

# A valid and reliable tool in assessing patient education: the Patient Education Implementation Scale

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## Abstract

**Aim:** This study aimed to develop a valid and reliable tool for assessing the frequency of nurses' implementation of patient education in line with the stages of determining needs, assessment and planning, implementation, and evaluation and documentation.

**Background:** Patient education is important in terms of the patient's completion of a reliable and effective treatment process. Patient education is one of the main responsibilities of a nurse. No valid and reliable study that assessed nurses' patient education process implementation was found in the literature.

**Methods:** This instrument development study was conducted with 583 nurses working at university, private, and research and training hospitals located in the province of Istanbul in Turkey. The items of the Patient Education Implementation Scale were developed in line with the literature and expert opinions. The analyses involved descriptive statistics and psychometric analyses. The level of statistical significance was accepted as  $P < .05$ .

**Results:** The content validity index was calculated as 0.96 for the 42-item Patient Education Implementation Scale, which explained 63.37% of the total variance. The scale items whose factor loads were 0.45 or higher were divided into four factors as (a) determining education needs, (b) assessment and planning, (c) implementation, and (d) evaluation and documentation. The Cronbach's alpha coefficients were 0.78–0.95 for the subdimensions and 0.97 for the general scale.

**Conclusion:** It was determined that the Patient Education Implementation Scale is a valid and reliable tool.

## KEYWORDS

instrument development, nurses, patient education, psychometric assessments

## SUMMARY STATEMENT

What is already known about the topic?

- Patient education is one of the most basic rights of the patient and

their family/relatives and is one of the main responsibilities of a nurse.

- Patient education, which starts with admission of the patient to the hospital and continues until they are discharged, is a main element of patient-centred care.

- No valid and reliable study that assessed the processes of nurses' implementation of patient education was found in the literature.

#### What this paper adds?

- The Patient Education Implementation Scale was demonstrated to be a valid and reliable tool.

#### The implications of this paper

- The Patient Education Implementation Scale is available to provide objective evaluation of nurses' patient education activities in relation to determining educational needs, assessment and planning, implementation, and evaluation and documentation.
- The Patient Education Implementation Scale is available for use (with permission) as part of nurse education programmes.

## 1 | INTRODUCTION

Patient education is increasingly important due to increasing rates of hospitalization, with increasing numbers of people living with chronic disease and more prevalent home care services (Abdi, Izadi, Vafaei, & Lorestani, 2014; Akçin, 2006; Rankin & Stallings, 2001; Wingard, 2005). Patient education, which starts at the admission of the patient to the hospital and continues until they are discharged, is a main element of patient-centred care. It is one of the basic rights of the patient and their family/relatives (Nolan, Nolan, & Booth, 2001; Ramezanli & Jahromi, 2015; Stoop, van't Riet, & Berg, 2004). The purpose of patient education, which is one of the main responsibilities of a nurse, is protection of the patient from complications related to their disease and other health problems that may accrue to their disease. The intention is to provide the patient with information, skills, and attitudes regarding their disease, to increase quality of life, and help the patient become physically, psychologically, and socially self-sufficient as soon as possible (Aziznejad, Zabihi, Hossini, & Bighani, 2010; De Bruijn et al., 2007; De, Brandes, Krauth, & Petermann, 2008; Marcolongo et al., 2001; Potter & Perry, 1997; Ramezanli & Jahromi, 2015; Şenyuva & Taşocak, 2007; Wingard, 2005). Studies on patient education have emphasized that it minimizes disease-related complications, makes it easier for patients to adapt to their disease and the treatment process, reduces rates of readmission to health-care institutions, reduces length of hospital stay, increases quality of life, and decreases patients' anxiety regarding their health status in general (Akçin, 2006; Aziznejad et al., 2010; Dehaghani, Akhormeh, & Mehrabi, 2012; Edwardson, 2007; Gallefoss & Bakke, 2002; Hoving, Visser, Mullen, & van den Borne, 2010; Shimbo et al., 2004).

To achieve success in reaching these goals requires that patient education is implemented throughout the hospitalization process. Effective and individualized patient education, which is an indispensable part of the nursing process, consists of the stages of determining

educational needs, making a plan to meet the determined needs, and implementing, assessing, and recording this plan (Akçin, 2006; Aziznejad et al., 2010; Dehaghani et al., 2012; Wingard, 2005). However, while studies from Kruger (1991) through Carpenter and Bell (2002), Edwardson (2007), Redman (2007), Lillis, LeMone, LeBon, and Lynn (2010), and Kelo, Martikainen, and Eriksson (2013) all emphasized that most nurses believe they are responsible for patient education, they do not in practice accept patient education as one of their prioritized roles. These studies also stated that nurses in general do not know about the patient education process, and implement this process informally.

Valid and reliable evaluation is important in order to demonstrate the steps followed by nurses in patient education, to determine the extent to which nurses reach these learning goals, and, where they do not reach those goals, decide upon the necessary adjustments (Akçin, 2006; Şenyuva & Taşocak, 2007). However, when the literature was reviewed, no valid and reliable measurement tool was found to assess the frequency with which nurses implement patient education in line with the patient education process. This study is therefore important in terms of developing a valid and reliable tool to assess the frequency of nurse implementation of patient education in line with the stages of educational needs assessment and planning, implementation, and evaluation and documentation.

## 2 | METHODS

### 2.1 | Aim

This study aimed to develop a valid and reliable tool to assess the frequency of nurses' implementation of patient education in line with the stages of determining needs, assessment and planning, implementation, and evaluation and documentation.

### 2.2 | Design

This was an instrument development study.

### 2.3 | Study setting

The study population consisted of 2,915 nurses who were employed at university, private, and research and training hospitals located in the province of Istanbul in Turkey. The size of the sample was calculated based on the number of items in the scale. The literature reported that including 5–10 participants per item is sufficient for assessing the validity and reliability of an evaluation tool (Çokluk, Şekercioğlu, & Büyüköztürk, 2009). The participant:item ratio was determined as 11/1. The sample of the study consisted of 583 nurses who volunteered to participate in the study and were randomly selected to include approximately 20% of the nurses at each institution.

## 2.4 | Instruments

The data were collected using an Information form and the draft Patient Education Implementation Scale as follows:

- *The Information Form*: This was developed by the researchers in line with the literature. The form included five questions determining nurses' descriptive characteristics (age, educational status, department of employment, duration of employment, and duties).
- *Patient Education Implementation Draft Scale*: The draft form of this scale was developed by the researchers in the light of the literature in two stages. In the first stage, an item pool was created for the draft scale. In the second stage, the draft scale was piloted by the nurses participating in the study and the content validity and reliability of the scale were assessed.

### 2.4.1 | Stage 1: Creation of the item pool and development of the draft scale

A 49-item draft scale, which contained statements reflecting the behaviours of nurses in determining patient education needs, assessment and planning, implementation, and evaluation and documentation, was developed by the researchers by reviewing studies that investigated the role of nurses in patient education (Akçin, 2006; Barber-Parker, 2002; Bastable, 2003; Copel, 2000; De Bruijn et al., 2007; Fidyk, Ventura, & Green, 2014; Kaariainen & Kyngas, 2010; Brucoliere, 2000; Kelo et al., 2013; Khorasani, Rassouli, Parvizy, Zagheri-Tafreshi, & Nasr-Esfahani, 2015; O'Connor, Devine, Cook, Wenk, & Curtin, 1990; Rankin & Stallings, 2001; Seyedin, Goharinezhad, Vatankhah, & Azmal, 2015; Şenyuva & Taşocak, 2007; Vafae-Najar, Ebrahimipour, Shidfar, & Khani-Jazani, 2012; Willems, De Maesschalck, Deveugele, Derese, & De Maeseneer, 2005; Wingard, 2005) and based on the experiences of the researchers.

The draft scale was submitted for the opinion of five experts. The experts scored the statements in all items based on their suitability. After reviewing the experts' recommendations, seven items were removed from the scale and adjustments were made on a few items in terms of language and expression. Based on the opinions of the experts, the content validity index values of all the items in the draft scale were 0.81 or higher.

The comprehensibility of the statements in the draft scale was tested by face-to-face interviews with a small group of 15 nurses. No item was changed, eliminated, or discarded. The 42-item Patient Education Implementation Draft Scale, scored using five point Likert-type scoring, was ready to be tested with the sample.

### 2.4.2 | Stage 2: Testing the validity and reliability of the scale

The second stage involved the validity and reliability testing and psychometric analysis of the 42-item Patient Education Implementation Draft Scale with 583 nurses employed at university, private, and research and training hospitals in Istanbul. The data were collected by

face-to-face interview. The nurses responded to the items in the draft scale in relation to the steps they followed in patient education by choosing one of the options: Always (5), Usually (4), Sometimes (3), Rarely (2), or Never (1).

## 2.5 | Statistical analysis

The data were analysed with the IBM SPSS 21.00 software. Frequencies, percentages, means, and standard deviations were used to present the distribution of the descriptive characteristics of the nurses and scale items. In order to assess content validity, the Content Validity Index (CVI) was calculated. Item analysis was used to investigate inter-item and item-scale relationships. Relationships among the items and between the items and the entire scale were analysed by Spearman Rho correlation analysis. To determine the factors of the scale, exploratory factor analysis was conducted. Exploratory factor analysis was used to calculate the factor loads of the items in the draft scale and define the subdimensions of the scale. Internal consistency analysis was used to test the internal consistencies of the items that were associated with the factors that were defined in the factor analysis. In the analysis, the level of statistical significance was accepted as  $P < .05$  (Polit & Beck, 2012).

## 2.6 | Ethical considerations

Ethics board approval with the date-number 18.03.2016-105269 was obtained from the Clinical Research Ethics Board of the Cerrahpaşa Faculty of Medicine.

Written permission was received from the institutions where the study was conducted. The objective of the study was explained to the nurses who would participate in it.

Verbal and written consent was received from the nurses who agreed to voluntarily participate in the study.

## 3 | RESULTS

### 3.1 | The descriptive characteristics of the nurses

The mean (SD) age of the nurses was 32.77 (7.71; minimum 18, maximum 56), 59.0% had undergraduate degrees, 59.0% worked at internal departments, 41.0% worked at surgical departments, 75.0% were patient care nurses, 20.2% service supervision nurses, and 1.5% were training nurses. The mean length of their experience as a nurse was  $11.23 \pm 8.48$  years (minimum 1, maximum 35; Table 1).

### 3.2 | The validity and reliability results for the Patient Education Implementation Scale

#### 3.2.1 | Item analysis

Item analysis was carried out with the purpose of examining all items in the draft scale and elimination of items with low correlation. As low

**TABLE 1** Descriptive characteristics of the nurses (n = 583)

		n	%
Mean age	32.77 ± 7.71		
Education program of graduation	Undergraduate	344	59.0
	Graduate (master's/PhD)	121	20.8
	Associate degree	85	14.5
	High school (Vocational School of Health)	33	5.7
Department	Internal	344	59.0
	Surgical	239	41.0
Length of career	0–11 months	40	9.6
	1–5 years	148	35.5
	6–10 years	113	27.1
	11–15 years	62	14.9
	16–20 years	23	5.5
	21 years or longer	31	7.4
Duties	Service Nurse	437	75.0
	Supervision Nurse	118	20.2
	Administrative Nurse	11	1.9
	Education Nurse	9	1.5
	Other (polyclinic, intensive care, etc.)	8	1.4

item total score correlation values decrease the reliability of the scale, it is desired that the relationship between variables is not negative or weak. In the literature, it is reported that correlation values of lower than 0.30 indicate that the items are inadequate while values of higher than 0.40 indicate good discriminatory characteristics of the items (Polit & Beck, 2012). In the item analysis, item total score correlations of the items were calculated. Accordingly, it was found that the item total score correlation values of the items in the draft scale were in the range of 0.30–0.78 (Table 2).

### 3.2.2 | Exploratory factor analysis

The exploratory factor analysis was carried out with principal component analysis with varimax rotation with the purpose of the factor structure of the draft scale. The acceptable level for the scale items was adjusted to be higher than 0.30. As there was no item with a factor load of <0.30 in the first iteration, the 42-item draft scale structure was protected. In the exploratory factor analysis, it was found that the 42 items in the draft scale were divided into four factors that explained 63.37% of the total variance and had factor loads of 0.45 or higher (Table 3).

The eigenvalues of the factors were, respectively, 48.54, 6.48, 4.44, and 3.91. In the exploratory factor analysis, the Kaiser-Meyer-Olkin (KMO) sample adequacy test statistic was calculated as 0.96 (Table 3).

### 3.2.3 | Naming the scale factors

The experts who were consulted in forming the item pool assisted naming the subdimensions of the scale. As seen in Table 3, the first factor consisted of four items. The factor loads in the first factor ranged between 0.38 and 0.91. The items collected under this factor express the ways nurses determine the educational needs of the patients. Therefore, the factor was named “Determining educational needs” (Table 3).

The factor loads in the second factor ranged between 0.33 and 0.74. These 16 items showed that nurses diagnosed the educational needs of the patients and planned to meet these needs that they had diagnosed. In addition, these items show what are, in which order, when, by whom, and how to evaluate the objectives of education during the planning of patient education and also how to guide to the nurse in the implementation of patient education. Therefore, the factor was named “Assessment and planning” (Table 3).

The third factor consisted of 14 items with factor loads ranging from 0.31 to 0.89. The items in this factor reflected the care nurses take while implementing the patient education they have planned. These items also covered planned patient education activities, functions employed to enable/support learning of the patient and their family. For this reason, it was named “Implementation” (Table 3).

The fourth factor consisted of eight items with factor loads ranging from 0.56 and 0.81. These items contained evaluation of the entire patient education process from determining educational needs to planning and implementation: setting goals, identifying content, teaching methods and materials, monitoring the environment and deciding on changes, recording, and so forth at the beginning of the patient education process. For this reason, it was named “Evaluation and documentation” (Table 3).

### 3.2.4 | Internal consistency

In the four-factor structure formed after the exploratory factor analysis, item analysis and Cronbach's alpha internal consistency analysis were used to assess the item total score correlations in the factors and the internal consistencies of the obtained measurements. The subfactor scores were obtained by addition of the scores of all items in the subfactor and dividing the result by the number of items. The total scale score was obtained by all the scores of all of the items and dividing the result by the total number of scores.

The acceptable value for the internal consistency of the scale was determined as 0.70. The internal consistency analysis revealed that the subfactor and general scale item total correlation coefficients and the Cronbach's alpha coefficient values were high. The Cronbach's alpha coefficient of the scale was 0.97. This value was calculated as 0.95 for Factor 1, 0.95 as Factor 2, 0.94 Factor 3, and 0.95 for Factor 4 (Table 4). Test-retest reliability was not analysed.

**TABLE 2** Item total score correlations of the Patient Education Implementation Scale (n = 583)

			Item total score correlation			
			Subgroup	General scale		
			$r_s$	$r_s$		
			$\bar{x}$	SD		
Determining educational needs			4.16	0.67		
M1	I collect information from the patient themselves, their family, or relatives		4.38	0.75	0.72	0.72
M2	I collect information from medical records or nursing records		4.22	0.84	0.80	0.80
M3	I collect information from physicians		3.95	1.02	0.83	0.83
M4	I collect information from my colleagues or other members of the team		4.11	0.86	0.75	0.75
Assessment and planning			4.17	0.61		
M5	I learn what the patient knows about their disease		4.20	0.83	0.69	0.69
M6	I assess the self-care skills of the patient		4.27	0.86	0.77	0.77
M7	I consider the socioeconomic status of the patient		3.94	1.03	0.68	0.68
M8	I assess the physical and mental state of the patient		4.32	0.71	0.72	0.72
M9	I collaborate with other members of the healthcare team while assessing the patient		4.20	0.80	0.67	0.67
M10	I determine the educational needs of the patient and their family in the light of the information I collected		4.22	0.80	0.79	0.79
M11	I consider the patient's educational needs towards information		4.29	0.72	0.75	0.75
M12	I consider the patient's educational needs towards their feelings		4.17	0.80	0.77	0.77
M13	I consider the patient's educational needs towards implementation-skills		4.20	0.78	0.80	0.80
M14	I determine goals and aims towards patient education		4.20	0.76	0.77	0.77
M15	I ranked the goals I determined based on priority		4.17	0.82	0.76	0.76
M16	I pay attention to determine goals that are realistic and accessible		4.24	0.77	0.73	0.73
M17	I determine the time and duration that are suitable for patient education		4.18	0.78	0.73	0.73
M18	I use standard content for specific issues in patient education		4.03	0.81	0.75	0.75
M20	I determine the tools-equipment that I will use during patient education		4.14	0.78	0.77	0.77
M21	I include topics necessary for the home care of the patient in patient education		4.08	0.85	0.74	0.74
Implementation			4.14	0.59		
M19	I choose the suitable instruction methods and techniques I will use during patient education		4.09	0.83	0.72	0.72
M22	I take the age of my patient into account during patient education		4.24	0.76	0.70	0.70
M23	I provide written materials like brochures		3.81	1.08	0.71	0.71
M24	I present an individualistic approach in patient education		4.09	0.84	0.72	0.72
M25	I choose the evaluation methods I will use in assessing patient education		4.06	0.81	0.74	0.74
M26	I consider the characteristics of the patient		4.28	0.70	0.70	0.70
M27	I provide the suitable physical and psychological setting		4.08	0.81	0.73	0.73
M28	I pay attention to use a language that can be understood by the patient and their family		4.40	0.63	0.73	0.73
M29	I use effective communication techniques		4.31	0.66	0.77	0.77

(Continues)

TABLE 2 (Continued)

				Item total score correlation			
				Subgroup		General scale	
						$r_s$	$r_s$
		$\bar{x}$	SD				
M30	I use the instruction methods and tools–equipment I have planned	4.13	0.83	0.80	4.13	0.83	0.80
M31	I encourage active participation of the patient to the education process	4.23	0.70	0.81	4.23	0.70	0.81
M32	I encourage the patient to ask questions	4.30	0.75	0.77	4.30	0.75	0.77
M33	I provide patient education as a team approach	4.06	0.86	0.75	4.06	0.86	0.75
M34	I receive necessary (administrative) support from the institution in patient education implementations	3.89	1.02	0.69	3.89	1.02	0.69
Evaluation and documentation		3.97	0.79				
M35	I assess the patient education I provided	4.14	0.85	0.82	4.14	0.85	0.82
M36	I want the patient, their family, and relatives to assess the patient education I provided	3.96	0.94	0.84	3.96	0.94	0.84
M37	I ask my colleagues to assess the education I provided	3.73	1.02	0.79	3.73	1.02	0.79
M38	I make evaluation in every stage of the education process	3.90	0.96	0.88	3.90	0.96	0.88
M39	I used the methods I determined to assess patient education	3.98	0.88	0.84	3.98	0.88	0.84
M40	I utilize evaluation outcomes with the purpose of improving patient education	3.97	0.92	0.86	3.97	0.92	0.86
M41	I keep records regularly in every stage of patient education	4.04	0.95	0.76	4.04	0.95	0.76
M42	When I fail to reach the desired outcome in patient education, I reimplement it by making the necessary adjustments	4.08	0.86	0.82	4.08	0.86	0.82
General scale score		4.11	0.56				

## 4 | DISCUSSION

The study was carried out with the purpose of developing a valid and reliable tool for evaluation of the steps followed by nurses in patient education (determining educational needs, assessment and planning, implementation, and evaluation and documentation). The study was carried out with nurses working at university, private, and research and training hospitals in Istanbul. There was no reason to think that the nurses employed in the institutions where the study was carried out were any different in relation to their sociodemographic characteristics and the adequacy of their behaviours in patient education than nurses working all over Turkey.

The draft scale was developed by the researchers based on the information in the literature and their experience (Büyüköztürk, 2011). To determine whether the items in the scale measured the characteristics that were intended to be measured, the draft scale was presented for the opinions of five experts (Tezbaşaran, 1996). After reviewing the recommendations by the experts, seven items were removed from the scale and some minor adjustments made. The comprehensibility of the statements in the draft scale was tested in a small group and no items were changed, eliminated, or discarded.

The Patient Education Implementation Draft Scale was tested, and its reliability and validity demonstrated. Item analysis was conducted to discard the items that showed low correlation with the entire scale. The study found that all items had item total score

correlation values of higher than 0.30, and compliant with the recommendations (Table 2).

The literature recommends analyses for the purpose of determining whether the sample in scale development studies are large enough. This study used the KMO sample adequacy test. Şencan (2005) stated that factor analysis can be applied when the result of the KMO test is higher than 0.50, while sample adequacy is medium at KMO values of 0.70–0.80, good at values of 0.80–0.90, and excellent at values higher than 0.90. Significant results of Bartlett's test are another indicator of sample adequacy (Şencan, 2005). In the study, the KMO value of 0.96 showed that the sample was adequate for factor analysis and the significance of Bartlett's test showed that the correlation matrix had excellent adequacy.

In the literature, exploratory factor analysis is recommended for creating factors that are conceptually meaningful by combining numbers of variables (Çokluk et al., 2009; Gözüm & Aksayan, 2003; Tezbaşaran, 1996). While there is no fixed limit for factor load values that explain the relationship between the items and the factor, Akgül (2005) stated that the minimum acceptable factor load value is 0.30 while values of 0.30–0.59 indicate medium-level factor loads and values of 0.60 or higher indicate high factor loads. Büyüköztürk (2011) considered factor load values of >0.45 as a good criterion. The factor load values of all the items in the study were 0.45 or higher; thus, no item was eliminated by the factor analysis (Table 2).

**TABLE 3** Psychometric characteristics of the Patient Education Implementation Scale (n = 583)

Determining educational needs		
M1	I collect information from the patient themselves, their family, or relatives	0.38
M2	I collect information from medical records or nursing records	0.47
M3	I collect information from physicians	0.91
M4	I collect information from my colleagues or other members of the team	0.62
Assessment and planning		
M5	I learn what the patient knows about their disease	0.46
M6	I assess the self-care skills of the patient	0.65
M7	I consider the socioeconomic status of the patient	0.74
M8	I assess the physical and mental state of the patient	0.50
M9	I collaborate with other members of the healthcare team while assessing the patient	0.40
M10	I determine the educational needs of the patient and their family in the light of the information I collected	0.50
M11	I consider the patient's educational needs towards information	0.49
M12	I consider the patient's educational needs towards their feelings	0.50
M13	I consider the patient's educational needs towards implementation-skills	0.53
M14	I determine goals and aims towards patient education	0.41
M15	I ranked the goals I determined based on priority	0.41
M16	I pay attention to determine goals that are realistic and accessible	0.42
M17	I determine the time and duration that are suitable for patient education	0.41
M18	I use standard content for specific issues in patient education	0.39
M20	I determine the tools-equipment that I will use during patient education	0.42
M21	I include topics necessary for the home care of the patient in patient education	0.33
Implementation		
M19	I choose the suitable instruction methods and techniques I will use during patient education	0.38
M22	I take the age of my patient into account during patient education	0.41
M23	I provide written materials like brochures	0.89
M24	I present an individualistic approach in patient education	0.57
M25		0.50

(Continues)



**TABLE 3** (Continued)

	I choose the evaluation methods I will use in assessing patient education	
M26	I consider the characteristics of the patient	0.30
M27	I provide the suitable physical and psychological setting	0.36
M28	I pay attention to use a language that can be understood by the patient and their family	0.31
M29	I use effective communication techniques	0.32
M30	I use the instruction methods and tools-equipment I have planned	0.52
M31	I encourage active participation of the patient to the education process	0.40
M32	I encourage the patient to ask questions	0.38
M33	I provide patient education as a team approach	0.46
M34	I receive necessary (administrative) support from the institution in patient education implementations	0.46
Evaluation and documentation		
M35	I assess the patient education I provided	0.59
M36	I want the patient, their family, and relatives to assess the patient education I provided	0.75
M37	I ask my colleagues to assess the education I provided	0.81
M38	I make evaluation in every stage of the education process	0.78
M39	I used the methods I determined to assess patient education	0.65
M40	I utilize evaluation outcomes with the purpose of improving patient education	0.72
M41	I keep records regularly in every stage of patient education	0.60
M42	When I fail to reach the desired outcome in patient education, I reimplement it by making the necessary adjustments	0.56

The exploratory factor analysis used principal component analysis, which is the most frequently used method and reported to be easy to interpret (Büyüköztürk, 2011). Additionally, rotation was carried out during factor analysis to achieve independence and clarity in interpretation. The study used the varimax rotation technique, which is one of the most frequently used among orthogonal rotation techniques (Büyüköztürk, 2011). As a result of the analysis, the higher the ratio of total variance explained by the factors, the stronger the factorial structure of the scale (Tavşancıl, 2014). While it is expected that at least 30% of the total variance is explained in single-factor scales, this value is desired to be higher in constructs that have multiple factors (Büyüköztürk, 2011). The four factors that arose in this draft scale explained almost two thirds (63.37%) of the total variance. Therefore, it may be stated that the factor

structure of the scale was strong. Factor analysis aims to reach a small number of factors that are independent and conceptually meaningful from a high number of related original variables (Tavşancıl, 2014). The researchers accepted the scale should consist of four factors created by combining the items that were conceptually close to each other with highly significant and positive relationships ( $r = .440$ ,  $P < .001$ ).

Naming the factors that emerge as a result of exploratory factor analysis is dependent on theoretical expectations and interpretations, which is why it is important to utilize the opinions of experts in the subject field (Akgül, 2005; Tezbaşaran, 1996). The experts who were consulted in forming the item pool assisted naming the subdimensions of the scale, and the literature was reviewed. Five-factor variables identified in the literature were included in the



draft scale, but as a result of the analyses, it was found suitable to combine the Assessment and Planning factors into a single factor, creating a four-factor scale comprised of determining educational needs, assessment and planning, implementation, and evaluation and documentation. This result was compliant with the theoretical literature.

The Cronbach's alpha coefficient is a criterion of internal consistency and homogeneity of the items that form the scale. A scale consisting of items that are highly related to each other has a high Cronbach's alpha coefficient (Tezbaşaran, 1996). The study used the Cronbach's alpha coefficient to test the reliability of this scale. Cronbach's alpha coefficient values of lower than 0.40 have been described as indicating that the measurement tool is not reliable, values of 0.40–0.59 show low reliability, values of 0.60–0.79 show acceptable reliability, and values of 0.80–1.00 show high reliability (Kurnaz & Yiğit, 2010; Şencan, 2005; Yurdugül, 2005). This value should be as close to 1 as possible (Tezbaşaran, 1996). Accordingly, it may be stated that the internal consistency of the total and factors of the Patient Education Implementation Scale was high.

#### 4.1 | Limitations

The study is limited by being only tested with a single sample of nurses employed at university, private, and research and training hospitals located in the province of Istanbul in Turkey. Findings therefore cannot be generalized to all nurses and further work is required.

## 5 | CONCLUSIONS

As a result of the study, it was determined that the Patient Education Implementation Scale is a valid and reliable tool that may be used to assess nurses' activities in terms of carrying out patient education processes in line with the theoretically determined stages of determining educational needs, assessment and planning, implementation, and evaluation and documentation. The tool provides an objective evaluation of patient education activities, to inform care quality improvement.

## CONFLICT OF INTEREST

No conflict of interest has been declared by the authors.

## AUTHORSHIP STATEMENT

EŞ designed the study, collected the data, and prepared the manuscript. EŞ, HK, and GC guided the paper in the whole process from designing to writing. GC analysed the data. EŞ reviewed articles and extracted data. All listed authors meet the authorship criteria and that all authors are in agreement with the content of the manuscript.

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