instrument is a reflective scale, where items are viewed as effect indicators of the underlying latent construct of CKD self-management that is being measured (Polit & Yang, 2016). While we attempted to replicate Lin et al.’s (2012) original four factor structure of CKD self-management in our sample using principal components analysis, future research is needed to examine the structural validity of the V.CKD-SM using exploratory and confirmatory factor analysis within a latent model framework (e.g., structural equation model).

Implications for practice

This study has some implications for practice. First, the V.CKD-SM was found to be a valid, reliable and culturally acceptable instrument which can be used as a PROM to assess Vietnamese-speaking patients in clinical settings. Second, renal multidisciplinary teams could use the findings of this study to develop intervention programs targeting each of the self-management skills. Lastly, the V.CKD-SM can be used in future research testing interventions designed to better support people who speak Vietnamese in other countries.

Strengths and limitations

The major strength in the psychometric phase was including participants with a range of ages and stages of CKD, and having a sufficient sample size for factor analysis. Despite the strengths, this study has some limitations. First, the period between the initial test and the retesting was short which might have overestimated the stability results of the V.CKD-SM. Second, the retest sample size was small and this may have also biased the instrument's stability. Finally, the target sample was recruited from only one hospital and it would have been ideal to include participants from other renal clinics or in community health centres in Vietnam to increase the generalisability of the study. A further study is needed in Vietnamese-speaking people living in other countries.

CONCLUSION

The Vietnamese version of the Chronic Kidney Disease Self-Management instrument was found to be a valid, reliable and feasible PROM. The 30-item V.CKD-SM contains four factors related to self-management behaviours and is suitable to use in future practice and research. The V.CKD-SM can be used clinically to assess patients' self-management behaviours. The instrument will be useful for nurses or allied health staff when educating or supporting patients in the earlier stage of CKD when adherence to lifestyle modifications and medications are important components of treatment to slow the progression of CKD.

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Table 1 Participant characteristics (N = 293)

Characteristics	Mean (SD)	Number (n = 293)	Percentage, %
Age (years)	46.8 (15.3)		
Gender			
Female		148	50.5
Male		145	49.5
Marital status			
Married		253	86.3
Single/Divorced/Widowed		40	13.7
Education			
Primary school		57	19.5
Secondary school		99	33.8
High school		78	26.6
College/University		59	20.1
Occupation			
Farmer		98	33.4
Retired		50	17.0
Salesperson		45	15.4
Professional		44	15.0
Industrial worker		31	10.6
Home worker		9	3.1

Others	16	5.5
CKD stage (eGFR mL/min/1.73m ²)		
Stage 1 (≥ 90)	9	3.1
Stage 2 (60–89)	15	5.1
Stage 3A (45–59)	32	10.9
Stage 3B (30–44)	53	18.1
Stage 4 (15–29)	58	19.8
Stage 5 (10–15)	104	35.5
Stage 5D (< 10)	22	7.5
Blood pressure (mmHg)		
Systolic	129.6 (18.0)	
Diastolic	81.1 (10.8)	
Body mass index	21.4 (3.2)	

Notes: CKD, Chronic Kidney Disease; eGFR, estimated Glomerular Filtration Rate; 5D, Haemodialysis.

Table 2 Factor analysis of the 30-item Chronic Kidney Disease Self-Management Instrument–Vietnamese version

Items		Factor loading				Cronbach alpha
		Factor 1	Factor 2	Factor 3	Factor 4	
Factor 1: Understanding my kidney disease						.90
29	I seek out information about chronic kidney disease from a range of sources (e.g., internet, flyers, brochures, books, kidney support group).	.90				
5	I understand results of laboratory tests which were used to evaluate my kidney function (e.g., creatinine, eGFR).	.79				
16	I asked doctors or nurses questions to clarify my kidney treatment plan.	.77				
9	I solve problems related to my kidney disease by using different sources of information (e.g., calling my doctors or nurses, using the internet, Google, kidney disease support group).	.77				
2	I would ask about the possible reasons for my decline in kidney function.	.74				
6	When my blood pressure is high (more than 140/90), I try to find out any possible cause for this.	.72				

Items	Factor loading				Cronbach alpha
	Factor 1	Factor 2	Factor 3	Factor 4	
22 I take steps to understand the risk factors associated with chronic kidney disease (e.g., high blood pressure, diabetes, smoking, obesity).	.63				
32 When I have questions about my kidney disease, I discuss what to do with my doctors or nurses.	.60				
26 When my body has new or worsen physical symptoms (e.g., foot swelling, severe headache, urinate frequently at night), I try to find out the cause.	.56				
14 I keep tract of my symptoms and early warning signs (e.g., blood glucose, weight, shortness of breath, foot swelling).	.54				
31 I take action when my early warning signs and symptoms get worse.	.52				
Factor 2: Taking action to manage my kidney disease					.82
30 I take my medications as prescribed by my doctors.		.78			
27 I still take all of my medications even when I am not at home.		.74			
12 I avoid habits which worsen my kidney function (e.g., smoking, drinking alcohol, overly salty food).		.63			

	Items	Factor loading				Cronbach alpha
		Factor 1	Factor 2	Factor 3	Factor 4	
21	I stop bad habits which are harmful to my kidneys (e.g., smoking, eating salty food, drinking alcohol).		.60			
17	I follow doctors and nurses' recommendations about not smoking.		.59			
24	I make good choices about the type and amount of food I eat when I am not at home (e.g., at the shops, parties, eating out).		.57			
25	I can adjust my daily activities based on my kidney disease treatment plan when I am not at home (e.g., on travel, retreat).		.56			
28	I feel I am able to attend social activities (e.g., weddings, parties), even though I have kidney disease.		.44			
18	I have changed my lifestyle to prevent my kidney disease from getting worse.		.43			
23	I control my weight according to the advice from doctors or nurses.		.42			
13	I follow doctors and nurses' recommendations of doing exercises.		.41			
Factor 3: Seeking social support						.77
10	When I am feeling upset or frustrated, I discuss my feelings with others.			.89		

Items	Factor loading				Cronbach alpha
	Factor 1	Factor 2	Factor 3	Factor 4	
19 I seek help from others when I am feeling upset or frustrated.			.81		
1 When I have questions about my kidney disease, I discuss what I have to do with my family and friends.			.71		
3 I inform my family and friends about my kidney treatment plan (e.g., medications changes, lifestyle changes).			.54		
4 I share my personal experience of kidney disease with other patients who have kidney disease.			.51		
Factor 4: Adhering to a healthy diet					.88
8 I follow the diet suggested by my doctors or nurses.				.87	
15 I follow doctors and nurses' recommendations about eating a balanced diet.				.86	
7 To prevent the increased workload on my kidneys, I am able to control what I eat.				.84	
Total scale					.91