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METHODOLOGICAL ARTICLE

Scale development study: The Fluid Control in Hemodialysis Patients

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Abstract

Aim: The aim of this study was to develop a valid and reliable measurement instrument to identify knowledge, behaviors, and attitudes of hemodialysis (HD) patients about fluid control as these patients are inadequate in ensuring and sustaining fluid control.

Methods: The sample of this methodological study consisted of 276 HD patients who are being treated in two public and two private hemodialysis centers. The validity of the scale was assessed through content validity, construct validity, and similar scale validity, and its reliability through item analysis, internal consistency coefficient and test–retest. For the content validity of the scale, expert views were assessed, and opinions of a Turkish language specialist were obtained.

Results: According to the exploratory factor analysis, the scale had 24 items and three subdimensions, namely, knowledge, behavior, and attitude. The total variance explained was found to be 51.15%. Cronbach's alpha reliability coefficient of the Fluid Control in Hemodialysis Patients Scale (FCHPS) turned out to be 0.88 and Cronbach's alpha for its subdimensions were 0.92, 0.80, and 0.67, respectively. The correlation value between test and retest was 0.94 ($P < 0.001$). A moderate significant correlation ($r = 0.58$, $P < 0.001$) was found between the scale scores and the scores of the Dialysis Diet and Fluid Restrictions Non-adherence Questionnaire.

Conclusion: The FCHPS that was developed has good validity and reliability. This scale can be used to measure knowledge, behavior, and attitude of hemodialysis patients about fluid restriction.

Key words: fluid control, hemodialysis, scale development.

INTRODUCTION

Despite all the developments in hemodialysis therapy, excess fluid intake between two dialysis sessions continues to be a serious problem. If the weight gain (fluid intake) between two dialysis sessions is more than 5.7% of the dry weight, this is defined as inappropriate interdialytic weight gain (Hecking *et al*., 2004).

The fluid intake between two dialysis sessions during a 4 h hemodialysis is drawn by ultrafiltration (UF). As the UF speed increases, complications such as hypotension, nausea/vomiting, dizziness, muscle cramps, and malaise emerge in patients (Daugirdas, Blake, & Ing, 2003; Hoenich & Levin, 2003). Additionally, excess fluid intake may result in hypervolemia, edema in lower extremes, ascites, left ventricular hypertrophy, congestive heart failure, pulmonary vascular congestion, or acute pulmonary edema (Lindberg, 2010; Movilli *et al*., 2007).

Fluid control is a major problem in hemodialysis patients (Denhaerynck *et al*., 2007; Lindberg, 2010) and it is the most crucial restriction in patient diet (Pace, 2007). Research results show that 10–60% of hemodialysis patients are non-compliant with fluid control

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(Bame, Petersen, & Wray, 1993; Denhaerynck *et al*., 2007). Physical debility and depression are also seen in patients not complying with fluid restriction (Welch & Davis, 2000). Therefore, excess fluid intake significantly increases morbidity in hemodialysis patients (Pace, 2007).

Eating and drinking are basic needs for humans and are associated with sociocultural structure and traditions. For this reason, it is difficult for patients to change their usual eating and drinking habits (Sagawa, Oka, Chaboyer, Satoh, & Yamaguchi, 2001). Individuals receiving hemodialysis have different dietary habits, knowledge, living conditions, and personal reactions to prescribed limitations. They are prescribed a complex diet that requires many cognitive and behavioral skills for successful self-management. The methods that are agreed to be effective for ensuring compliance with fluid restriction include "Measuring the amount of fluid taken in during the whole day, apportioning the fluid to be taken in during the whole day and avoiding salty food in their diets" (Welch & Davis, 2000; p. 394). The Dietary Intake Monitoring Application (DIMA) is extremely helpful for individuals as they self-monitor their intake. If desired, DIMA could also be used for dietary counseling (Welch *et al*., 2009). The DIMA is a feasible and acceptable intervention that had a marginal effect on some aspects of dietary and fluid intake. (Welch *et al*., 2013). The DIMA has potential to facilitate dietary and fluid self-monitoring but requires additional refinement and further testing (Welch *et al*., 2013).

It is important for the hemodialysis nurses, who play a key role in the treatment, care, and training of hemodialysis patients, to know about the knowledge, behaviors, and attitudes of patients about fluid control, so that they can train patients in issues they are not adequate and develop custom-made fluid control methods. The present authors have not encountered any measurement instrument in the published work to be used for identifying knowledge, behaviors, and attitudes of hemodialysis patients. Because the difficulty in fluid control is among the serious problems still prevailing in hemodialysis patients, there is a need to develop a valid and reliable measurement instrument for fluid control.

Because hemodialysis patients are inadequate in ensuring and sustaining fluid control, this study was carried out for the purpose of developing a valid and reliable measurement instrument to identify knowledge, behaviors, and attitudes of patients about fluid control, so that their quality of life can be improved and their safety secured by increasing their compliance with fluid restriction.

MATERIALS AND METHODS

This study was of methodological design.

Study population and sample

The study population consisted of 430 chronic hemodialysis patients who were being treated in two public and two private dialysis centers in Istanbul in 2011. The sample consisted of 276 chronic hemodialysis patients who agreed to take part in the study and who met the inclusion criteria. The sample size was determined considering the fact that the sample size suggested for methodological studies has to be 5–10 times more than the number of items in the scale (Özdamar, 2002).

The inclusion criteria were: being between 18 and 65 years of age; undergoing a hemodialysis therapy three times a week for a period longer than 3 months; being literate; having no communication disability such as blindness, deafness, and aphasia; not having received a psychiatric diagnosis; not having residual urine of more than 1 L; and having an interdialytic weight between 1 and 5 kg.

The cognitive abilities of hemodialysis patients were evaluated by a physician and the patients who were found to have problems related to cognitive abilities were excluded.

The patients receiving hemodialysis in the morning session were enrolled for the test–retest because it is easy to reach these patients.

Data collecting instrument

The study data were collected using a Patient Description Form, the Fluid Control in Hemodialysis Patients Scale (FCHPS), and the Dialysis Diet and Fluid Restrictions Non-adherence Questionnaire (QDDF).

Patient description form

This form includes sociodemographic characteristics and data on the disease and treatment.

FCHPS

Preparation of an item pool for the scale

At the first stage of the FCHPS, which is developed to measure the knowledge, behaviors, and attitudes of chronic hemodialysis patients about fluid restriction, a question pool was formed in line with the information in the published work review (Pace, 2007; Sagawa *et al*., 2001; Welch & Davis, 2000; Welch *et al*., 2009), interviews, and the knowledge and experiences of the researchers. Views of 20 hemodialysis patients on the prepared questions were obtained. The patients were

asked about comprehensibility of the questions and their positive or negative opinions and suggestions about the questions. The questions were prepared in line with the patients' opinions and suggestions and then presented to a Turkish-language specialist for opinion. The necessary corrections were made in line with the recommendations and a draft scale was formed containing 41 items that were agreed to appear in the scale.

Content validity of the FCHPS

For content validity, the draft scale of 41 items was sent to 11 specialists including nephrologists, nurse instructors, and scale development specialists. The scale items were assessed by these specialists as "appropriate", "partly appropriate", and "not appropriate". A "your suggestions" section was opened next to each item to enable them to write their comments on the items. In evaluating the responses from the specialists, a content validity ratio (CVR) index was calculated for each item and five items with CVR less than 0.59 were excluded from the scale (Murray *et al*., 2006; Odagiri *et al*., 2011; Piliskin, Yurk, TammyHo, & Umans, 1996; Tamura *et al*., 2010). The content validity defines the degree to which the items of the measurement instrument adequately reflect the construct to be measured (Scholtes, Terwee, Rudolf, & Poolman, 2011). Additionally, eight items in the scale were brought down to four items due to similarity as suggested by the specialists and three new items were added to obtain the final version of the scale containing 35 items. The items that were stated to be problematic by the specialists were corrected in line with the suggestions. Before administering the 35 item scale to all patients, it was administered to a pilot group of 20 hemodialysis patients by the investigator to determine its comprehensibility and the scale's content validity was completed. Because cognitive decline related to uremia were common among hemodialysis patients, the scale was prepared in the form of a 3 point Likert-type scale (Murray *et al*., 2006; Odagiri *et al*., 2011; Piliskin *et al*., 1996; Tamura *et al*., 2010). The participants were asked to respond to each item as "agree", "indecisive", or "don't agree".

When assessing positive items, "agree" was scored 3, "indecisive" 2, and "don't agree" 1. The negative items (6, 7, and 18–24) are reversely scored.

QDDF

The QDDF was developed by Vlaminc and associates (2001) to assess non-compliance to diet and fluid restrictions in hemodialysis patients. It was tested for validity and reliability in Turkey by Kara (2009). The QDDF consists of four items that assess patients' behaviors of non-compliance to diet (items 1 and 2) and fluid (items 3 and 4) based on their frequency and extent. The scale has a Likert-type structure ("no non-compliance", 0; "slight", 1; "moderate", 2; "serious", 3; "very serious", 4). As the score obtained from the QDDF increases, patient compliance to diet and fluid restriction decreases. Kara (2009) found the Cronbach's alpha coefficient of the scale to be 0.70. The Cronbach's alpha reliability coefficient was reassessed for this study and found to be 0.84.

Data collection and evaluation

The study data were collected by the researchers through face-to-face interviews with the patients. The data related to the disease and treatment, and biochemical parameters were obtained from patient files. The data were entered and evaluated on the SPSS program version 17.0 (SPSS, Chicago, IL, USA). The patients' descriptive characteristics were assessed as percentage and mean ± standard deviation (SD).

The scale was tested for reliability using the content validity, construct validity, and similar scale validity methods. In content validity, the scale items were presented to specialists for their opinions. In determining construct validity, the exploratory factor analysis (principal components analysis) was applied and the varimax rotation method was used. For similar scale validity, the relationship between the QDDF and FCHPS was assessed using Pearson correlation analysis.

In reliability assessment, the internal consistency was determined using Cronbach's alpha, Guttman's and Spearman–Brown reliability coefficient, item analysis (item–total, item–remainder, and item–discrimination indices), and test–retest techniques. For the test–retest reliability, the relationship between the two applications was assessed using Pearson correlation analysis.

Ethical considerations

This study was approved by the ethical review boards at the authors' institutions. Written permissions were obtained from the private hemodialysis centers and Istanbul Provincial Health Directorate.

Care was taken to base the participation in the study on volunteering principle, the patients were explained about the study objective both verbally and through the information form before the study and their written permissions were obtained through the Subject Information and Consent Form.

The participants were ensured that their identities and information they provided would not be disclosed to others.

RESULTS

Results related to sociodemographic characteristics of patients

The sample consisted of 276 chronic hemodialysis patients and the majority of the patients were male (58.3%), in the 50–65 year age group (53.6%), and married (69.6%). Of the patients, 32.6% were retired, 47.8% unemployed, and most graduates of primary school (62.3%).

Validity of the FCHPS in hemodialysis patients

Construct validity

The principal components analysis was used to test the scale's construct validity and identify the factors. As a result of the exploratory factor analysis that was carried out to explore the factor structure of FCHPS, the Kaiser–Meyer–Olkin (KMO) coefficient was found to be 0.89 and the result of the Bartlett test to be $P < 0.001$. The varimax rotation method was used to name and easily interpret the factors. No limitation was applied to the number of factors in the factor analysis and values with an eigenvalue greater than 1.00 were included in the scale. The scree plot of factor (subdimension) eigenvalues is shown in Figure 1. When the plot is reviewed, there is a breaking point at the third factor and there is a rapid decline in the graph after this point. Therefore, the number of factors was limited to three in the scale.

After examining the initial results of the factor analysis, the analysis was repeated after excluding 11 items that were not suitable for the factor structure. At the end of the rotation procedure, a structure was obtained which consisted of three dimensions and 24 items with homogeneous characteristics and 51.15% of whose variance was explained (Table 1). The three factors that were obtained as a result of the factor analysis were named as knowledge, behavior, and attitude in view of the item expressions they contained (Table 2).

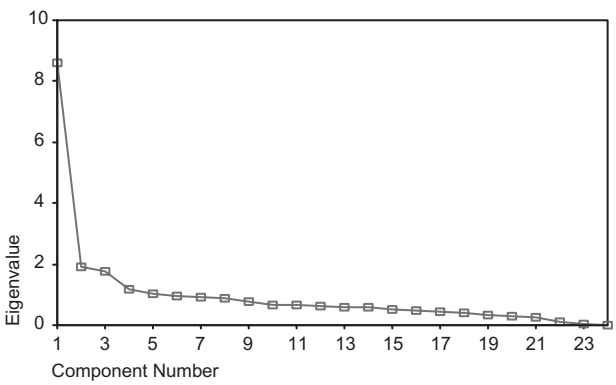

Figure 1 Scree plot of the subdimensions of the fluid control scale.

Similar scale validity

For similar scale validity, the FCHPS together with the QDDF was administered to the group of 276 people and the correlation between them was assessed using Pearson correlation analysis. The FCHPS and QDDF were found to be harmonious at a moderate level ($r = –0.58$, $P < 0.001$). This result meant that as the FCHPS scores increased, the QDDF scores decreased.

Reliability of the FCHPS

Internal consistency

The scale's general Cronbach's alpha internal consistency coefficient was 0.88. Its Spearman–Brown and Guttman's internal consistency coefficients, which were calculated by dividing the test into two equal halves, were 0.87 and 0.86. The internal consistency coefficients of the scale's subdimensions are given in Table 3.

The scale's item total correlations ranged 0.18–0.83 and item remaining correlations ranged 0.26–0.85 (Table 4). The Student's *t*-test values that show the item discrimination coefficients ranged 3.99–16.13. The entire items in the whole scale was found to be highly ($P < 0.001$) significant statistically.

Test–retest reliability

For the test–retest reliability to reveal invariability in time, the scale was administered to a group of 35 people twice with an interval of 15 days and the correlation between the two administrations was assessed with Pearson correlation analysis. A highly significant positive correlation was found between the scores of the first and second administrations ($r = 0.94$, $P < 0.001$).

Table 1 Total variance explained and internal consistency coefficients

Factors	Eigenvalues	% of variance	Cumulative %
1	8.58	35.78	26.39
2	1.92	8.00	40.52
3	1.76	7.35	51.15

Table 2 Result of factor analysis for the Fluid Control in Hemodialysis Patients ($n = 276$)

Factor	No. of items	Item no. included	Items	Factor load
Factor 1 (knowledge)	7	1	Eating salty and spicy food increases fluid intake	0.89
		3	Excess intake of fluid by dialysis patients causes swelling in the body (face, legs, and feet)	0.89
		5	Some other foods also increase weight (fluid)	0.69
		8	Taking in more than 2–3 L of fluid between two dialysis sessions is harmful	0.88
		16	Excess water drinking causes shortness of breath in dialysis patients	0.79
		30	The higher the fluid intake is between two dialysis sessions, the more comfortable that dialysis session is	0.79
		35	Excess intake of fluid by dialysis patients lowers blood pressure	0.84
Factor 2 (behavior)		6	I use a measuring cup when taking fluid food	0.32
		13	I consume food in brine such as cheese and olives after I keep them in water for a while (1 h)	0.38
		15	I keep away from activities that cause me to drink much fluid	0.60
		18	Fluid restriction prevents me from eating outside	0.58
	11	19	I drink my beverages sip by sip over a long time	0.31
		23	I keep a record of how much fluid I take in daily	0.50
		26	I rinse my mouth when I feel thirsty	0.64
		27	I chew gum to overcome my thirst	0.57
		29	I take care not to put salt on my food	0.56
		33	I avoid salty food such as pickles, chips, sunflower seeds, and crisps	0.30
		34	I cannot restrict fluids when meeting with friends	0.62
Factor 3 (attitude)		10	I find it very difficult to comply with fluid restriction	0.61
		11	There are times when I do not comply with fluid restriction	0.67
	6	17	There are times when I exceed 2 L of fluid between two dialysis sessions	0.40
		20	I have no idea how I can reduce my need for water	0.65
		25	I feel more thirsty when I leave the dialysis session	0.66
		31	Using a lot of drugs increases my intake of fluid	0.39

Table 3 Internal consistency coefficients

Factors	Cronbach's alpha	Spearman–Brown*	Guttman*
1	0.92	0.91	0.92
2	0.80	0.75	0.81
3	0.67	0.62	0.66

*$P < 0.001$.

DISCUSSION

For a study to be strong scientifically, the measurement instrument used (data collection instrument) should be a valid and reliable instrument (Şencan, 2005).

Validity of the FCHPS

In assessing validity of a data collection instrument, the methods of face validity, content validity, criterion validity, and construct validity are used (Büyüköztürk, 2008; Tavşancıl, 2006; Şencan, 2005).

For the content validity of the scale, the scale was presented to specialists for their views and specialist views were assessed. Then, the opinions of a Turkish-language specialist were obtained and the scale was presented to the hemodialysis patients for their views and in this way the content validity was secured.

The exploratory factor analysis was used to assess construct validity and to identify factors. Whether or not a factor analysis will be applied to a scale used and suitability of data are assessed through the KMO and Bartlett tests. The KMO test assesses whether the distribution is sufficient for a factor analysis and 0.80–0.90 interval is evaluated as very good (Şencan, 2005). The KMO value is 0.899 in this study and the sample size can be considered to be very good to be able to carry out a factor analysis. Whether the data come from a

Table 4 Results of item analyses and internal consistency coefficients of the Fluid Control in Hemodialysis Patients ($n = 276$)

Item no.	Item total*	Item remaining*	Item discrimination*	Cronbach's alpha if item removed
M.01	0.83	0.85	6.36	0.87
M.03	0.82	0.84	6.18	0.87
M.05	0.51	0.55	4.55	0.88
M.06	0.19	0.27	3.99	0.89
M.08	0.83	0.85	6.41	0.87
M.10	0.34	0.42	8.71	0.88
M.11	0.45	0.52	12.22	0.88
M.13	0.67	0.70	7.25	0.87
M.15	0.47	0.53	7.99	0.88
M.16	0.50	0.56	6.94	0.88
M.17	0.36	0.43	7.76	0.88
M.18	0.26	0.35	4.85	0.88
M.19	0.51	0.57	7.81	0.88
M.20	0.18	0.26	5.63	0.89
M.23	0.40	0.47	9.06	0.88
M.25	0.38	0.45	11.44	0.88
M.26	0.46	0.52	16.08	0.88
M.27	0.53	0.58	8.38	0.88
M.29	0.49	0.56	16.13	0.88
M.30	0.56	0.60	4.50	0.88
M.31	0.35	0.44	7.56	0.88
M.33	0.66	0.69	6.59	0.87
M.34	0.51	0.57	11.05	0.88
M.35	0.81	0.82	5.79	0.87

*$P < 0.001$.

multivariate and normal distribution is assessed with the Bartlett test. The Bartlett test is said to give χ^2-statistic value, and if the significance value is less than 0.05, the factors can be identified (Şencan, 2005). The result of the Bartlett test in this study turned out to be $P < 0.001$. This result indicated that data were suitable to carry out a factor analysis.

Although there are various methods for an exploratory factor analysis that is to be performed according to the results of Bartlett and KMO tests, the principal components analysis is used in general. The rotation technique is used to name the factors and easily interpret them. The rotation technique is an orthogonal rotation and it can be varimax, equamax, or quartimax (Baydur & Eser, 2006). The eigenvalue is used to decide on the number of factors. The eigenvalue is employed in both calculating the variance explained by the factors and deciding on the number of significant factors. In factor analysis, factors with an eigenvalue of 1 or more are considered as significant factors. As the eigenvalue increases, the explained variance rates also increase (Baydur & Eser, 2006; Şencan, 2005). In this study, the present authors used the principal components analysis and the varimax rotation method. No limitation was applied to the number of factors in the study and factors with an eigenvalue greater than 1.00 were included in the scale. Higher variance rates obtained from a factor analysis indicate a strong factor structure in the scale and variance rates ranging 40–60% are considered ideal (Şencan, 2005). The total variance amount obtained in the present authors' study (51.15%) can be said to be ideal.

A factor loading value is a coefficient explaining the relationship of items with subdimensions. It is stated in the published work that factor loads ranging 0.30–0.40 can be taken as the lower cut-off point when designing the factor pattern (Büyüköztürk, 2008; Gözüm & Aksayan, 2003; Şencan, 2005; Tavşancıl, 2006). The lower cut-off point was set at 0.30 in this study. When the first outcomes of the factor analysis were reviewed, seven items were seen to have a factor load value less than 0.30. At the end of the factor analysis, the FCHPS consisting of three subdimensions and 24 items was formed. After rotation of factors, the first subdimension

of the scale (knowledge) included seven items, the second subdimension (behavior) 11 items, and the third subdimension (attitude) six items.

Another method to assess validity in a scale development effort is to look at the correlation between the scores obtained from the scale being developed and the scores of another measurement instrument that had been developed previously which measures a similar characteristic and is known to have a high validity. In comparisons with similar scales, correlation coefficients between 0.50 and 0.70 that show a moderate relationship are considered to be the proof of validity (Şencan, 2005). The FCHPS the present authors were developing and the QDDF were found to be in harmony at a moderate level ($r = 0.58$, $P < 0.001$). According to this result, as the fluid control scale scores go up, the QDDF scores go down. Given these results, the FCHPS and QDDF show similarity.

Reliability of the FCHPS

Reliability is about to what extent a test or a measurement instrument measures that which it measures correctly. A measurement instrument should measure the aspect it measures consistently and should produce the same results when it is administered once more under the same conditions (Ercan & Kan, 2004; Şencan, 2005). Although there are various methods to assess the reliability of a scale being developed, the present authors used item analyses, Cronbach's alpha, Spearman–Brown and Guttman's internal consistency coefficients, and test–retest reliability.

The item analysis is meant to calculate item statistics, to choose the items that can be directly included in the test, to identify items that can be added to the test after being corrected, and to discard the items that are not possible to include in the test. Although there is no distinct standard as to below what measure the item total correlation falls to consider its reliability insufficient, 0.20 is used as the lower limit in practice (Gözüm & Aksayan, 2003). The item remaining correlation is the relationship of the item in question with the total score obtained from the other items excluding the item in question. Both in item total and item remaining, the results are expected to be at a minimum of $P < 0.05$ level statistically (Şencan, 2005). In the present authors' study, the item total score correlations ranged 0.18–0.83 and the item remaining correlation coefficients 0.26–0.85. In the item analyses made for all the subdimensions of the FCHPS, the item total and item remaining correlations of the entire subdimensions were observed to be high. The item total coefficients of two items in the FCHPS remained below 0.20, but the present authors decided to keep these items in the scale, because exclusion of these would lower the Cronbach's alpha coefficient, the item total correlations were high in the subdimensions where these items were and the items were statistically significant. Item discrimination is a comparison of the mean scores given to each item by the terminal groups (upper group, lower group) when the groups are sequenced from the highest score to the lowest score according to the total scores obtained from the scale. The difference between the item averages of the lower group (the part in the lower 27%) and the upper group (the part in the upper 27%) that are formed according to the test's total scores are compared using Student's *t*-test for independent groups (Şencan, 2005). The present authors decided to keep all the items in the scale when they observed that the item total, item remaining, and item discrimination features at there FCHPS overall and subdimensions were statistically significant. These results prove that the items are discriminative with respect to the characteristic they measure, and the reliabilities of the items in the scale are high and they are meant to measure the same objective.

Cronbach's alpha coefficient, which is used for measuring the reliability of Likert-type scales, is calculated for the adapted scale and its subdimensions and this coefficient provides information on consistency/homogeneity of the items (Büyüköztürk, 2008; Şencan, 2005). Cronbach's alpha coefficient for the total FCHPS was found to be good and for the subdimension of knowledge to be highly, behavior to be good, and attitude to be moderate. Moderate Cronbach's alpha coefficients (>0.60) are assumed to indicate that the scale is composed of more consistent items (Öksüz & Malhan, 2005; Özdamar, 2002). According to Özdamar (2002), if Cronbach's alpha internal consistency coefficient of a scale is within the interval of 0.80–0.99, then the scale is highly reliable. These results indicate that all the items in the scale measure the same feature; in other words, the feature measured by the FCHPS is homogenous and the FCHPS is a reliable measurement instrument.

The test–retest reliability, which is performed to reveal the stability of an instrument over time, involves administration of a scale developed to the same group under the same conditions in a certain interval and looking at the relationship in between using the Pearson correlation. The correlation coefficient is expected to show a positive and high-level relationship. The test–retest correlation of the present authors' scale was high, indicating a good stability over time. This means that the

FCHPS can ensure similar measurement outcomes in repeated measurements and is consistent over time.

In this study, the total mean score obtained from the FCHPS was 56.55 ± 6.37, the mean knowledge subdimension score was 19.80 ± 1.59, the mean behavior subdimension score was 25.5 ± 4.54, and the mean attitude subdimension score was 11.21 ± 3.35. An increase in the total score indicates that the knowledge, behaviors, and attitudes of hemodialysis patients about fluid control are positive and a decrease that they are negative.

Limitations of this study

A limitation of the study is that it cannot be generalized for the entire HD patients, because the study population includes only the HD centers that could be reached by the researchers in Istanbul.

CONCLUSION

The FCHPS is a good validity and reliability measurement instrument measuring the knowledge, behaviors, and attitudes of hemodialysis patients about fluid restriction. The scale can be used by doctors, nurses, and other health professionals in developing personal fluid restriction methods before and after training on fluid restriction to be given to hemodialysis patients. The present authors recommend that the scale be tested for validity and reliability for various cultures to verify that its factor structure is preserved.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest in publishing this research article. There are no sources of funding and the role of funders in the conduct of the research.

AUTHOR CONTRIBUTIONS

A. A. C. contributed to acquisition of data, drafted data of this study, and drafted the manuscript. S. C. contributed to the conception and design, interpreted the statistical analysis, critically reviewed the manuscript, and supervised the whole study process. All authors read and approved the final manuscript.

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