Original Article

KIDNEY RESEARCH AND CLINICAL PRACTICE

Evaluating a shared decision-making intervention regarding dialysis modality: development and validation of self-assessment items for patients with chronic kidney disease

Soojin Kim[1], Jung Tak Park[2], Sung Joon Shin[3], Jae Hyun Chang[4], Kyung Don Yoo[5], Jung Pyo Lee[6], Dong-Ryeol Ryu[7], Soontae An[1], Sejoong Kim[6,8]

[1]Division of Communication and Media, Ewha Womans University, Seoul, Republic of Korea
[2]Department of Internal Medicine, Institute of Kidney Disease Research, Yonsei University College of Medicine, Seoul, Republic of Korea
[3]Department of Internal Medicine, Dongguk University Ilsan Hospital, Goyang, Republic of Korea
[4]Department of Internal Medicine, Gil Medical Center, Gachon University College of Medicine, Incheon, Republic of Korea
[5]Division of Nephrology, Department of Internal Medicine, Ulsan University Hospital, University of Ulsan College of Medicine, Ulsan, Republic of Korea
[6]Department of Internal Medicine, Seoul National University College of Medicine, Seoul, Republic of Korea
[7]Department of Internal Medicine, Ewha Womans University College of Medicine, Seoul, Republic of Korea
[8]Department of Internal Medicine, Seoul National University Bundang Hospital, Seongnam, Republic of Korea

Background: Shared decision-making is a two-way symmetrical communication process in which clinicians and patients work together to achieve the best outcome. This study aimed to develop self-assessment items as a decision aid for choosing a dialysis modality in patients with chronic kidney disease (CKD) and to assess the construct validity of the newly developed items.
Methods: Five focus group interviews were performed to extract specific self-assessment items regarding patient values in choosing a dialysis modality. After survey items were refined, a survey of 330 patients, consisting of 152 hemodialysis (HD) and 178 peritoneal dialysis (PD) patients, was performed to validate the self-assessment items.
Results: The self-assessment for the decision aid was refined to 35 items. The structure of the final items appeared to have three dimensions of factors; health, lifestyle, and dialysis environment. The health factor consisted of 12 subscales (α = 0.724), the lifestyle factor contained 11 subscales (α = 0.624), and the dialysis environment factor was represented by 12 subscales (α = 0.694). A structural equation model analysis showed that the relationship between the decision aid factors (health, lifestyle, and dialysis environment), patients' CKD perception, and cognition of shared decision-making differed between HD patients and PD patients.
Conclusion: We developed and validated self-assessment items as part of a decision aid to help patients with CKD. This attempt may assist CKD patients in making informed and shared decisions closely aligned with their values when considering dialysis modality.

Keywords: Decision support techniques, Perception, Self-assessment, Shared decision-making

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Introduction

During the past three decades, the number of people undergoing maintenance dialysis globally has increased dramatically [1]. According to the Global Burden of Disease study, 697.5 million individuals worldwide had chronic kidney disease (CKD) in 2017, and 1.2 million of them died [2]. Korea is no exception; in 2019, the end-stage renal disease (ESRD) population was more than 100,000, doubling over a 10-year period [3].

CKD is not only a public health issue but also creates an economic burden. According to the 2014 National Health Insurance Statistical Yearbook (Korea), the number of hospital visits due to CKD increased from ~150,000 in 2013 to ~160,000 in 2014, and the corresponding medical expenses also increased [4]. CKD has the highest medical cost per person among chronic diseases, and hemodialysis (HD) and peritoneal dialysis (PD) cost 87 and 65 times more than hypertension treatment, respectively [5].

People with CKD and ESRD have a poorer health-related quality of life (HRQOL) than the general population [6,7]. In patients with ESRD, low HRQOL is associated with a higher risk of death and hospitalization, which affects morbidity and mortality in patients with ESRD [6–8]. However, little is known about the relationship between low HRQOL and adverse outcomes in patients with predialysis CKD.

Patients whose advanced CKD is approaching ESRD face complex medical decision-making regarding the type of medical therapy they wish to pursue. More than a decade ago, the Renal Physicians Association and the American Society of Nephrology recommended a shared approach to decision-making for all patients with ESRD [9], which is supported by evidence that shared decision-making can improve patient outcomes [10]. Despite shared decision-making emerging as a pillar of national and international quality of care standards and policies [11], evidence shows that people suffering from CKD still have limited involvement and participation in treatment decision-making [12,13].

Effective interventions to guide patients in decision-making include decision aids (DAs) and shared decision-making [14]. Patients exposed to DAs are more likely to be informed, have realistic expectations of option outcomes, participate actively in decision-making, and feel lower decisional conflict [15]. In this context, there is growing interest in developing, implementing, and further strengthening the quality of decision support provided to patients and families living with CKD. However, relatively little is known about how to achieve this goal.

The present research aims to develop self-assessment items for a DA by employing both qualitative and quantitative methods. We then seek to confirm the robustness of this study by examining the multifaceted validity of the newly developed scales for a DA.

Methods

Study 1: scale development

The aim of Study 1 was to develop DA scales for patients with CKD and to examine the content validity of the DA's self-assessment items.

Study design

A flow chart of our study is shown in Fig. 1. First, we conducted five focus group interviews (FGIs) consisting of two groups undergoing HD, two groups undergoing PD, and one group of people facing a modality choice decision. Each group consisted of five patients, and interviewees volunteered to participate from two university medical centers; Ewha Womans University Medical Center and Severance Hospital. Based on the literature reviews of existing DA and communication expert consultations, 40 draft items were selected to undergo preliminary testing for further item selection and dimension exploration. Five nephrologists then reviewed the selected items, and two were excluded because they did not apply to the Korean population. Subsequently, items derived from the literature review and extracted from the FGIs were refined, and content validity was examined. Medically inappropriate items were deleted following content validity testing, and finally, 35 self-assessment items remained.

Procedure: item generation

A systematic literature review on international renal guidelines and other dialysis DA booklets was performed as the initial step in item procurement. Next, we solicited feedback from health communication experts regarding previously developed DA materials. Although there were many aspects that could be generally agreed upon from the review of existing DA materials, some elements did not fit the Korean
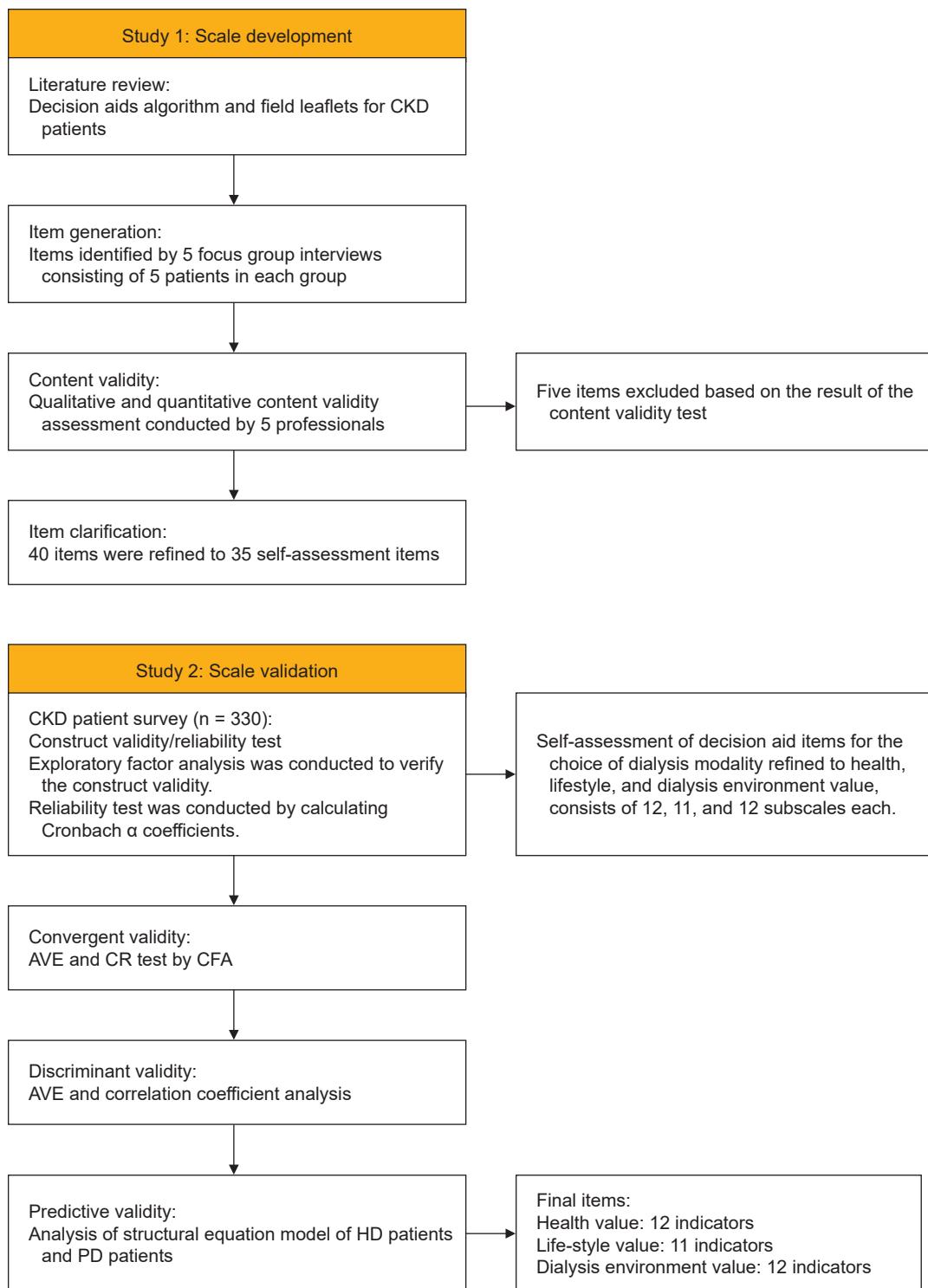
Figure 1. Flow chart of the study.
AVE, average variance extracted; CFA, confirmatory factor analysis; CKD, chronic kidney disease; CR, composite reliability; HD, hemodialysis; PD, peritoneal dialysis.

context. Therefore, considering adequate self-assessment items for decision-making are culturally dependent, an in-depth qualitative study was planned to fulfill the objective of extracting specialized items for CKD patients in Korea. FGIs were conducted by a trained facilitator and a study team member using an interview guide developed by study team members with expertise in health communication. The interview questionnaire consisted of open questions not only relevant to health and lifestyle but also pertaining to other factors such as how patients think of the relative benefits and barriers of dialysis modality, dilemmas in undergoing the chosen treatment, satisfactory communication with attending doctors, and so on.

A qualitative interview study with five focus groups was performed from October 8, 2019 to October 31, 2019, at Ewha Womans University Medical Center and the dialysis center at Severance Hospital in Seoul. Interviews were conducted according to a semi-structured interview protocol that presented a series of questions designed to 1) identify interviewees' demographic and cultural background, 2) articulate their illness perception and elicit ownership of their CKD management, and 3) explore the CKD patients' communication traits and factors affecting doctor-patient communication. The interviews were recorded, and all interviewees gave consent to the analysis. The transcribed interviews were read repeatedly, and remarks that were determined to be relevant to each investigated phenomenon were recorded separately by each researcher. Through the interpretation and mutual exchange of opinions from the health communication researchers, the concept was refined, and the basis for deriving DA questions was formed.

Based on an extensive review of the DA materials in the field of CKD and the FGIs with patients, we generated an initial pool of 40 self-assessment items reflecting various aspects of personal orientation.

Study 2: scale evaluation

The aim of Study 2 was to evaluate the construct validity of the newly developed self-assessment DA items for patients with CKD. A sample of 330 participants was recruited from seven university hospitals to validate the properties of the items. Inclusion criteria were patients age 19 years or older who had undergone HD or PD for more than 3 months. Exclusion criteria were patients who were not able to partic-

ipate in the survey due to cognitive impairment or psychological illness.

Procedure

An evaluation of the DA instrument was performed as follows. Patients with CKD undergoing dialysis at seven hospitals in Seoul were recruited from March 2020 to September 2020 to participate in preliminary testing of the DA instrument, containing 35 items. A total of 152 HD and 178 PD patients who met the eligibility criteria approved by institutional review board participated and completed the DA questionnaire.

Ethical considerations

This study was approved by each hospital's Institutional Review Board (Ewha Womans University Seoul Hospital, No. 2020-03-018; Seoul National University Bundang Hospital, No. B-2004-604-307; Ulsan University Hospital, No. UUH 2020-06-009; Gil Medical Center, No. GFIRB2020-244; Seoul National University Boramae Medical Center, No. 06-2020-0036; Dongguk University Medical Center, No. DUIH 2020-05-011; and Severance Hospital, No. 4-2020-0422).

Statistical analysis

Statistical analyses were performed using IBM SPSS version 26.0 (IBM Corp., Armonk, NY, USA) and IBM SPSS AMOS version 21.0 (IBM Corp.). Exploratory factor analysis (EFA) was employed to identify the underlying relationships between measured variables (DA questions) and to extract their common dimensions. Based on the EFA results, confirmatory factor analysis (CFA) was performed to verify construct validity. Additional analysis was performed to examine the predictive validity of the newly developed scales using structural equation modeling (SEM).

Results

In total, 330 patients completed the instrument (DA questionnaire). Their mean age was 48.5 ± 12.8 years. The sociodemographic details of the study participants are summarized in Table 1.

Table 1. Participant demographics

Characteristic	Data
No. of patients	330
Age (yr)	
20–29	17 (5.2)
30–39	30 (9.1)
40–49	83 (25.2)
50–59	82 (24.8)
60–69	92 (27.9)
≥70	26 (7.9)
Sex	
Male	202 (61.2)
Female	128 (38.8)
Education	
Elementary school	8 (2.4)
Middle school	24 (7.3)
High school	145 (43.9)
College/University	135 (40.9)
Graduate school	16 (4.8)
Others	2 (0.6)
Marital status	
Married	218 (66.1)
Widowed	10 (3.0)
Separated	5 (1.5)
Divorced	27 (8.2)
Single	68 (20.6)
Others	2 (0.6)
Monthly income (Korean won)	
<1,000,000	107 (32.5)
1,000,000–2,000,000	39 (11.8)
2,000,000–3,000,000	30 (9.1)
3,000,000–4,000,000	32 (9.7)
4,000,000–5,000,000	14 (4.3)
5,000,000–6,000.000	2 (0.6)
6,000,000–7,000.000	4 (1.2)
≥7,000,000	6 (1.8)
Not available	96 (29.1)
Dialysis modality	
Hemodialysis	152 (46.1)
Peritoneal dialysis	178 (53.9)
Treatment time (yr)	
<0.5	32 (9.7)
0.5–1	22 (6.7)
1–2	36 (10.9)
2–3	52 (15.8)
≥3	188 (57.0)

Data are expressed as number (%).

Content validity

Content validity is usually qualitatively judged by experts; however, in this study, content validity was assessed by calculating the content validity index (CVI) for each item based on experts' ratings of item relevance [16,17]. Here, CVI was assessed in terms of the item-level CVI (I-CVI), calculated as the proportion of experts assigning a rating of 3 (quite relevant) or 4 (highly relevant) among the total number of experts. In most cases, an I-CVI of 1.00 when there are five or fewer experts and an I-CVI greater than 0.78 otherwise are generally acceptable [16–18].

Out of 40 preliminary items, 37 were represented by I-CVI scores distributed between 0.80 and 1. Three items that did not meet the I-CVI criteria were deleted. The deleted items were "I am worried about the cost of dialysis," "I am living with my elderly parents or in-laws," and "I am so restless that I cannot lie still." Two items that were not medically appropriate, "I want to be pregnant to be a mother" and "My sex life is important to me." were also deleted. Through this refining process, 35 preliminary items were set up.

Exploratory factor analysis

Prior to conducting an EFA, we examined two indicators to determine whether the sample was appropriate for such an analysis. The Kaiser-Meyer-Olkin measure of sampling adequacy index was 0.62, and Bartlett's test of sphericity was significant at χ^2 (degree of freedom [df] = 595, n = 330) = 2,821.37 (p < 0.001), indicating that the sample was appropriate for the analysis [19]. We performed an EFA using the principal components analysis extraction method with a varimax rotation because varimax rotation simplifies factor loadings by removing the middle ground and more specifically identifies the factor on which data load [20]. The EFA showed 13 factors, explaining 65.3% of the variance in the data; however, the number of factors retained from the EFA seemed to be too large and inadequate as the smallest number of possible factors. Thus, EFA by principal component analysis was performed again based on three fixed factors. Each factor consisted of 10 to 12 items with Cronbach alpha (α) values ranging from 0.62 to 0.72. Next, an independent t-test was conducted to determine the difference between the two groups, according to the dialysis modality, through the average difference for each item. Table 2 lists all scale

Table 2. Descriptive statistics of decision aid self-assessment items

Factor			Modality	No	Mean ± SD	p-value
Health-related factors (α = 0.724)	(1)	I want to protect my bones, joints, and nerves	HD	152	4.36 ± 0.66	0.005
			PD	178	4.15 ± 0.68	
	(2)	I want to protect my heart	HD	152	4.33 ± 0.80	0.04
			PD	178	4.16 ± 0.73	
	(3)	I live a regular life	HD	152	3.43 ± 1.01	0.01
			PD	178	3.17 ± 0.89	
	(4)	I myself can control my daily routine	HD	152	3.78 ± 0.97	0.56
			PD	178	3.72 ± 0.86	
	(5)	I want regular check-ups with a doctor	HD	152	4.00 ± 0.85	0.25
			PD	178	3.89 ± 0.90	
	(6)	I want to live a high quality of life as much as I can	HD	152	3.82 ± 0.97	0.03
			PD	178	4.04 ± 0.91	
	(7)	I don't want to be a burden on my family	HD	152	4.15 ± 0.99	0.95
			PD	178	4.16 ± 0.87	
	(8)	I want to be free from dialysis for at least one day	HD	152	4.34 ± 0.77	0.08
			PD	178	4.17 ± 0.92	
	(9)	I need to feel in control of my time and my life	HD	152	4.07 ± 0.77	0.10
			PD	178	4.20 ± 0.72	
	(10)	I make plans and act in daily life	HD	152	3.16 ± 1.01	0.29
			PD	178	3.05 ± 0.93	
	(11)	I like playing sports	HD	152	3.16 ± 0.99	<0.001
			PD	178	2.70 ± 0.98	
	(12)	I don't want to undergo dialysis everyday	HD	152	4.06 ± 1.04	<0.001
			PD	178	3.61 ± 1.11	
Lifestyle-related factors (α = 0.624)	(1)	I need to be able to work or go to school	HD	152	2.36 ± 1.53	<0.001
			PD	178	3.06 ± 1.63	
	(2)	I take care of a child or a disabled or elderly person	HD	152	2.10 ± 1.32	0.008
			PD	178	2.53 ± 1.55	
	(3)	I care about how I look	HD	152	2.87 ± 1.08	0.32
			PD	178	2.98 ± 0.92	
	(4)	I often travel abroad	HD	152	1.79 ± 1.03	0.47
			PD	178	1.87 ± 1.02	
	(5)	I love to travel and cannot give up traveling	HD	152	2.24 ± 1.21	0.44
			PD	178	2.34 ± 1.13	
	(6)	I want to be able to eat and drink what I like	HD	152	3.22 ± 1.12	0.87
			PD	178	3.20 ± 1.06	
	(7)	I am fostering a baby	HD	152	2.12 ± 1.43	0.40
			PD	178	2.26 ± 1.54	
	(8)	I want to spend as much time as I can with my family	HD	152	4.02 ± 0.90	0.60
			PD	178	3.97 ± 0.91	
	(9)	I like to take baths because I sweat a lot	HD	152	3.26 ± 1.03	<0.001
			PD	178	2.87 ± 0.98	
	(10)	It takes me a long time to get used to something new	HD	152	3.09 ± 1.04	0.15
			PD	178	2.93 ± 0.93	
	(11)	I don't have a care partner to help me	HD	152	2.59 ± 1.29	0.02
			PD	178	2.26 ± 1.16	
Dialysis environment-related factors (α = 0.694)	(1)	I don't want a dialysis machine in my home	HD	152	3.26 ± 1.29	<0.001
			PD	178	2.48 ± 1.13	
	(2)	I want professionals to take care of me	HD	152	4.11 ± 0.94	<0.001
			PD	178	2.38 ± 0.97	

Table 2. Continued

Factor			Modality	No	Mean ± SD	p-value
	(3)	I want to stay out of the hospital	HD	152	3.64 ± 1.17	0.19
			PD	178	3.80 ± 0.97	
	(4)	It is hard for me to lie down for a long time	HD	152	3.29 ± 1.15	0.20
			PD	178	3.13 ± 1.12	
	(5)	I am terrified of needles	HD	152	2.68 ± 1.15	0.17
			PD	178	2.51 ± 1.19	
	(6)	I want somebody to take care of me	HD	152	2.90 ± 1.12	0.01
			PD	178	2.62 ± 0.95	
	(7)	I am quite conscious of others' eyes on me	HD	152	2.76 ± 1.13	0.04
			PD	178	3.00 ± 1.02	
	(8)	I love to experience new things	HD	152	3.08 ± 1.10	0.09
			PD	178	3.28 ± 1.01	
	(9)	I tend to rely on my spouse a lot in my daily life	HD	152	2.71 ± 1.27	0.79
			PD	178	2.67 ± 1.21	
	(10)	I like watching TV	HD	152	3.55 ± 0.99	0.59
			PD	178	3.49 ± 0.97	
	(11)	I am comfortable with the familiar	HD	152	3.88 ± 0.86	0.91
			PD	178	3.87 ± 0.71	
	(12)	I don't like environmental changes	HD	152	3.44 ± 1.01	0.55
			PD	178	3.38 ± 0.93	

HD, hemodialysis; PD, peritoneal dialysis; SD, standard deviation.

items and their properties.

Confirmatory factor analysis

CFA was performed on the 35 items based on the entire sample of 330 patients. Following the recommendations of Cole [21], Cuttance and Ecob [22], and Marsh and Bella [23], the DA scale's goodness-of-fit was evaluated using multiple criteria: the goodness-of-fit index (GFI), the adjusted GFI, the root mean square error of approximation (RMSEA), the incremental fit index (IFI), the comparative fit index (CFI), and the Akaike information criterion [24]. Multiple criteria were used because each index has different strengths and weaknesses in assessing goodness-of-fit between a particular model and the observed data.

To assess the construct validity of the new scale, we estimated a series of CFA models using IBM SPSS AMOS [25]. The three-factor model identified via EFA initially consisted of three first-order latent variables, representing the following three scales; health-related values (12 indicators), lifestyle-related values (11 indicators), and dialysis environment-related values (12 indicators). In the first analysis of three first-order latent variables, model fit indices showed poor fitness; thus, we deleted some measured variables

with low standardized path coefficients. Although the standardized estimate appeared low (>0.40), some measured variables were retained because they showed significance in the t-test, meaning that the item should be related to the decision-making choice for dialysis modality. This model was then refined to three scales with four indicators each.

Therefore, we performed CFA three times to obtain the best fit. A comparison of these alternate models revealed a significant difference in the fit indices, showing the best fit for the three-factor model, with a χ^2 value (102.212, df = 51) significantly lower than those for the 13-factor (χ^2 = 946.551, df = 417) and one-factor (χ^2 = 2,255.458, df = 560) models. All the other fit indices (RMSEA = 0.05, GFI = 0.95, AGFI = 0.92, CFI = 0.91, IFI = 0.91, and χ^2/df = 2.00) also showed good fit for the three-factor model based on the cut-off values recommended by Hu and Bentler [24], Kline [26], and Wheaton et al. [27]. The fitness changes of the alternative models, the best fit model, and the model fit of the HD and PD patient groups are shown in Table 3.

Convergent and discriminant validity

Construct validity was examined in terms of convergent and discriminant validity. Convergent validity is a subcategory

Table 3. Fit indices of competing models

Model fit	χ^2	RMSEA	GFI	AGFI	IFI	CFI	AIC
First-order 3-factor model	102.21 df = 51 p < 0.001	0.06	0.95	0.93	0.91	0.91	156.21
Competing 13-factor model	946.55 df = 417 p < 0.001	0.06	0.86	0.81	0.76	0.75	1234.55
Competing 1-factor model	2255.46 df = 560 p < 0.001	0.10	0.71	0.67	0.29	0.28	2395.46
Hemodialysis	80.57 df = 51 p < 0.001	0.06	0.92	0.88	0.90	0.89	134.57
Peritoneal dialysis	102.05 df = 52 p < 0.001	0.07	0.92	0.87	0.86	0.86	154.05

AGFI, adjusted goodness-of-fit index; AIC, Akaike information criterion; CFI, comparative fit index; df, degree of freedom; GFI, goodness-of-fit index; IFI, incremental fit index; RMSEA, root mean square error of approximation.

of validity tests that can assist in establishing construct validity [28] and refers to the degree to which two measures of constructs, which theoretically should be related, are related. In contrast, discriminant validity tests whether concepts or measurements that are supposed to be unrelated are, in fact, unrelated [29].

The Fornell-Larcker [30] criterion has been commonly used to assess convergent and discriminant validity, and it can be assessed considering the average variance extracted (AVE) and composite reliability (CR). AVE measures the level of variance captured by a construct versus the level captured due to measurement error; values above 0.7 are considered very good, while a level of 0.5 is acceptable. CR is a less biased estimate of reliability than Cronbach α, and the acceptable values of CR are 0.7 and above. The AVE and CR can be calculated as follows:

$$AVE = \frac{\sum_{i=1}^{k}(\text{std}.\lambda_i^2)}{\sum_{i=1}^{k}(\text{std}.\lambda_i^2) + \sum_{i=1}^{k}(1-\text{std}.\lambda_i^2)}$$

$$CR = \frac{(\sum_{i=1}^{k}\text{std}.\lambda_i)^2}{(\sum_{i=1}^{k}\text{std}.\lambda_i)^2 + \sum_{i=1}^{k}(1-\text{std}.\lambda_i^2)}$$

Here, k is the number of items, and λ_i is the factor loading of item i.

As indicated in Fig. 1, four items have loaded onto each of the single latent factors, with standardized path coefficients ranging from 0.19 (item L2) to 0.90 (item H1) in the three-factor DA model. When evaluating the strength and adequacy of item loadings, some items and their expectedly related latent factors demonstrated poor convergent validity. For a more rigorous analysis of convergent and discriminant validity, the AVE and CR of each latent variable were calculated based on the formula given by Fornell and Larcker [30]. The AVE of health, lifestyle, and dialysis environment were found to be greater than 0.50, which is considered acceptable. The CR of each latent variable was also greater than 0.7, which can be said to signify convergent validity and internal consistency.

Discriminant validity was assessed by comparing the AVE and correlation coefficients. According to Fornell and Larker [30], when the AVE is greater than the square of the correlation coefficient between each factor, discriminant validity is secured. As a result of the verification, the AVE obtained between each factor was greater than the square of the correlation coefficient between each factor; thus, discriminant validity was secured (Table 4).

Predictive validity

A multigroup analysis of two patient groups was performed

Table 4. Validity and reliability of the decision aid self-assessment items

Variable	Health	Lifestyle	Environment	AVE	CR	Cronbach α
Health	1			0.53	0.75	0.72
Lifestyle	0.15**	1		0.53	0.74	0.62
Environment	0.21**	0.20**	1	0.50	0.80	0.69

AVE, average variance extracted; CR, composite reliability.
** $p < 0.01$.

Patients on dialysis (n = 330)
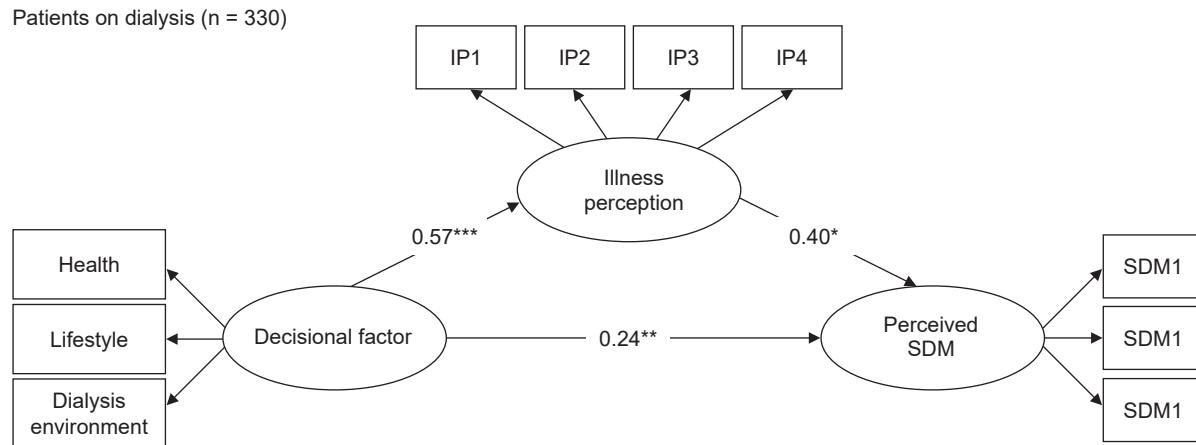
χ^2 = 68.791, df = 32, IFI = 0.90, CFI = 0.90, RMSEA = 0.05
Note: All the coefficients are standardized. *$p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 2. The relationship between decisional factors, illness perception, and the cognition of SDM.
CFI, comparative fit index; df, degree of freedom, IFI, incremental fit index; RMSEA, root mean square error of approximation; SDM, shared decision-making.

using SEM to determine whether the three decision support factors (health, lifestyle, and dialysis environment) could predict a patient's choice of dialysis modality. Based on the literature on illness perception and dialysis modality decision-making, we hypothesized a causal relationship between decisional factors, CKD perception, and shared decision-making cognition [31,32]. More specifically, we forecasted differences in factors influencing decision-making between HD and PD patients, and we predicted these differences to be related to the perception of CKD as an illness and, ultimately, to affect the perception of shared decision-making processes.

As expected, a difference was found between the HD and PD patient groups. For the HD patient group, the dialysis decisional factor exhibited a positive association with illness perception ($\beta = 0.60$, $p < 0.01$) and illness perception was positively associated with perceived shared decision-making ($\beta = 0.57$, $p < 0.05$). However, the direct effect of deci-

sional factors on perceived shared decision-making was not statistically significant. In the PD patient group, a positive relationship between the decisional factor ($\beta = 0.50$, $p < 0.01$), illness perception ($\beta = 0.29$, $p < 0.05$), and perceived shared decision-making ($\beta = 0.50$, $p < 0.01$) was found. Through the path difference between the two groups, which was statistically significant, the self-assessment items developed through this study can be said to have predictive validity. The results of the HD patient group analysis and the PD patient group analysis are shown in Fig. 2 and 3, respectively. The final items that have been validated are shown in Table 5.

Discussion

A recent review of DA validation demonstrated an increase in patients selecting options related to their values and less decision-making passivity, as well as lower decisional con-

Hemodialysis (n = 152)
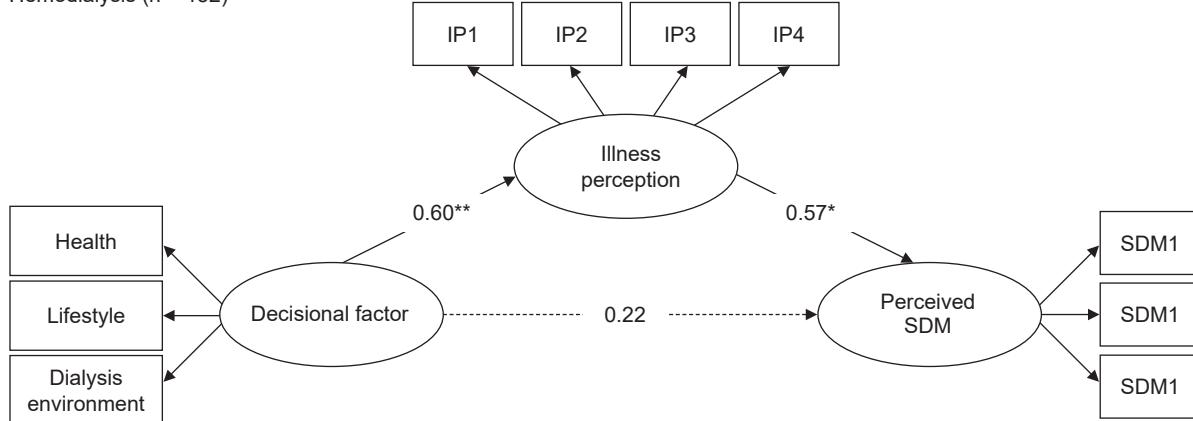
Peritoneal dialysis (n = 178)
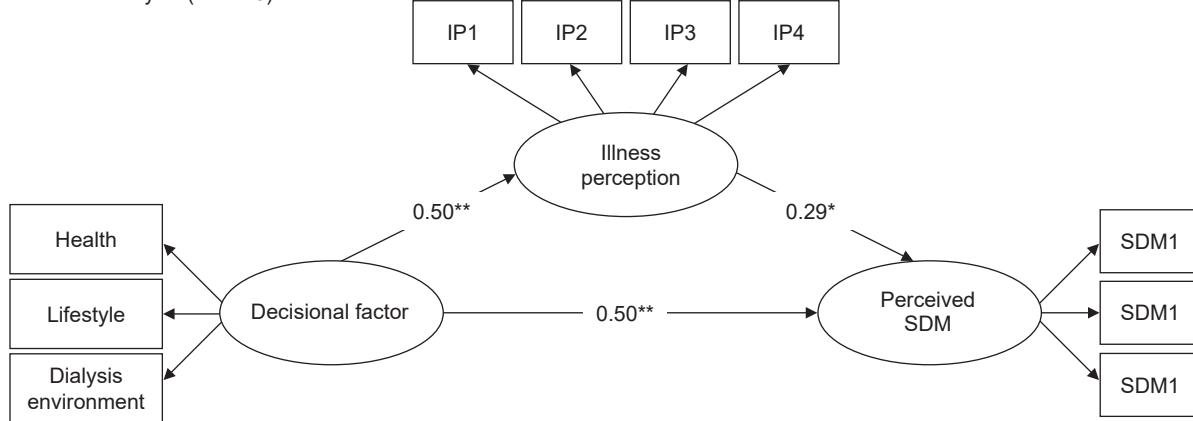
Two-group analysis model fit: χ^2 = 111.692, df = 64, IFI = 0.89, CFI = 0.88, RMSEA = 0.04
-----> Designates statistically non-significant.

Figure 3. Comparison between hemodialysis patients and peritoneal dialysis patients.
CFI, comparative fit index; IFI, incremental fit index; IP, illness perception; RMSEA, root mean square error of approximation; SDM, shared decision-making.

flict and increased knowledge levels [33]. In other words, DAs increase participation in shared decision-making. As proposed by the Kidney Disease Improving Global Outcomes guidelines, dialysis modality should be chosen with timely and shared decision-making among the healthcare team, patients, and their caregivers [34]. In particular, the decision to undergo dialysis depends on many abstract aspects, such as knowledge of dialysis; personal beliefs; and feelings toward life, suffering, death, and other patient experiences [13,32,35,36]. Moreover, how this specific illness is viewed and understood in any given society is crucial to medical decision-making because patients' social and cultural backgrounds highly influence their decision-making.

In this study, we developed Korea-specific DA scales for ESRD by integrating both qualitative and quantitative research methods. Some noteworthy findings from this study are as follows.

First, the content of the DA questionnaire was classified into three dimensions; health, lifestyle, and dialysis environment. Though the correlations between these three dimensions were statistically significant, they were not robust in effect size. These results imply that factors influencing decision-making are sometimes unrelated to each other, existing as independent factors in many cases. In other words, since there are various factors that influence decision-making, the communication process for shared decision-mak-

Authors' contributions

Conceptualization: Sejoong K, DRR, SA
Data curation: DRR, JHC, SJS, JPL, KDY, JTP, Sejoong K
Formal analysis, Methodology: Soojin K
Investigation, Project administration: Sejoong K, DRR
Writing-original draft: Soojin K
Writing-review & editing: Sejoong K
All authors read and approved the final manuscript.

ORCID

Soojin Kim, https://orcid.org/0000-0002-3305-0712
Jung Tak Park, https://orcid.org/0000-0002-2325-8982
Sung Joon Shin, https://orcid.org/0000-0002-0777-9278
Jae Hyun Chang, https://orcid.org/0000-0003-3947-0715
Kyung Don Yoo, https://orcid.org/0000-0001-6545-6517
Jung Pyo Lee, https://orcid.org/0000-0002-4714-1260
Dong-Ryeol Ryu, https://orcid.org/0000-0002-5309-7606
Soontae An, https://orcid.org/0000-0002-6016-8759
Sejoong Kim, https://orcid.org/0000-0002-7238-9962

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