

Turkish validity and reliability study of the Brief Emergency Department Patient Satisfaction Scale



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ABSTRACT

Introduction: Patient satisfaction is affected by many factors, as the emergency department are units that provide rapid examination and treatment. Patient satisfaction should be evaluated differently from other clinics.

Method: This study was a descriptive, psychometric analysis using cross-sectional data collection. The study was conducted in the emergency department of a training and research hospital with 400 patients between July and September 2018. Data were collected using "Descriptive Characteristics Form" and "Brief Emergency Department Patient Satisfaction Scale (BEPSS)". SPSS 21.0 and AMOS 24.0 package programs were used in the analysis of the data. Language equivalence, content validity, exploratory factor analysis, and confirmatory factor analysis of the scale were performed. Cronbach's alpha coefficient and item-total score correlation were evaluated to determine the reliability of the scale.

Results: The factor structure of the scale was found to be different from the factor structure of the original scale. Scale items were collected under different factors. The factor loads of the scale items ranged from 0.642 to 0.986. Goodness of fit values were sufficient in confirmatory factor analysis. Test-retest reliability was found sufficient. The Cronbach's alpha reliability coefficient ($\alpha = 0.940$) was high and the item total score correlation varied between 0.577 and 0.832.

Conclusion: The BEPSS is a valid and reliable scale and can be used in the Turkish population.

1. Introduction

Patient satisfaction is one of the most important indicators that determine the quality of health care [1,2]. Increasing the level of patient satisfaction positively affects the welfare and development levels of countries [3,4]. The quality and satisfaction of health care enables patients to benefit more from health services and to take an active role in their own disease management by following medical instructions [5,6]. In addition, increasing patient satisfaction, decreases the possibility of malpractice by increasing the harmony between the health personnel and the patient [7]. Therefore, patient satisfaction is crucial for all organizations that provide healthcare services [6].

The emergency level of the patients who applied to the emergency department, the emergency department environment they applied to, the waiting time and the attitudes and behaviors of the emergency department personnel affect level of the patient satisfaction perceived care more than other department [8,9]. Patients expect more attention, more courtesy and an adequate level of information from emergency

department personnel due to their emergency situations [6]. The patient satisfaction increases when emergency department personnel care about the patients complaints, behave politely and well, experienced in the treatment, explain in a way that the patients can understand and provide psychosocial support to the patients. [10]. Patients who are satisfied with the emergency departments they receive care in, prefer the emergency departments they trust in emergency situations and recommend these emergency departments to their relatives [11]. Therefore, patient satisfaction affects the hospitals' health service quality [11,12,13].

In order to improve the quality of care, emergency department personnel must firstly increase the satisfaction level of patients [2,14]. Since patient satisfaction is a subjective perception, it is difficult to evaluate. For this reason, various scales should be developed in order to make a subjective assessment [15]. Since emergency departments are different from other services from many aspects, patient satisfaction assessment tools should also be specific to the emergency department. Scales developed by considering emergency conditions should be different from the scales used in other clinics and should consist of short,

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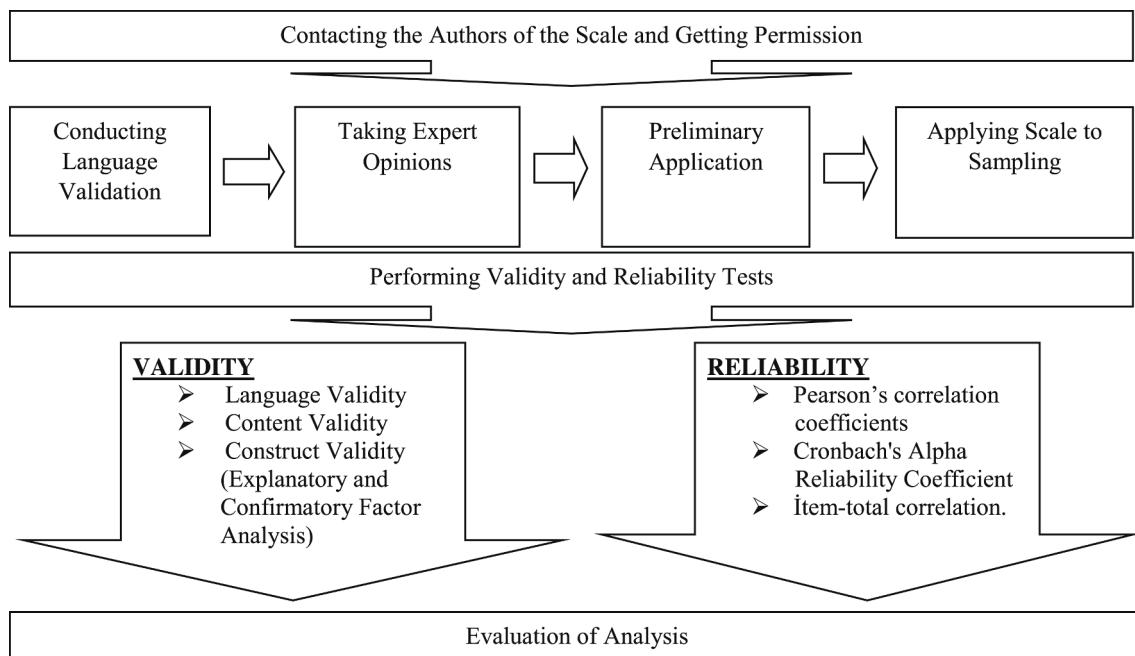
**Fig. 1.** Study Design.

Table 1
Distribution of the Descriptive Characteristics of the Patients (N = 400).

Characteristics	n	%
Gender		
Male	164	41
Female	236	59
Occupation		
Unemployed	28	7
Housewife	155	38.8
Civil servant	50	12.5
Worker	15	3.8
Retired	24	6
Self-employed	10	2.5
Artisan	29	7.3
Student	45	11.3
Other	44	11.1
Level of Education		
Literate	58	14.5
Primary School	159	39.8
Secondary School	64	16
High School	70	17.5
BS/MS/PhD	49	12.3
Social Security		
Social Security	381	95.2
No Social Security	19	4.8
Income Status		
Low	186	46.5
Middle	180	45
High	34	8.5
Reason for Choosing The Hospital		
Past Experiences	204	51
Suggestion	18	4.5
Easy access	138	34.5
Other	40	10
Arrival Time Interval		
08:00–16:00	90	22.5
16:00–24:00	219	54.8
24:00–08:00	91	22.8
Treatment Area		
Green Area	176	44
Yellow Area	224	56
Min-Max	X	SD
Age	18–88	37.7
Duration of Staying in the Emergency Department (min)	5–100	37.1
		9.2

brief and understandable sentences which are specific to emergency department patients. The developed scales can be used in another population after validity and reliability studies in the population. There is no valid and reliable assessment tool developed for emergency

department patients in Turkey. Therefore, purpose of the study is to conduct validity and reliability study of the Brief Emergency Department Patient Satisfaction Scale (BEPSS), developed by Mohammad and Maryam Atari (2015) in the Turkish population.

2. Methods

The study was conducted between June and September 2018 in the emergency department of a training and research hospital in Turkey. The study setting was organized according to the STARD checklist [16].

Research questions to be answered in the study;

- Is the scale a highly valid measurement tool in the Turkish population?
- Is the scale a highly reliable measurement tool in the Turkish population?

2.1. Design

The study design includes the steps required to adapt the scales to different populations (Fig. 1).

2.1.1. Language adaptation of the scale

Translation-back translation technique was used for the language validity of the scale. Language validity was completed by comparing the items of the original scale and the back-translated scale and thus providing semantic equality. The scale was translated into Turkish by 5 independent specialized translators, without making any change. A joint translation was created by evaluating the translations. The translated scale was translated back into English by an expert who is different, independent from the previous translators and has a good command of the culture of the country where the scale was made. The original scale and the translated scale were evaluated in terms of language equivalence and the scale was put into final form and submitted for expert opinion.

2.1.2. Taking expert opinions

For the content validity of the scale which was completed Turkish

Table 2
Findings of Exploratory Factor Analysis.

Items		Factor Load/Subscale				
		1	2	3	4	5
Nurse Satisfaction	1. Nurses care about my treatment. 2. Nurses inform me about the remaining of the treatment. 3. Nurses attended to me patiently. 4. Nurses relieved me of the pain well.	0.937 0.954 0.893 0.841				
Admission Staff Satisfaction	5. Admission staff guided me appropriately. 6. The behavior of the admission staff was suitable.	0.978 0.985				
Emergency Department Environment	7. The environment of the emergency department was calm and quiet. 8. Emergency department was well equipped. 9. The environment of the emergency department was hygienic.		0.894 0.937 0.913			
Physician Care Satisfaction	10. The physician told me about my treatment course. 11. The behavior of the physician was respectful. 12. The physician's explanation about the remaining of treatment was enough. 13. The physician spent a sufficient time examining me.			0.963 0.874 0.981 0.939		
General Patient Satisfaction	14. The waiting time before seeing the doctor was appropriate. 15. The waiting time before admission process was appropriate. 16. I would recommend this hospital to my acquaintances. 17. I am satisfied with the quality of services in the emergency department. 18. The emergency department of this hospital is well functioning.				0.956 0.986 0.676 0.675 0.642	

translation, an “Expert Evaluation Form” was prepared by the researchers and sent by e-mail to 7 nursing faculty members who were specialized in nursing and experienced in methodological studies. Experts were asked to evaluate Turkish version of the scale items in terms of both language and cultural equivalence and make suggestions. They were asked to score for each item on the scale, “1. Inappropriate”, “2. Somewhat appropriate – expression needs to be revised”, “3. Appropriate- Minor revisions needed for expression”, “4. Absolutely appropriate”. Recommendations section was allocated for each item. The CVI (Content Validity Index) grading criterion developed by Waltz and Bausel (1981) was used for the content validity of the scale. The CVI values were between 0.85 and 1.0 and the CVI value for the whole scale was 0.97. In line with expert opinions, no items were changed or deleted according to the CVI values.

2.1.3. Preliminary application

20 patients participated in the preliminary application to determine whether the questions in the scale were understandable for the patients. The patients who were included in preliminary application were not included in the sample of the study. After the preliminary application, it was decided that there was no incomprehensible question and the scale became ready to be applied on the sample of the study.

2.2. Sample and setting

The population of the study consisted of all patients who applied to the emergency department between the specified dates. The sample size of the study was calculated according to the number of the scale items [17,18]. In scale development and adaptation studies, it is considered adequate to include the number of participants 5–10 times of number of the scale items [19,20]. Increasing the sample size makes the factor analysis of the scale more convenient and increases its reliability [21,22]. Therefore, the sample size was calculated as 20 times the number of the scale items.

2.3. Participants

The patients who were Turkish aged 18 and over, conscious and oriented, treated in the green or yellow area (according to the emergency service triage color coding used in Turkey, patients whose condition is not urgent (stable)), scheduled for discharge, voluntarily agreed to participate in the study were included in the sample. Patients who were under the age of 18, not Turkish, confused or disoriented and treated in the red area (urgent/not stable) were excluded the study.

2.4. Data collection

“Descriptive Characteristics Form” prepared by the researchers and “BEPSS” were used to collect the data. The data were collected after the patients who applied to the emergency department and met the inclusion criteria were informed about the study.

2.4.1. Brief Emergency Department Patient Satisfaction Scale (BEPSS)

The BEPSS was developed to measure emergency department patient satisfaction. The scale is a 4-point Likert type scale. The scale consists of 20 items and 5 sub-dimensions. Items in the scale were scored as “1” completely disagree, “2” partially disagree, “3” partially agree, and “4” completely agree. The total score obtained from the scale shows the satisfaction score. As the total score increases, satisfaction increases. Cronbach’s alpha reliability coefficient of the scale is 0.94 [3].

2.5. Statistical analysis

The data of the study were analyzed using SPSS 21.0 and AMOS 24.0 package program. Mean, standard deviation, median (minimum-maximum) were calculated for quantitative variables; number and percentage were calculated for qualitative variables. Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were performed to evaluate the construct validity. Acceptable factor loads for EFA should be 0.60 or above [23]. The value obtained by dividing the chi square by the degrees of freedom is below 3, the RMSEA is equal or <0.08, the NNFI, NFI and CFI values are above 0.90, the RMR is close to zero, the GFI and AGFI values are close to 1; these show that the model is strong [24,25,26].

In order to determine reliability, Cronbach’s Alpha coefficient and item-total score correlation were calculated to test internal consistency. Pearson product-moment correlation coefficient was calculated to determine time invariance. For analyses, the value of $p < 0.05$ was accepted.

2.6. Ethical considerations

Each stage of the study was conducted in accordance with ethical principles. Before the application, approval from the ethics committee (dated 10.01.2018, numbered 01/11) and permission from the Ministry of Health (dated 08.05.2018, numbered 68690496). The patients were informed about the study and their written and verbal consent was obtained.

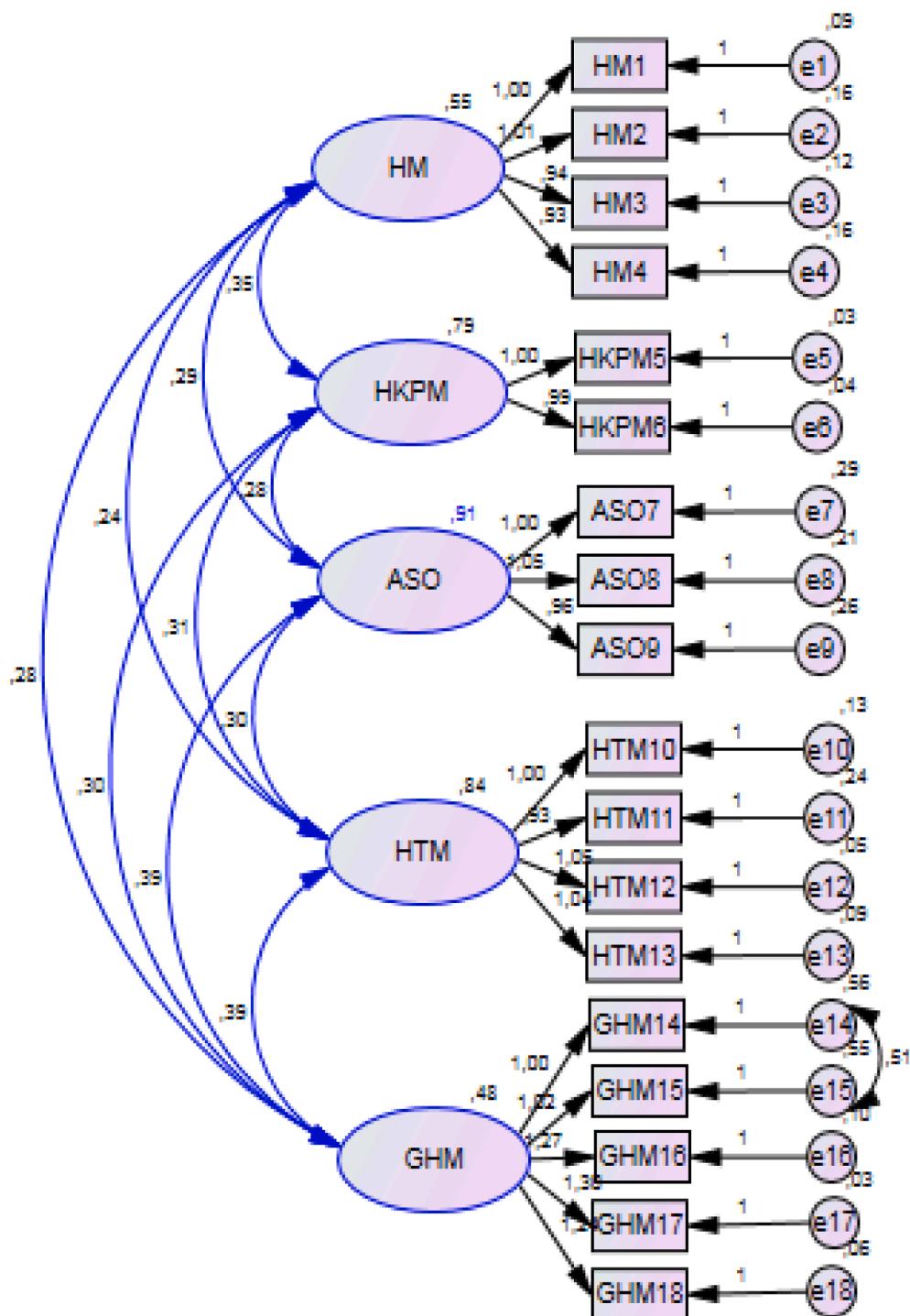


Fig. 3. Path Diagram.

3. Results

3.1. Findings related to the Descriptive Characteristics of the patients

It was determined that 59% of participating in the study were female, 39.8% were primary school graduates, 46.5% had a low income. The mean age of the sample was 37.4 ± 16.0 , and the mean duration of staying in the emergency department was 37.1 ± 9.2 min. In addition, 51% of the patients preferred the hospital due to past experiences (Table 1).

3.2. Findings related to the validity of the scale

Exploratory and confirmatory factor analyses were conducted to test the construct validity of the scale. Before factor analysis, KMO was used to determine the adequacy of the sample size and Bartlett's test was performed to evaluate the compatibility of the data set for factor analysis ($p < 0.05$). If the KMO value is higher than 0.80, it shows that the scale is quite suitable for factor analysis [27]. KMO value (0.882) being close to 1 indicated that the data were quite suitable for factor analysis. The sample size is sufficient according to the results of the KMO (0.882) and Bartlett's tests ($\times 2 = 9130.124$). Maximum Likelihood method was used

Table 3
Fit Values of Confirmatory Factor Analysis.

Fit Indices	Normal-Acceptable Fit	Analysis Result
Chi-square/df (CMIN/DF)	CMIN/DF \leq 3*	2.950
	CMIN/DF \leq 5 **	
P-Value for Test of Close Fit	p < 0.05 *	0.000
Root Mean Square Error Of Approximation (RMSEA)	RMSEA < 0.08**	0.070
Non-Normed Fit Index (NNFI)	NNFI \geq 0.90 *	0.967
Normed Fit Index (NFI)	NFI \geq 0.90 *	0.961
Comparative Fit Index (CFI)	CFI \geq 0.95**	0.974
Root Mean Square Residual (RMR)	0 < RMR < 0.08*	0.035
Goodness of Fit Index (GFI)	GFI \geq 0.85*	0.910
Adjustment Goodness of Fit Index (AGFI)	AGFI \geq 0.85*	0.876

Source: * (Karagöz, 2016) ** (Gatignon, 2011).

as extraction method and Direct Oblimin was used as rotation.

Exploratory factor analysis was performed to determine whether the factor structure of the Turkish version is the same as the original version. According to results of the exploratory factor analysis; Items 19 and 20 were not loaded into the subscale where they were found, as in the original scale, and the other factors were not loaded enough to represent the factor. In addition, the two items do not form a semantic whole with their subscale. It was observed that the Cronbach's alpha reliability coefficient of these items was 0.280 (unacceptable) and overall Cronbach's alpha reliability coefficient of the scale increased as the items were removed from the scale. For this reason, it was decided to exclude the items from the scale as they were not valid and reliable in the Turkish population.

Items 5 and 6 in the scale were not included in their subscales in the original scale but both formed a separate subscale. It was determined that the factor loads of these items, which constitute a different subscale, were 0.91 for the item 5 and 0.91 (quite high) for the item 6. These factor loads showed that the scale constituted a separate factor in the Turkish population. When this subscale in the original scale was examined, nurses and patient admission staff were grouped under the same subscale but when the emergency department personnel in Turkey are considered, nurses and patient admission staff should not be evaluated in the same subscale. This subscale of the scale was revised and divided into 2 subscales such that the statements about nurses would constitute a subscale, and the statements about patient admission staff would constitute another subscale. The subscales were named by the researchers as "Nurse Satisfaction" for the items related to nurses and "Patient Admission Staff Satisfaction" for the items related to the patient admission staff. As a result of the exploratory factor analysis, the final version of the scale consisted of 18 items. In the final form of the scale, the factor loads of the items were between 0.642 and 0.986 (Table 2). In addition, when the total variance explanations of 18 items were examined, 5 factors were found to have eigenvalue of >1 . This 5-factor structure accounted for 87.25% of the scale.

After the exploratory factor analysis, confirmatory factor analysis was performed with the AMOS 24.0 licensed program (Fig. 3). In the confirmatory factor analysis, it was observed that there was a high rate of covariance between items 14 and 15. After the covariance

assignment, all goodness of fit indices reached a very high level (Table 3).

3.3. Findings related to the reliability of the scale

Re-test method was used. In the test-retest method, a break of 15–21 days should be given after the first application [28]. When applying the test again, it will be sufficient to first apply the test to 25–50% of the sample participating in the study. In this study, measurement tools were applied again after 21 days by reaching to 25% of the total sample (100 people) by phone. The correlation coefficient (r) should be at least 0.70 or above. As this value gets close to +1, the reliability of the test increases [27]. The correlation coefficient for all subscales and the overall scale was found to be above 0.70. It was found that there is a very strong ($r = 0.933$ –0.995), positive and statistically very significant correlation between the two measurements ($p < 0.001$) Thus, it was determined

Table 5

Mean and Standard Deviation Values of the Items in the Scale, Item-Total Score Correlations, Cronbach's Alpha Values and p Values if Item is Deleted.

Items	X \pm SD	Item Total Score Correlation	Cronbach's Alpha if item is deleted	p
Q1	3.52 \pm 0.797	0.622	0.938	0.001
Q2	3.45 \pm 0.851	0.578	0.938	0.001
Q3	3.50 \pm 0.772	0.621	0.938	0.001
Q4	3.43 \pm 0.801	0.644	0.937	0.001
Q5	3.31 \pm 0.902	0.585	0.938	0.001
Q6	3.31 \pm 0.899	0.577	0.939	0.001
Q7	2.48 \pm 1.096	0.595	0.939	0.001
Q8	2.47 \pm 1.103	0.581	0.939	0.001
Q9	2.28 \pm 1.051	0.597	0.938	0.001
Q10	3.07 \pm 0.983	0.679	0.937	0.001
Q11	3.05 \pm 0.980	0.655	0.937	0.001
Q12	3.02 \pm 0.979	0.681	0.937	0.001
Q13	2.97 \pm 0.997	0.684	0.936	0.001
Q14	3.10 \pm 1.025	0.704	0.936	0.001
Q15	3.08 \pm 1.028	0.696	0.936	0.001
Q16	2.96 \pm 0.941	0.826	0.934	0.001
Q17	2.94 \pm 0.919	0.824	0.934	0.001
Q18	2.97 \pm 0.896	0.832	0.934	0.001
Total Cronbach's Alpha				0.940

Table 4

The Correlation Between the First and Second Application Scores of the Scale (n = 100).

Scale and Its Subscales	Emergency Department Patient Satisfaction Scale Score		Analysis Results	
	First Application X \pm SD	Second Application X \pm SD	r	p
Emergency Department Patient Satisfaction Scale	54.97 \pm 12.05	54.18 \pm 12.42	0.992	0.001
Sub scales				
Nurse Satisfaction	13.90 \pm 2.96	13.65 \pm 3.25	0.933	0.001
Admission Staff Satisfaction	6.63 \pm 1.78	6.63 \pm 1.78	0.980	0.001
Emergency Department Environment	7.24 \pm 3.00	7.67 \pm 3.06	0.965	0.001
Physician Care Satisfaction	12.11 \pm 3.73	12.11 \pm 3.73	0.978	0.001
General Patient Satisfaction	15.07 \pm 4.34	15.28 \pm 4.79	0.995	0.001

that the scale had time invariance (Table 4).

Item total score correlations that were examined to evaluate the reliability of the scale were above 0.50 reliability limit ($p < 0.05$). Deleting any item in the final form of the scale did not increase the total Cronbach's alpha coefficient of the scale (Table 5).

4. Discussion

It was found that the Turkish version of the scale is a psychometrically robust instrument that meets the validity and reliability standards. In intercultural scale adaptation studies, the factors of the scale are made by the authors who develop the scale but they may not find the same response in the new culture. Therefore, explanatory factor analysis should also be done for the adapted scale [29].

In the study, items that were not loaded on the original sub-factor with unacceptable factor loadings and constituted a separate factor were examined. According to the results of explanatory factor analysis; The items 19 and 20 were not loaded on the factor/sub-dimension in the original scale. The item 19 was loaded on the "Emergency Department Environment (EDE)" sub-dimension with a factor loading of 0.641, and the item 20 was loaded on the "General Patient Satisfaction (GPS)" sub-dimension with a factor loading of 0.566. In exploratory factor analysis, factor loads should be above 0.60. Low factor load is taken into account when removing items from the scales (26). For this reason, the item 20 was excluded from the scale because it could not represent the sub-dimension and another sub-dimension was low-representational. The item 19 does not form a semantic whole with the loaded factor items. The "Emergency Department Environment (EDE)" sub-dimension specifies the physical conditions of the emergency department environment. While the "Emergency Department Environment (EDE)" sub-dimension specifies the physical conditions of the emergency room environment, the item 19 is about respecting the patient's family. Therefore, the sub-dimension and the item do not provide semantic integrity. In addition, if item 19 is deleted from the scale, the Cronbach alpha reliability of the scale coefficient was found to increase. Therefore, it was decided to remove the item. The Cronbach's alpha reliability coefficient which was checked for reliability analysis, was found 0.280 (considered not possible) in the "Patient's Family Satisfaction (PFL)" sub-dimension. It shows that this sub-dimension should be completely removed from the Turkish scale. It was determined that the items 5 and 6 in the original scale were not loaded into the sub-dimension in the original scale and both of them formed a separate sub-dimension. The factor loads of these items which constitute a different sub-dimension were found to be 0.915 (quite high) for item 5 and 0.919 (quite high) for item 6. These factor loads show that a sub-dimension in the original scale actually has 2 sub-dimensions in the Turkish population. In this case, items 19 and 20 were excluded from the scale and items 4 and 5 formed a separate factor. When the total variance explanations of the 18 items in the last form of the scale were examined, it was determined that 5 factors with an eigenvalue greater than 1 were defined. While the total variance of the 5-factor structure of the scale was 87.25%, it was 70.7% in the original scale.

This new structure forming upon completion of EFA, was also tested by confirmatory factor analysis. In the study, the goodness of fit values were brought to the desired level by assigning covariance to items 14 and 15. In the model tested, CMIN/DF: 2.950, RMSEA: 0.070, NNFI: 0.967, NFI: 0.961, CFI: 0.974, RMR: 0.035, GFI: 0.910, and AGFI: 0.876. All fit indices in the study showed that the fit was very good.

It is very important that the scales are not only valid but also reliable. The Cronbach's alpha reliability coefficient is frequently considered for the reliability of the scale. Generally, it is required to be above 0.70 [27,30]. The total Cronbach's alpha reliability coefficient of the scale was found to be 0.940, as in the original version of the scale. Also, if any item in the scale is deleted, the Cronbach's alpha value decreases. This shows that each item of the scale is necessary and can be used safely in forming scientific judgments at high validity and reliability levels [31].

5. Conclusion

In this study, it was determined that the validity and reliability of the Brief Emergency Department Patient Satisfaction Scale was ensured and could be used in the Turkish population. It is recommended that the scale be used as a data collection tool to investigate the satisfaction levels of patients admitted to the emergency department and the factors affecting their satisfaction. Cronbach's alpha reliability coefficient should be repeated since the scale will be applied to different sample in the future studies.

Prior presentation

International Nursing Care and Research Congress in November 2019 (Gaziantep, Turkey)

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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