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METHODOLOGY

The Turkish Version of the Haemodialysis Self-Management Instrument: A Study of Validity and Reliability

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ABSTRACT

Aim: This study aims to adapt the 'Hemodialysis Self-Management Instrument (HDSMI-18)' to Turkish culture, and evaluate its psychometric properties.

Background: Self-management plays a critical role in improving patients' adherence to treatment and quality of life; however, self-management assessment tools specific to haemodialysis patients are limited.

Design: The research employed a methodological design.

Methods: The data were collected with a total of 200 haemodialysis patients receiving haemodialysis treatment between 15 July and 15 August 2024. Content Validity Index, Exploratory and Confirmatory Factor Analyses, Cronbach's alpha, Test–retest reliability and item-total score correlation were used in data analysis.

Results: The original HDSMI-18 consists of 18 items and four subdimensions (partnership, self-care, problem-solving, emotional management). However, the Turkish version of HDSMI-18 (HDSMI) comprises 17 items and introduces an additional fifth subdimension, 'self-control', alongside the four original subdimensions. The five-factor structure of the HDSMI demonstrated acceptable internal consistency and reliability. The scale's overall Cronbach's α coefficient was determined to be 0.77, with subscale coefficients ranging from 0.63 to 0.83.

Conclusion: The HDSMI is a valid and reliable tool for assessing self-management behaviours among haemodialysis patients in the Turkish population.

1 | Introduction

The incidence and prevalence of end-stage renal disease (ESRD) is steadily increasing in our country, as it is worldwide. Haemodialysis (HD) is the most commonly preferred treatment method for this disease (Kızıltan 2019; Naseri-Salahshour et al. 2020; Tüzün Özdemir and Akyol 2023). According to the 2023 registry data of the Turkish Society of Nephrology, 71.22% of a total of 86 665 ESRD patients are receiving HD treatment (Süleymanlar et al. 2023). Globally, the number of patients diagnosed with ESRD is estimated to be 37 million. In the United States, ESRD ranks as the ninth leading cause of death (Centres for Disease Control and Prevention [CDC] 2023).

The nature of the disease, along with the necessity of regularly attending HD sessions, adhering to fluid and dietary protocols and making lifestyle changes, leads to numerous emotional and physical challenges for HD patients, such as decreased self-esteem, social isolation, inactivity and economic losses (Mousa et al. 2018; Hafezieh et al. 2020; Lai et al. 2021). Poor adherence to these treatment requirements and lifestyle modifications results in increased mortality and morbidity. Furthermore,

Summary

What is already known about this topic?

- Compliance with fluid and dietary restrictions is critical for haemodialysis patients, as it directly impacts treatment efficacy and quality of life.
- Self-management is essential for improving adherence to treatment protocols and enhancing clinical outcomes in these patients. However, a specific tool to assess self-management behaviours in Turkish haemodialysis patients has not been available.

What this paper adds?

- This study successfully adapted and validated the Haemodialysis Self-Management Instrument (HDSMI-18) for the Turkish population, confirming it as a reliable tool for assessing self-management behaviours.
- The study also identified a five-factor structure unique to the Turkish version, offering a culturally relevant framework for evaluating self-management in haemodialysis patients.

The implications of this paper:

- Healthcare professionals in the field of haemodialysis can utilize the HDSMI to assess individual self-management in patients, allowing for the identification of non-adherence and the development of targeted interventions.
- The scale also provides a reliable tool for conducting longitudinal research aimed at improving patient outcomes in haemodialysis.

patients' abilities to cope with psychological and social stress are adversely affected, negatively impacting their survival rates and quality of life (Lai et al. 2021).

Self-management is defined as the ability of patients with chronic diseases to manage their condition, make lifestyle changes and successfully live with a chronic illness (Hou et al. 2022). Self-management aims to empower patients to lead active and productive lives, identify strategies for disease management and enhance their quality of life (Lin et al. 2012). In our country, the term 'self-management' is preferred when evaluating scales for chronic disease management. A review of the literature revealed that most of the scales are specific to diabetes patients, such as the 'Type 2 Diabetes Self-Management Scale', 'Diabetes Self-Management Perception Scale', 'Diabetes Self-Management Scale', 'Insulin Therapy Self-Management Scale' and 'Comprehensive Diabetes Self-Management Scale'. Additionally, there is one 'Epilepsy Self-Management Scale', one 'Multiple Sclerosis Self-Management Scale', one 'Chronic Disease Self-Management Scale' and one 'Self-Management Scale for Kidney Transplant Recipients'. However, no scale specifically designed to evaluate self-management in HD patients was identified (TOAD 2025).

In HD patients, self-management refers to the positive efforts to adhere to the recommended treatment, effectively manage symptoms, solve potential problems, control the disease, make decisions, participate in their own healthcare and fulfil the necessary medical treatment requirements (Wang et al. 2016; Peng et al. 2019; Chan et al. 2022; Lai et al. 2021).

The literature indicates that effective self-management may slow the progression of ESRD (Lin et al. 2012; Lai et al. 2021; Peng et al. 2019). In the study by Mousa et al. (2018), it was reported that HD patients with low self-efficacy had poor quality of life and were associated with multiple comorbidities. Improving self-management in HD patients is linked to increased treatment adherence and better clinical outcomes (Chan et al. 2022). In the study by Ma et al. (2022), a significant positive relationship was found between self-management, education and biochemical values. Developing methods to enhance self-management in HD patients and encourage their active participation in treatment increases their adherence to the treatment regimen (Hanifi et al. 2019).

The Haemodialysis Self-Management Instrument (HDSMI-18) was developed by Song and Lin to assess the self-management behaviours of HD patients. This tool includes items related to patients' knowledge of self-management behaviours and their past performance regarding these fundamental behaviours. There is a significant number of individuals receiving dialysis treatment in Turkey, and self-management plays a crucial role in coping with the disease and adhering to treatment. Currently, there is no assessment tool in Turkish to determine self-management in HD patients. Therefore, this study aims to investigate the validity, reliability and applicability of the HDSMI-18 in the Turkish population.

2 | Method

2.1 | Aim

To adapt the 'Hemodialysis Self-Management Instrument (HDSMI-18)' to Turkish culture and evaluate its psychometric properties.

2.2 | Design

This is methodological, descriptive, correlational and comparative study. It was conducted to test the validity and reliability of the Turkish version of the 'Hemodialysis Self-Management Instrument (HDSMI-18)'. The study process is summarized in Figure 1. The article follows the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines in its writing.

2.3 | Settings and Participants

The research was conducted between July 15 and August 15, 2024, with patients receiving HD treatment at two private dialysis centres in Izmir. Since this is a methodological study, no sampling method was employed. Inclusion criteria were: (a) willingness to participate in the study, (b) being over 18 years of age, (c) currently undergoing chronic HD sessions, (d) having

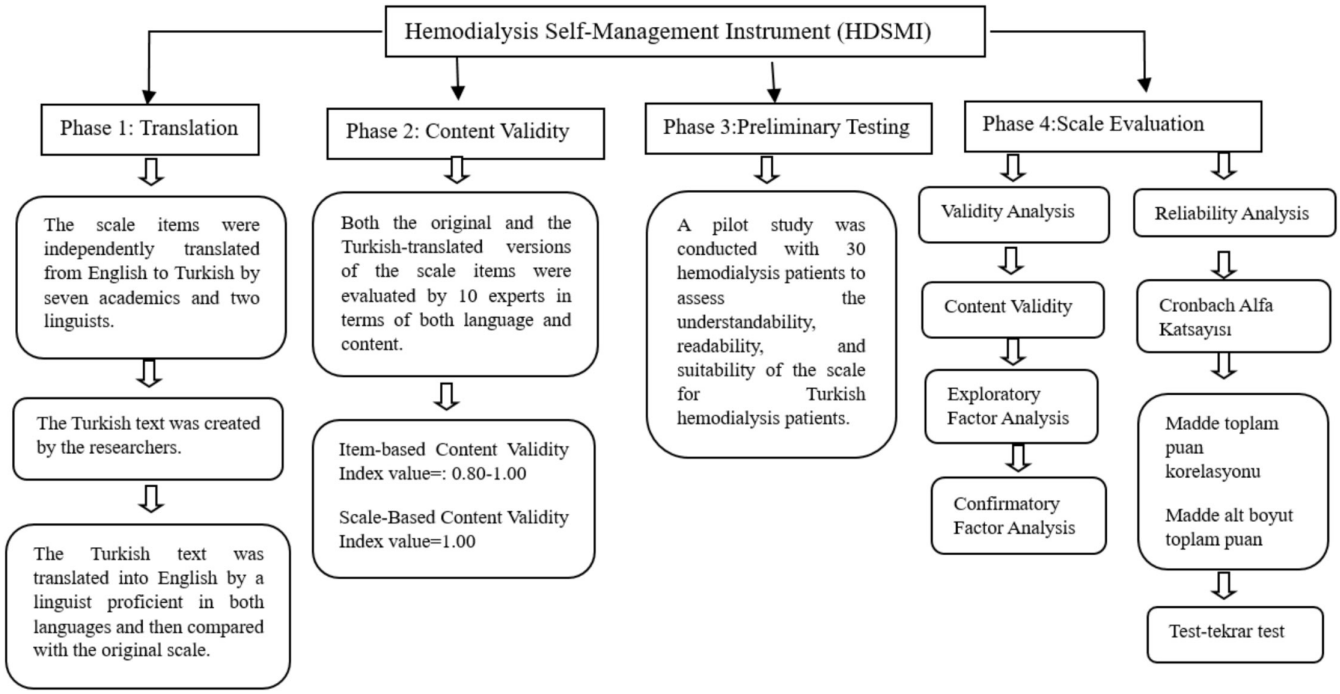

FIGURE 1 | The process of the study.

received HD treatment in the last 3 months and (e) being able to perform daily living activities independently. Exclusion criteria were: (a) having a history of psychiatric illness, acute infection, acute heart failure or cerebrovascular disease, (b) having undergone organ transplantation and (c) receiving peritoneal dialysis treatment.

The literature suggests that for validity and reliability studies of measurement instruments, the sample size should be 5–10 times the number of items in the scale (Hair et al. 2010; Sousa and Rojjanasrirat 2011). As this measurement tool consists of 18 items, the study aimed to include 90–180 HD patients. A total of 200 HD patients who agreed to participate voluntarily and completed the forms without missing data were included in the study.

2.4 | Data Collection

Data were collected using a 'Questionnaire Form', which included sociodemographic and disease-related questions and HDSMI, both administered by the researchers through face-to-face interviews.

2.4.1 | Questionnaire Form

This form, developed based on a literature review to gather demographic information about the participants, includes questions about age, gender, education level, marital status, employment status, as well as medical diagnosis, the presence of other chronic diseases, the frequency and duration of dialysis sessions (days per week and hours per session) and the year dialysis treatment began (Wang et al. 2016; Peng et al. 2019; Chan et al. 2022; Lai et al. 2021).

2.4.2 | Haemodialysis Self-Management Scale (HDSMI-18)

Developed by Song and Lin (2009) to assess the self-management behaviours of HD patients, this instrument is designed to evaluate patients' self-management behaviours. The scale consists of four subcategories and 20 items that describe the patient's disease management behaviours over the past 3 months. The scale is a four-point Likert type, with responses ranging from *never* (1 point), *rarely* (2 points), *sometimes* (3 points), to *always* (4 points) and each item is rated on a scale of 1–4. The total score ranges from 20 to 80, with higher scores indicating higher levels of self-management behaviours. The Cronbach's alpha coefficient, which represents the internal consistency of the scale, is 0.87, and the coefficients for the four subcategories range from 0.70 to 0.78, indicating that the scale is highly consistent (Song and Lin 2009; Chan et al. 2022; Chen et al. 2021).

2.5 | The Procedure

2.5.1 | Validity

2.5.1.1 | Translation Procedure. Before the study began, the scale underwent a language adaptation process, followed by expert consultation and a pilot study. The original English scale was independently translated into Turkish by nine experts, including seven academicians and two bilingual linguists. Subsequently, a bilingual expert who had not seen the original scale back translated it into English, and necessary adjustments were made after comparing it with the original scale.

2.5.1.2 | Content Validity. The content validity of the scale was evaluated using expert opinions (Jonhson

and Christensen 2014; Kartal and Bardakçı 2018). The literature recommends consulting at least three experts (Jonhson and Christensen 2014). The Turkish version of the scale was assessed by 10 experts, including HD nurses (n: 6), a nephrologist (n: 2) and a dialysis physician (n: 2), using the Davis technique to evaluate the clarity and cultural appropriateness of each item. The Davis technique uses a four-point scale for expert opinions: (a) 'Appropriate', (b) 'Item needs minor revision', (c) 'Item needs major revision' and (d) 'Item is not appropriate'. The Content Validity Index (CVI) for each item is calculated by dividing the number of experts who selected (a) or (b) by the total number of experts. A CVI value of 0.80 is used as the benchmark for acceptability (Rubio et al. 2003).

To assess the language comprehensibility of the scale, a pre-test was conducted with 20 HD patients from a different dialysis centre who were not included in the main study. It was found that these patients experienced no comprehension issues while completing the scale, indicating that the Turkish version is equivalent to the original scale.

2.5.1.3 | Construct Validity. To determine the construct validity of the Turkish version of the HDSMI, the sample was randomly split into two halves. An Exploratory Factor Analysis (EFA) was conducted on the first half, and a Confirmatory Factor Analysis (CFA) was performed on the second half (Orçan 2018; Swami and Barron 2019). Prior to conducting the factor analyses, the adequacy of the sample size and the suitability of the data for factor analysis were assessed using the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity (Hayran 2011; Jonhson and Christensen 2014). The literature suggests that a KMO value of 0.60 or above is recommended for the applicability of factor analysis (Tavşanlı 2006). CFA was conducted to evaluate whether the model derived from EFA accurately reflects the original scale structure.

2.5.2 | Reliability

2.5.2.1 | Internal Consistency. In scale development and adaptation studies, internal consistency analysis is conducted to determine the degree of agreement among the scale items (Çokluk et al. 2012). One of the most commonly used methods in this analysis is the calculation of the Cronbach's alpha reliability coefficient (Karatana and Öztürk Yıldırım 2023). To assess the reliability of the scale and its subscales, Cronbach's alpha internal consistency coefficient and item-total correlation values were calculated. The temporal stability of the scale was determined through test–retest reliability. Additionally, in this study, a 95% confidence interval and a statistical significance level of $p < 0.05$ were accepted (Aksoy et al. 2023; Karagöz 2019; Seçer 2017).

To assess test–retest reliability, the scale was administered to 30 patients undergoing HD with a three-week interval. The timing of the test–retest administration was determined to be sufficiently long to avoid influencing the second test scores due to recall of the test content by the participants, yet short enough to ensure no significant changes in the measured characteristics of the individuals (Sönmez et al. 2017).

2.6 | Statistical Analysis

Data were analysed using IBM SPSS 24.0 and AMOS 24.0 statistical software. Normal distribution of the data was assessed using the Kolmogorov–Smirnov test, and the data were found to follow a normal distribution based on the Shapiro–Wilk test ($p > 0.05$). Descriptive statistics for the sociodemographic data of HD patients were calculated using frequencies, percentages, means and standard deviations.

In the validity phase, language validity, content validity and construct validity were examined. Content validity was assessed using the Davis Technique. Construct validity was tested through CFA and EFA. The factorability of the scale was determined using Bartlett's Test of Sphericity and KMO values. EFA utilized the unweighted least squares (ULS) method based on tetrachoric correlations.

In the reliability phase, test–retest reliability was evaluated, and internal consistency was measured using the Kuder–Richardson 20 method and Cronbach's alpha coefficient. The relationship between test–retest scores was assessed using Spearman's correlation test.

2.7 | Ethical Considerations

Permission was obtained from the responsible author to adapt the 'Hemodialysis Self-Management Instrument' developed by Song and Lin (2009) into Turkish. Prior to commencing the study, ethical approval was obtained from the Ege University Medical Research Ethics Committee (TAEK) (decision no: 24-7t/11). Necessary permissions were secured from the institutions where the study was conducted, and written informed consent was obtained from the participating patients. Participants were also informed of their right to withdraw from the study at any time. This study adhered to the principles of the Helsinki Declaration, as accepted by the World Medical Association.

3 | Results

3.1 | Sociodemographic and Disease-Related Characteristics

The participants had a mean age of 61.30 ± 12.14 years. Among the HD patients who participated in the study, 59.5% were male, 66.5% had completed primary education, 79.5% were married, 88% had children, 59.5% reported that their income was equal to their expenses, 93.5% were not employed and 98.5% had social security. The majority of participants required assistance in their care, with 68.0% receiving support from family members. Additionally, 54.5% of the participants had been undergoing HD treatment for one to 5 years, 76.5% had comorbidities, 28.5% had both hypertension and diabetes, 26.5% had only hypertension and 22% had heart failure (Table 1).

TABLE 1 | Socio-demographic and disease related characteristics.

Variable	*n*	%
Age (X ± SD)	61.30 ± 12.14 (min:30—max: 85)	
Gender		
Female	81	40.5
Male	119	59.5
Education Level		
Illiterate	28	14.0
Primary education	133	66.5
High School	33	16.5
University	6	3.0
Marital Status		
Married	159	79.5
Single	41	20.5
Having Children		
Yes	176	88.0
No	24	12.0
Financial income Status		
Material Income less than expenditure	64	32.0
Tangible Income equal to expenditure	119	59.5
Material Income more than expenditure	17	8.5
Employment Status		
Yes	13	6.5
No	187	93.5
Existence of Social Health Insurance		
Yes	197	98.5
No	3	1.5
Need for care support		
No	42	21.0
Yes	158	79.0
HD treatment duration (months/year)		
6 month-1 year	8	4.0
2–5 year	109	54.5
6–10 year	56	28.0
11–15 year	13	6.5
16 years and more	14	7.0
Presence of comorbidities		
Yes	153	76.5
No	47	23.5
Comorbidities		
Hypertension	53	26.5
Diabetes	27	13.5
Heart failure	44	22.0
Hypertension + Diabetes	57	28.5
Other	19	9.5
Total	200	100

3.2 | Validity

Content validity analysis using the Davis technique revealed that both the CVI and the item-specific CVI were 1.0. The construct validity of the scale was evaluated through exploratory and confirmatory factor analyses.

3.2.1 | Exploratory Factor Analysis

The EFA results showed a KMO value of 0.73 (>0.60) and a Bartlett's test result of $\chi^2 = 910.6$, which was statistically highly significant ($p < 0.001$). The five-factor structure, comprising 17 items, explained a total variance of 43.158%. The total explained variance is attributed as follows: 19.289% to the active participation subscale, 9.246% to the self-care subscale, 6.136% to the self-monitoring subscale, 4.452% to the problem-solving subscale and 4.035% to the emotional management subscale. Factor loadings ranged from 0.507 to 0.705 for the active participation subdimension, 0.835 to 0.863 for the self-care subdimension, 0.552 to 0.658 for the self-monitoring subdimension, 0.407 to 0.736 for the problem-solving subdimension and 0.574 to 0.747 for the emotional management subdimension (Table 2).

The anti-image correlation value for Item 10 was found to be 0.564, which is below the required threshold of 0.60. Additionally, the communality value for Item 10 was 0.081, and since no factor loading was observed in the pattern matrix for Item 10, it could not be classified under any subdimension.

3.2.2 | Confirmatory Factor Analysis

To validate the five-factor structure of the Turkish version of the HDSMI, CFA was conducted. The factor loadings for the 17 items ranged from 0.33 to 0.88 (Figure 2). The fit indices for the Turkish version of the HDSMI were $\chi^2 = 165.56$, $\chi^2/df = 1.533$. RMSEA = 0.05, GFI = 0.91, CFI = 0.93, IFI = 0.93 and TLI = 0.91, indicating that the model meets acceptable standards and demonstrates a strong congruence between the adapted scale and the original scale (Table 3).

TABLE 2 | Exploratory factor analysis: factor loadings of the Turkish version of the HDSMI ($n = 100$).

Item numbers	Items	Partnership	Self-care	Self-management	Problem-solving	Emotional management
9	During dialysis, I monitor whether the dialysis machine parameters (e.g., ultrafiltration, blood flow rate or temperature) reach the values set by healthcare professionals.	0.66				
12	Before dialysis, I would like to be consulted by the medical staff about the parameters of the dialysis machine (e.g., blood flow rate, temperature).	0.71				
13	Before dialysis, I give my opinion about the area from which health professionals should intervene.	0.44				
17	Before dialysis, I discuss with health professionals the amount of fluid I want to withdraw.	0.59				
4	I maintain my arteriovenous fistula.		0.84			
8	Before dialysis, I clean the fistula access site.		0.86			
2	Even if I eat out, I still choose foods that comply with dietary guidelines (e.g., low sodium, low potassium and low phosphorus).			0.66		
3	I especially choose vegetables and fruits low in potassium.			0.66		
7	According to the advice of health professionals, I blanch the greens before cooking.			0.60		
14	I try to control my fluid intake even when I am extremely thirsty.			0.51		
1	When my blood test results aren't good, I try to find the underlying causes.				0.41	
5	When I have questions about kidney diseases, I ask other people (e.g., healthcare staff, family, friends or other patients).				0.50	
6	When I feel uncomfortable, I try to understand what causes these symptoms or when they occur.				0.66	
11	When I have questions about kidney diseases, I actively seek/obtain information from books, videos, television or the internet.				0.74	
15	I feel comfortable telling health professionals about my emotional distress.					0.57
16	I alleviate my emotional distress due to dialysis treatment by some activities (e.g., chanting. Praying or travelling).					0.59

(Continues)

TABLE 2 | (Continued)

Item numbers	Items	Partnership	Self-care	Self-management	Problem-solving	Emotional management
18	I ask for help from others (family or friends) to reduce my emotional distress caused by dialysis.					0.75
Explained variance		%19.29	%9.25	%6.14	%4.45	%4.04
Eigenvalues		4.00	2.15	1.60	1.32	1.28
KMO coefficient				0.734		
Bartlett's test				910.611 ($p<0.001$)		

3.3 | Reliability

3.3.1 | Internal Consistency

To determine the reliability of the Turkish version of the HDSMI. Cronbach's alpha coefficient and item-total correlation analyses were conducted. The overall reliability of the five-subscale scale was found to be $\alpha=0.77$. Reliability analyses of the subscales revealed that the reliability for the Effective Participation subscale was $\alpha=0.69$, the Self-Care subscale was $\alpha=0.83$, the Self-Monitoring subscale was $\alpha=0.70$, the Problem-Solving subscale was $\alpha=0.65$ and the Emotional Management subscale was $\alpha=0.67$. These analyses indicate that the HDSMI, including its subscales, is a reliable measurement tool.

3.3.2 | Test–Retest Reliability

Test–retest reliability was evaluated using Pearson correlation analysis, which revealed a strong positive correlation between the items ($r=0.995$, $p<0.001$). Based on these findings, the scale was determined to be reliable over time.

3.4 | Scoring of the Scale

In the HDSMI scale, each item is scored from 1 to 4: 1 for 'never' 2 for 'rarely' 3 for 'sometimes' and 4 for 'always'. The scale does not include any reverse-scored items. The total scores range from 17 to 68, with higher scores indicating a higher level of individual management.

4 | Discussion

HD treatment involves not only regular dialysis sessions but also adherence to dietary and fluid intake restrictions, as well as consistent medication use. The adoption of these radical lifestyle changes can enhance dialysis adequacy and reduce potential complications and mortality–morbidity rates by increasing individuals' level of self-management (Li et al. 2014). Self-management refers to the patient's active participation in health services to gain the skills necessary to control their illness, solve problems and adapt daily life to their condition. Effective self-management includes the ability to monitor one's health status and emotional responses, and improving self-management levels in HD patients is an effective way to reduce mortality and complication rates while enhancing quality of life (Wang et al. 2016; Lin et al. 2017). Studies in the literature have shown that individual management behaviours in HD patients are significantly impaired in the presence of conditions such as diabetes mellitus, hypertension, anaemia, hypoalbuminaemia and depression, with depressive symptoms increasing dietary noncompliance (Gebrie and Ford 2019; Ma et al. 2022). Therefore, measuring the self-management behaviours of HD patients and planning interventions to improve these behaviours when they are found to be inadequate is of great importance.

Song and Lin (2009) developed a scale consisting of 20 items and four subdimensions to measure individual management behaviours in HD patients in Taiwan. This scale was later adapted

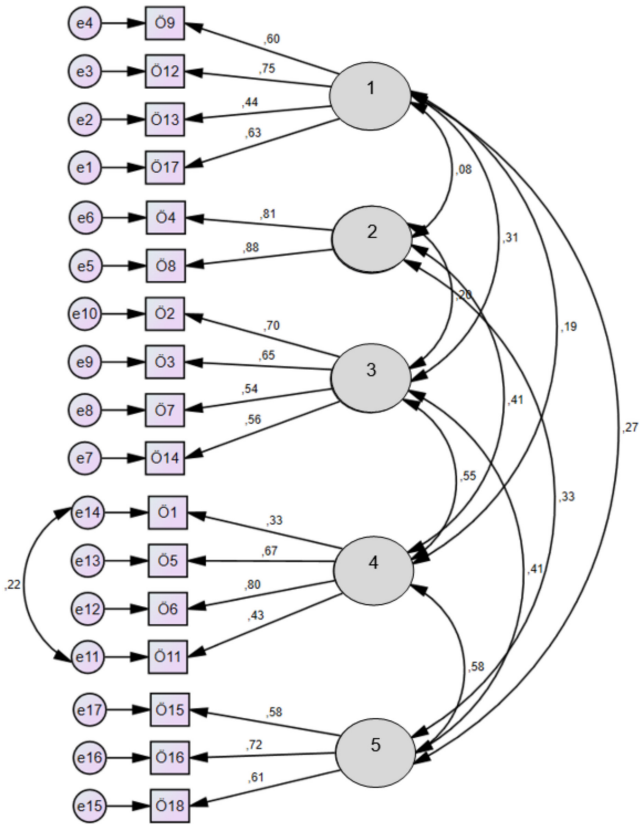

FIGURE 2 | Confirmatory factor analysis of the Turkish version of the haemodialysis self-management instrument (HDSMI).

adequate (Aksoy et al. 2023). In Chen et al.'s (2021) study, since the KMO and Bartlett's test of sphericity were not conducted in the original scale analysis, direct comparison of the study data was not feasible.

4.1.2 | Construct Validity

The literature indicates that a high total explained variance reflects strong construct validity of a scale, with the value ideally being 40% or higher (Seçer 2017). The EFA of the Turkish version of the HDSMI revealed that the total variance explained was over 43.1%, and all factor loadings exceeded the 0.40 threshold. This finding suggests that the scale has robust construct validity (Seçer 2017; Aksoy et al. 2023). As Chen et al. (2021) did not provide results for total variance and factor loadings in their original study, a direct comparison could not be made. However, Song and Lin (2009) reported a total variance of 45.13%, which is consistent with our findings. The scale adapted for the Turkish population consists of five subdimensions, which differ from those reported by Song and Lin (2009) and Chen et al. (2021). The original scale's subdimensions were defined as partnership, self-care, problem-solving and emotional management. The addition of the 'self-control' subdimension distinguishes the Turkish version of the HDSMI from the original instrument.

Self-control is defined as the daily tasks individuals undertake to manage symptoms, treatment and lifestyle changes associated with chronic illness (Grady and Gough 2014). This concept highlights patients' active engagement in controlling

TABLE 3 | Goodness of fit indices.

Models/data-model fit indices	$\chi 2$	df	$\chi 2$/df	RMSEA	GFI	CFI	IFI	TLI
Five-factor model	165.56	108	1.53	0.05	0.91	0.93	0.93	0.91

Note: CFI, Comparative Fit Index; df, Degrees of Freedom; GFI, Goodness of Fit; IFI, Incremental Fit Index; RMSEA, Root Mean Standard Error Approximation; sRMR, Standardized Root Mean Square Residual; TLI, Tucker-Lewis Index; X2, Chi-square.

by Chen et al. (2021) through psychometric analysis, resulting in an 18-item scale with four subdimensions. Given the lack of a tool for measuring individual management behaviours among HD patients in our country, it is essential to adapt Chen et al.'s (2021) scale for the Turkish population and conduct validity and reliability analyses.

4.1 | Validity of HDSMI

4.1.1 | Content Validity

The content validity of the Turkish version was assessed using the Davis technique, revealing that both item-level and overall scale-level CVI scores were above 0.80. These results indicate that experts believe the items are consistent with Turkish culture and sufficiently represent the intended domain (Polit and Beck 2018; Aksoy et al. 2023). In this study, the KMO value of the scale was found to be 0.73, and the Bartlett's test of sphericity yielded a p-value of <0.001. These results suggest that the data are suitable for factor analysis and that the sample size is

their disease progression and adhering to treatment regimens (Huang et al. 2024). Accordingly, the 'self-control' subdimension conceptually reflects culturally specific aspects of self-management among Turkish HD patients, emphasizing patients' abilities to regulate impulses, emotions and adherence behaviours that are crucial for managing their chronic condition.

In the Turkish healthcare context, treatment adherence is influenced not only by physician directives but also by patients' personal discipline and self-regulatory behaviours (Büken and Arapkirlioglu 2010; Irmak 2016). Therefore, this subdimension captures unique behavioural strategies not separately identified in the original scale.

Including the self-control subdimension enhances the instrument's sensitivity and cultural relevance, allowing for a more comprehensive assessment of self-management behaviours specific to the Turkish population. Prior research has shown that self-control is a key predictor of successful self-management and

improved health outcomes (Kroese et al. 2012; Chen et al. 2020). This addition may affect the use of the instrument by providing richer information on patients' self-management capacities, which is vital for tailoring interventions and improving health outcomes in this cultural context.

To validate the five-factor structure of the Turkish version of the HDSMI, a CFA was conducted. The results of the CFA successfully confirmed the five-factor structure identified in the EFA. For an acceptable fit, the χ^2/df value should be five or less; CFI and IFI values should be 0.85 or higher; GFI, RFI, NFI and TLI values should be 0.80 or higher; and RMSEA should be 0.08 or lower (Kartal and Bardakçı 2018; Tabachnick and Fidell 2015; Aksoy et al. 2023; Demir Kösem et al. 2023). The fit indices obtained in this study were: χ^2/df = 1.53, GFI = 0.91, CFI = 0.93, IFI = 0.93, RFI = 0.77, NFI = 0.82, TLI = 0.91 and RMSEA = 0.05, indicating that the model fit is acceptable. Chen et al. (2021) reported that all factor loadings were significant ($p < 0.001$), with fit indices of χ^2/df = 1.74, CFI = 0.96, TLI = 0.95 and RMSEA = 0.05. According to the CFA results, the Turkish version of the HDSMI demonstrates excellent model fit and a robust factor structure (Seçer 2017; Aksoy et al. 2023). Chen et al. (2021) noted that two items (Items 2 and 10) were removed and one item (Item 13) was assigned to a different subdimension. In the Turkish version of the HDSMI, Item 10 was excluded because its factor loading was below 0.20. While statistical analyses justified its removal, cultural factors may also have influenced its performance. In the Turkish healthcare context, particularly in chronic disease management such as HD, treatment schedules and clinical decisions are predominantly determined by physicians. Patients often perceive adherence to these regimens as a mandatory medical requirement rather than as an element of their own decision-making process. This reflects a paternalistic model of healthcare delivery, where physician authority is prioritized and patient autonomy in treatment management may be limited (Büken and Arapkirlioglu 2010; Irmak 2016). Consequently, many participants likely interpreted Item 10 as compliance with physician instructions rather than self-initiated behaviour, making it conceptually less relevant to self-management. This mismatch likely contributed to its low factor loading. Moreover, previous cross-cultural adaptation studies indicate that cultural norms around autonomy and shared decision-making can significantly influence how items are interpreted in patient-reported instruments (Büken and Arapkirlioglu 2010; Ulman 2023).

4.2 | Reliability of the HDSMI

The Cronbach's alpha coefficient determines the extent to which all items of a scale measure the same underlying concept or construct and indicates the level of internal consistency among the items (Seçer 2017). In this study, the overall Cronbach's alpha coefficient for the Turkish version of the HDSMI was found to be 0.77, with the Cronbach's alpha coefficients for the subdimensions being above 0.60. Due to the lack of reported total Cronbach's alpha values in the study by Chen et al. (2021), a direct comparison could not be made. However, Song and Lin (2009) reported that in the initial version of their 20-item scale, the overall Cronbach's alpha coefficient was 0.87, and the subscale Cronbach's alpha coefficients ranged from 0.70 to 0.78. The Cronbach's alpha coefficients obtained in this study, being above 0.60, demonstrate that the Turkish version of the HDSMI possesses reliable internal consistency (Gürbüz and Şahin 2017; Seçer 2017; Demir Kösem et al. 2023).

As part of the scale reliability analysis, item-total correlation analysis was conducted to assess the relationship between scores on individual items and the total scale score. For the Turkish version of the HDSMI, all items except Item 10 had item-total correlation values exceeding 0.20, indicating that the items effectively measure the intended construct of the scale (Karagöz 2019; Seçer 2017). Additionally, test–retest reliability analysis was performed to evaluate the temporal stability and consistency of the scale, revealing a significant correlation between the two measurements ($r = 0.96$, $p < 0.001$). These results validate the temporal stability and consistency of the Turkish form of the HDSMI (Aksoy et al. 2023).

4.3 | Strengths and Weaknesses

The scale developed by Song and Lin (2009) originally consisted of 20 items, while Chen et al. (2021) reported it with 18 items. The Turkish version of the HDSMI comprises 17 items and takes approximately 5–10 min to complete. The Turkish version has been found to be easily understandable and acceptable to participants, indicating that the scale is suitable for measuring long-term individual management in HD patients.

Despite the strengths of this study, using a sample from only two different dialysis centres in a specific region is a limitation. Moreover, these centres are private healthcare facilities, which may have patient populations with different sociodemographic and clinical characteristics compared to public or university hospitals. This limitation may restrict the generalizability of the study's findings to broader patient populations. Additionally, the possibility that participants may provide inaccurate responses due to concerns about being criticized in the dialysis treatment setting could impact the reliability of the answers.

Future validation studies are recommended to include more diverse patient samples from a variety of healthcare settings, including public hospitals and rural clinics, to enhance the external validity and applicability of the Turkish HDSMI across different contexts.

5 | Conclusion

In this study, the analysis and evaluation of the Turkish version of the HDSMI have determined that the scale is a valid and reliable measurement tool for the Turkish sample. The HDSMI scale has demonstrated its reliability in assessing individual management among HD patients in the Turkish population. A significant advantage of the scale is its ability to comprehensively evaluate the individual management levels of HD patients across five different dimensions. HD nurses can use this scale to identify reasons for non-compliance with treatment and areas needing improvement, and can plan effective educational programmes to enhance patients' active participation in their treatment. Additionally, the use of this scale can facilitate longitudinal and experimental studies, providing valuable data to the literature.

Author Contributions

Sevda Tüzün Özdemir: conceptualization; data curation; investigation; formal analysis; study supervision; writing – original draft; writing – review and editing. **Öznur Usta Yeşilbalkan:** conceptualization; study supervision; writing – review and editing.

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Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

References

Aksoy, B., V. Apaydın Cırık, and M. Bektaş. 2023. "Media Parenting Scale for School-Aged Children (MEPA-20): Psychometric Properties of the Turkish Version." *Journal of Pediatric Nursing* 73: 91–101. https://doi.org/10.1016/j.pedn.2023.08.023.

Büken, N. O., and K. Arapkirlioglu. 2010. "Bioethics Committees and Examining Consent Within the Patient-Physician Relationship in Turkey." *Medicine and Law* 29, no. 3: 403–418.

Chan, F. H. F., S. Newman, B. A. Khan, and K. Griva. 2022. "The Role of Subjective Cognitive Complaints in Self-Management Among Haemodialysis Patients: A Cross-Sectional Study." *BMC Nephrology* 23, no. 1: 363. https://doi.org/10.1186/s12882-022-02994-2.

Chen, W. C., C. C. Lin, C. C. Wu, and Y. C. Song. 2021. "Psychometric Testing of the Hemodialysis Self-Management Instrument (HDSMI-18): A Confirmatory Factor Analysis." *Nursing Open* 8, no. 5: 2832–2839. https://doi.org/10.1002/nop2.867.

Chen, X., X. Zhou, H. Li, J. Li, and H. Jiang. 2020. "The Value of WeChat Application in Chronic Diseases Management in China." *Computer Methods and Programs in Biomedicine* 196: 105710. https://doi.org/10.1016/j.cmpb.2020.105710.

Chronic Kidney Disease in the United States. 2023. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.cdc.gov/kidneydisease/pdf/CKD-Factsheet-H.pdf.

Çokluk, Ö., G. Şekercioğlu, and Ş. Büyüköztürk. 2012. *Multivariate Statistics for Social Sciences: SPSS and LISREL Applications (2.Bs)*. Pegem Akademi.

Demir Kösem, D., M. Bektaş, and O. Gawronski. 2023. "Psychometric Properties of the Turkish Version of the Vital Signs Monitoring on Pediatric Wards Scale (Ped-V Scale)." *Journal of Pediatric Nursing* 71: e38–e45. https://doi.org/10.1016/j.pedn.2023.04.013.

Gebrie, M. H., and J. Ford. 2019. "Depressive Symptoms and Dietary Non-Adherence Among End Stage Renal Disease Patients Undergoing Hemodialysis Therapy: Systematic Review." *BMC Nephrology* 20, no. 1: 429. https://doi.org/10.1186/s12882-019-1622-5.

Grady, P. A., and L. L. Gough. 2014. "Self-Management: A Comprehensive Approach to Management of Chronic Conditions." *American Journal of Public Health* 104: e25–e31. https://doi.org/10.2105/AJPH.2014.302041.

Gürbüz, S., and F. Şahin. 2017. *Research Methods in Social Sciences (Revised and Updated 4th Edition)*. Seçkin Publishing.

Hafezieh, A., M. Dehghan, M. Taebi, and S. Iranmanesh. 2020. "Self-Management, Self-Efficacy and Knowledge Among Patients Under Haemodialysis: A Case in Iran." *Journal of Research in Nursing* 25, no. 2: 128–138. https://doi.org/10.1177/1744987120904770.

Hair, J. F., W. C. Black, B. J. Babin, R. E. Anderson, and R. L. Tatham. 2010. *Multivariate Data Analysis*. 7th ed. Prentice Hall.

Hanifi, N., L. S. Ezzat, and M. Dinmohammadi. 2019. "Effect of Consultation and Follow-Up Phone Calls on Biochemical Indicators and Intradialytic Weight Gain in Patients Undergoing Hemodialysis." *Oman Medical Journal* 34, no. 2: 137–146. https://doi.org/10.5001/OMJ.2019.26.

Hayran, M. 2011. *Basic Statistics for Health Surveys*. 1st ed. Art Ofset Publication.

Hou, Y., L. Li, Q. Zhou, G. Wang, and R. Li. 2022. "Relationships Between Social Capital, Patient Empowerment, and Self-Management of Patients Undergoing Hemodialysis: A Cross-Sectional Study." *BMC Nephrology* 23, no. 1: 71. https://doi.org/10.1186/s12882-022-02669-y.

Huang, Y., S. Li, X. Lu, W. Chen, and Y. Zhang. 2024. "The Effect of Self-Management on Patients With Chronic Diseases: A Systematic Review and Meta-Analysis." *Healthcare (Basel)* 12, no. 21: 2151. https://doi.org/10.3390/healthcare12212151.

Irmak, N. 2016. "Right to Refuse Treatment in Turkey: A Diagnosis and a Slightly Less Than Modest Proposal for Reform." *Journal of Medical Ethics* 42, no. 7: 435–438. https://doi.org/10.1136/medethics-2015-103266.

Jonhson, B., and L. Christensen. 2014. *Educational Research: Quantitative, Qualitative, and Mixed Approaches*. 3rd ed. SAGE Publication.

Karagöz, Y. 2019. *SPSS 23 and AMOS 23 Applied Statistical Analysis*, 878–940. Nobel Akademi Publishing.

Karatana, Ö., and T. Öztürk Yıldırım. 2023. "Turkish Adaptation of the Patients' Care Perception Scale for Nursing Students: Validity and Reliability Study." *SBU Journal of Nursing* 5, no. 3: 213–218. https://doi.org/10.48071/sbuhemsirelik.1258828.

Kartal, M., and S. Bardakçı. 2018. *Reliability and Validity Analysis With SPSS and AMOS Applied Examples*. Akademisyen Publishing.

Kızıltan, G. 2019. "Medical Nutrition Therapy in End-Stage Renal Failure." *Journal of Nutrition and Dietetics* 46, no. 1: 48–56. https://doi.org/10.33076/2018.bdd.1170.

Kroese, F. M., M. A. Adriaanse, and D. T. D. De Ridder. 2012. "Boosters, Anyone? Exploring the Added Value of Booster Sessions in a Self-Management Intervention." *Health Education Research* 27, no. 5: 825–833. https://doi.org/10.1093/her/cys062.

Lai, P. C., S. V. Wu, J. Alizargar, S. Pranata, J. M. Tsai, and N. C. Hsieh. 2021. "Factors Influencing Self-Efficacy and Self-Management Among Patients With Pre-End-Stage Renal Disease (Pre-ESRD)." *Healthcare (Basel)* 9, no. 3: 266. https://doi.org/10.3390/healthcare9030266.

Li, H., Y. F. Jiang, and C. C. Lin. 2014. "Factors Associated With Self-Management by People Undergoing Hemodialysis: A Descriptive Study." *International Journal of Nursing Studies* 51, no. 2: 208–216. https://doi.org/10.1016/j.ijnurstu.2013.05.012.

Lin, C. C., C. C. Wu, R. M. Anderson, et al. 2012. "The Chronic Kidney Disease Self-Efficacy (CKD-SE) Instrument: Development and Psychometric Evaluation." *Nephrology, Dialysis, Transplantation* 27, no. 10: 3828–3834. https://doi.org/10.1093/ndt/gfr788.

Lin, M. Y., M. F. Liu, L. F. Hsu, and P. S. Tsai. 2017. "Effects of Self-Management on Chronic Kidney Disease: A Meta-Analysis." *International Journal of Nursing Studies* 74: 128–137. https://doi.org/10.1016/j.ijnurstu.2017.06.008.

Ma, L. C., Y. M. Liu, Y. C. Lin, et al. 2022. "Factors Influencing Self-Management Behaviors Among Hemodialysis Patients." *Journal of*

Personalized Medicine 12, no. 11: 1816. https://doi.org/10.3390/jpm12111816.

Mousa, İ., R. Ataba, K. Al-ali, A. Alkaiyat, and S. H. Zyoud. 2018. "Dialysis-Related Factors Affecting Self-Efficacy and Quality of Life in Patients on Hemodialysis: A Cross-Sectional Study From Palestine." *Renal Replacement Therapy* 4, no. 21: 1–12. https://doi.org/10.1186/s41100-018-0162-y.

Naseri-Salahshour, V., M. Sajadi, A. Nikbakht-Nasrabadi, F. Davodabady, and A. Fournier. 2020. "The Effect of Nutritional Education Program on Quality of Life and Serum Electrolytes Levels in Hemodialysis Patients: A Single-Blind Randomized Controlled Trial." *Patient Education and Counseling* 103, no. 9: 1774–1779.

Orçan, F. 2018. "Exploratory and Confirmatory Factor Analysis: Which Should Be Used First." *Journal of Measurement and Evaluation in Education and Psychology* 9, no. 4: 413–421.

Peng, S., J. He, J. Huang, et al. 2019. "Self-Management Interventions for Chronic Kidney Disease: A Systematic Review and Meta-Analysis." *BMC Nephrology* 20, no. 1: 142. https://doi.org/10.1186/s12882-019-1309-y.

Polit, D., and C. Beck. 2018. *Essentials of Nursing Research: Appraising Evidence for Nursing Practice*. 7th ed. Lippincott Williams & Wilkins.

Rubio, D. M. G., M. Berg-Weger, S. S. Tebb, E. S. Lee, and S. Rauch. 2003. "Objectifyng Content Validity: Conducting a Content Validity Study in Social Work Research." *Social Work Research* 27, no. 2: 94–104. https://doi.org/10.1093/swr/27.2.94.

Seçer, İ. 2017. *Reliability and Validity: Practical Data Analysis-Analysis and Reporting With SPSS and LISREL*. 3rd ed., 211–224. Anı Publishing.

Song, Y. C., and C. C. Lin. 2009. "The Development and Testing of a New Hemodialysis Self-Management Instrument (HD-SMI)." *Journal of Nursing and Healthcare Research* 5: 51–59. https://doi.org/10.6225/jnhr.5.1.51.

Sönmez, B., F. Bacaksız Eşkin, and A. Yıldırım. 2017. "Adaptation of Innovation Climate Scale to Turkish: Validity and Reliability Study." *Journal of Anatolia Nursing and Health Sciences* 20, no. 2: 75–82. http://dergipark.gov.tr/ataunihem/issue/31359/342617.

Sousa, V. D., and W. Rojjanasrirat. 2011. "Translation, Adaptation and Validation of Instruments or Scales for Use in Cross-Cultural Health Care Research: A Clear and User-Friendly Guideline." *Journal of Evaluation in Clinical Practice* 17, no. 2: 268–274. https://doi.org/10.1111/j.1365-2753.2010.01434.x.

Süleymanlar, G., K. Ateş, N. Seyahi, and İ. Koçyiğit. 2023. *Nephrology, Dialysis and Transplantation Registry 2023 in Turkey, T.C. Ministry of Health Joint Report and Turkish Society of Nephrology Joint Report*. Vol. 2023. 1st ed., 1–6. Miki Matbaacılık san. ve tic. Ltd. Şti.

Swami, V., and D. Barron. 2019. "Translation and Validation of Body Image Instruments: Challenges, Good Practice Guidelines, and Reporting Recommendations for Test Adaptation." *Body Image* 31: 204–220.

Tabachnick, B. G., and L. S. Fidell. 2015. *Using Multivariate Statistics*. (Baloğlu, M., Trans.), 612–760. Nobel Academic Publishing.

Tavşanlı, E. 2006. *Measurement of Attitudes and Data Analysis With SPSS*. 3rd ed. Nobel Publication Distribution.

TOAD. 2025. "Turkey Index of Measurement Instruments." Access date 03.05.2024. https://toad.halileksi.net/page/1/?s=%C3%B6z+y%C3%B6netim&sm=b&sonuc=25&sirala=baslik.

Tüzün Özdemir, S., and A. Akyol. 2023. "Effect of Inhaler and Topical Lavender Oil on Pain Management of Arteriovenous Fistula Cannulation." *Journal of Vascular Access* 24: 11297298211031086.

Ulman, Y. I. 2023. "Advance Directives and the Turkey Context." In *Advance Directives Across Asia: A Comparative Socio-Legal Analysis*, edited by D. Cheung and M. Dunn, 207–222. Cambridge University Press.

Wang, S. L., L. F. Kung, T. H. Chen, S. M. Hsiao, P. N. Hsiao, and C. J. Chiou. 2016. "Construction and Validation of a Chronic Kidney Disease Self-Care Scale." *Hu Li Za Zhi* 63: 90–99. https://doi.org/10.6224/jn.63.4.90.