ORIGINAL RESEARCH

Brief Emergency Department Patient Satisfaction Scale (BEPSS); Development of a New Practical Instrument

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Abstract

Introduction: Methodologically correct assessment of patient satisfaction (PS) plays a crucial role for quality-improvement purposes. Evaluation of Iranian literature on emergency department's PS resulted in an emerging need for developing a new instrument with satisfactory psychometric properties. The present study, aimed to develop and initially validate a scale to measure PS in emergency departments. **Methods:** A sample of 301 patients was selected in 2014 from two hospitals in Tehran. A pool of 24 items was prepared for administering. An item analysis was conducted to evaluate the quality of each item. Validity and reliability of the scale were evaluated. The data were analyzed using SPSS. **Results:** Item analysis and exploratory factor analysis yielded in a 20-item scale in five domains named emergency department staff, emergency department environment, physician care satisfaction, general patient satisfaction, and patient's family's satisfaction. Validity and factor structure of the scale were reported satisfactory. Reliability coefficients of the domains ranged between 0.75 and 0.88. **Conclusion:** The findings of the present study provided evidence for psychometric properties of a newly developed scale for PS assessment in emergency departments. Five underlying components of PS were found in the item pool. In sum, this scale may be used in research and emergency departments to measure PS.

Key words: Satisfaction, patient; healthcare quality; departments, emergency; reliability and validity; psychometrics

Introduction:

Patient satisfaction (PS) is the measure of quality in healthcare perceived by patients and roots in different complicated factors (1). Several factors should be coordinated with each other to make an appropriate condition for developing and improvement of PS with observing patient's rights in all aspects (2). This topic deserves attention because it is broadly a worthy goal and is a potentially important mediator for a range of outcomes. Satisfied patients are statistically more compliant with their medical instructions, suggesting that satisfaction may be an important component in promoting health and well-being (3-5). Satisfaction may also directly affect the financial viability of an institution by influencing consumer choice in the future. Moreover, it is a highly valuable factor for quality-improvement purposes which is gaining momentum in Iran as well as other countries (6). These factors have led to a proliferation of studies on PS over the last years (7). Although the field of emergency medicine is comparatively new in Iran, it has not been neglected in the PS research. However, like the larger PS body of literature, many of the existing emergency department (ED) PS studies have serious methodological flaws, which has led to inconsistent and, at times, contradictory conclusions (7). In Iran, many studies have utilized questionnaires in order to measure PS (8-12); however, no specially designed scale for ED was found reporting satisfactory psychometric properties. Studies that utilize such scales have the risk of acquiring limited or inconsistent data (7, 13). As a result, the present study aimed to develop and initially validate brief emergency department patient satisfaction scale (BEPSS).

Methods:

Study design and setting

Considering the body of literature, effective items in PS evaluation were extracted in a valid and reliable manner. All items aimed to measure a specific aspect of PS. The

preliminary battery of items was then checked for content by a panel of experts including two hospital managers, two quality-improvement officers, one physician, and one psychometrics professional. The aforementioned panel of experts confirmed the face validity of each item. It was then modified to fit the current Iranian needs and resources. The Items were categorized into seven major domains of admission, nursing, physician care, environment, patient's family, waiting time, and general satisfaction. Authors evaluated the content validity of the instrument in the final step of scale development as well as initial steps. Reviews were used to evaluate if the instrument covers required aspects of ED patient satisfaction (7, 11).

Item selection:
Exploratory Factor Analysis (EFA) was performed in order to identify underlying components of the instrument. A broad item analysis was conducted prior to EFA (14). In this step, items' exclusion criteria were set as: (a) missing more than 15% of data (b) having inappropriate indices of skewness and kurtosis and (c) inappropriate cross-loadings in EFA. Components were rotated using the varimax procedure and loadings under 0.4 were suppressed. Items with double loadings were categorized considering their contents and conceptual frame of work. Each item was scored from four (complete satisfaction) to one (complete dissatisfaction) as the response option was provided in a 4-point scale of Likert sort. No reverse scoring was required. Total ED patient satisfaction score was calculated by summing all the items' scores. Cronbach's alpha coefficient was calculated to assess the internal consistency of each domain and total scale as a measure of reliability.

Initial validation:
301responders were consecutively recruited from two hospitals in Tehran, summer of 2014. All participants were given final approved questionnaire by the panel as well as demographic questions. Questionnaires with more than five missing values were excluded. Demographics consisted of respondent (patient/family), post-examination status (released/hospitalized/else), age, sex, time of admission, delay before admission (waiting time), and educational level. Demographic questions were developed in line with the existing literature and on an exploratory basis. The verbal consent of all participants was obtained before administering the questionnaires in the emergency department. Questions were read aloud by an assistant for the elderly. Moreover, all respondents were assured of the confidentiality of their responses.

Statistical analysis
Data entry and analyses were performed in a blinded manner by staff members who were not involved in the process of data collection. Statistical analysis was performed using statistical package for the social sciences

(SPSS) software (version 21.0; SPSS Inc, Chicago, Illinois). An EFA with principal components technique was performed. Kaiser-Meyer-Olkin (KMO) measure was calculated to evaluate sampling adequacy. Bartlett's test of sphericity was also performed. Finally, one-way analysis of variance (ANOVA) and independent t-test were used to evaluate total satisfaction among different groups derived from demographic characteristics. The minimum value of KMO measure for adequacy of data matrix for factorability was considered as 0.6 (15). $P<0.05$ was defined as significant.

Results:
Considering the body of literature in PS evaluation, 32 items were extracted but the final questionnaire approved by the panel consisted of 24 items. 301 full field questionnaires met the inclusion criteria and were entered in the validation analysis. Baseline characteristics of the responders are presented in table 1. Items' descriptive information and results of item analysis are presented in Table 2. All items' indices of skewness and kurtosis were within acceptable range. Therefore, no items were discarded in this step of analysis.

Table 1: Baseline characteristics of participants

Demographic characteristic	Number (%)
Respondent	
Patient	132 (43.8)
Family	165 (54.8)
Missing	4 (1.4)
Post-examination	
Released	88 (29.3)
Hospitalized	51 (16.9)
Else	108 (35.9)
Missing	54 (17.9)
Sex	
Male	186 (61.8)
Female	109 (36.2)
Missing	6 (2.0)
Waiting time (minute)	
Under 5	158 (52.5)
5-10	37 (12.3)
More than 10	18 (6.0)
Missing	88 (29.2)
Educational level	
High school or lower	112 (37.2)
Associate degree	38 (12.6)
Bachelor's degree	123 (40.9)
Master's or higher	19 (6.3)
Missing	9 (3.0)
Admission shift	
Morning shift	142 (47.2)
Evening shift	45 (14.9)
Night shift	6 (2.0)
Missing	108 (35.9)
Age (years)	53.2 ±18.1

Table 2: The results of item analysis

Item*	Number	Mean (SD)**	Skewness Statistic (SD)	Kurtosis Statistic (SD)
Q1	298	2.89 (0.36)	-3.90 (0.14)	18.79 (0.28)
Q2	300	2.88 (0.40)	-4.24 (0.14)	21.20 (0.28)
Q3	283	2.77 (0.49)	-2.65 (0.15)	9.47 (0.29)
Q4	297	2.91 (0.32)	-4.49 (0.14)	27.03 (0.28)
Q5	295	2.88 (0.38)	-3.77 (0.14)	16.95 (0.28)
Q6	280	2.84 (0.43)	-3.36 (0.15)	14.50 (0.29)
Q7	293	2.94 (0.29)	-6.00 (0.14)	44.48 (0.28)
Q8	270	2.74 (0.50)	-1.92 (0.15)	4.06 (0.30)
Q9	259	2.49 (0.62)	-0.92 (0.15)	0.32 (0.30)
Q10	289	2.83 (0.46)	-3.04 (0.14)	9.93 (0.29)
Q11	283	2.71 (0.55)	-1.90 (0.15)	3.32 (0.29)
Q12	275	2.68 (0.59)	-2.08 (0.15)	5.20 (0.29)
Q13	274	2.72 (0.56)	-2.10 (0.15)	4.63 (0.29)
Q14	298	2.92 (0.36)	-5.51 (0.14)	35.13(0.28)
Q15	300	2.85 (0.42)	-3.16 (0.14)	11.58(0.28)
Q16	289	2.68 (0.55)	-1.75 (0.14)	3.51 (0.29)
Q17	276	2.92 (0.34)	-4.92 (0.15)	29.16(0.29)
Q18	266	2.91 (0.34)	-4.46 (0.15)	25.25 (0.30)
Q19	253	2.75 (0.58)	-2.46 (0.15)	5.74 (0.31)
Q20	295	2.77 (0.52)	-2.62 (0.14)	8.08 (0.28)
Q21	288	2.50 (0.71)	-1.32 (0.14)	1.15 (0.29)
Q22	295	2.81 (0.45)	-2.57 (0.14)	7.61 (0.28)
Q23	295	2.84 (0.42)	-3.34 (0.14)	14.37 (0.28)
Q24	299	2.80 (0.49)	-2.97 (0.14)	10.74 (0.28)

*: See appendix 1; **: SD= standard deviation.

EFA was performed on the 24 items with varimax rotation. KMO measure of sampling adequacy was 0.923.

Since the minimum value of this measure for adequacy of data matrix for factorability is 0.6, the data matrix had the required assumptions for factor analysis. Bartlett's test of sphericity was significant ($P<0.001$). Four items (3, 7, 9, and 19 in the 24-item version) were discarded in this step because of inappropriate cross-loadings. Another EFA was performed on the remaining 20 items (KMO=0.925) using varimax rotation and fixed number of five domains (Appendix 1). These domains were respectively named as emergency department staff (EDS), emergency department environment (EDE), physician care satisfaction (PCS), general patient satisfaction (GPS), and patient's family's satisfaction (PFS). After rotation, these domains accounted for 16.1%, 15.1%, 14.5%, 13.6%, and 11.4% of the total variance. Thus, 70.7% of the total variance was explained via these five domains. Results of EFA are presented in Table 3. The total alpha coefficient of the 20-item scale was 0.94. Reliability coefficients of domains are presented in table 4. One-way ANOVA and t-test detected no significant difference in satisfaction of patients differentiated by gender, education, post-examination status, and responding person ($P>0.05$). However, those patients who were visited with shorter waiting times were significantly more satisfied (F=10.267; $P<0.001$) as predicted (Table 5). Finally, the overall satisfaction score was inversely associated with waiting time (r=-0.295, $P<0.01$).

Discussion:

Following this study, brief emergency department patient satisfaction scale (BEPSS) was developed to evaluate the PS. This scale involves 20 items that score 1 to 4 and are categorized in 5 domains (EDS, EDE, PCS, GPS, and PFS). EDs are confronted with challenging issues which may reduce the PS (16). The satisfaction of ED clients cannot be achieved without research and an organized way of assessment in the field (17). So, this topic has been considered by researchers for many years to find an appropriate worldwide scale, but the search still goes on (18, 19). Variety of cultural effective factors in different countries and even different area may be one of the reasons of limitation for using the current questionnaires (20, 21). In this manner, considering the psychometric properties of PS is also the missing point. Thus, assessment of PS within emergency departments of Iranian hospitals was in need of a reliable and valid instrument (22). Translation of foreign tools without reporting characteristics of the test runs two potential risks. Firstly, validity and reliability of such instruments is questionable within Iranian population. Secondly, cross-cultural differences may play a central role in perception of healthcare quality from the viewpoint of patients (23). Using unrelated instruments such as inpatient/outpatient satisfaction tools also runs the risk of low face and content validity (24). Therefore, a specific scale for

Table 3: The results of exploratory factor analysis (rotated component matrix)

Items	Domains				
	EDS	**EDE**	**PCS**	**GPS**	**PFS**
5	0.712				
8	0.712				
4	0.632				0.415
6	0.587	0.516			
2	0.556	0.525			
1	0.497				0.434
15		0.723			
16		0.670			
14		0.666			0.529
24		0.618		0.489	
11			0.783		
10			0.746		
12			0.721		
13			0.640	0.478	
21				0.698	
20				0.696	
23				0.669	
22				0.520	
17					0.775
18					0.748

Corresponding loadings are bolded, emergency department staff (EDS), emergency department environment (EDE), physician care satisfaction (PCS), general patient satisfaction (GPS), and patient's family satisfaction (PFS).

Table 4: Reliability coefficients of five domains

Domain	**EDS**	**EDE**	**PCS**	**GPS**	**PFS**
Question (N)	6	3	4	5	2
Alpha	0.88	0.75	0.87	0.84	0.87

*: N=Number, emergency department staff (EDS), emergency department environment (EDE), physician care satisfaction (PCS), general patient satisfaction (GPS), and patient's family satisfaction (PFS).

measuring PS in EDs seems essential as emergency patients have complicated and specific situations. One of the problems associated with above-mentioned patients is a lack of time (25). Therefore, brevity should be considered quite noteworthy. Additionally, adopting non-validated approaches of measurement is psychometrically problematic (13). This may also lead to inappropriate data and consequently wrong decisions in managerial levels. Measures of PS should adhere to basic principles of psychometric measurement (15, 26). A study analyzed 195 studies of PS and concluded that authors demonstrated a poor understanding of the importance of core measurement properties required if a measure is to assess satisfaction with confidence (26). BEPSS made an effort to incorporate all effective factors of PS into an integrated measure in order to assess PS in emergency departments. Brevity is an extraordinary characteristic of the current instrument. This seems even more essential considering the unusual situation of ED patients. It was illustrated that delay (waiting time) in ED is significantly associated with dissatisfaction of patients. Two delay-related items (20 and 21) are present in BEPSS, which are loaded in the General Patient Satisfaction (GPS) domain. Periodic assessment of PS, as a critical indicator in healthcare quality, seems centrally important. Strategies for quality-improvement purposes are made upon figures derived from the process of assessment. Widening the target population on a national level could have strengthened the results of the study; especially its generalizability. Since the primary properties of the scale are very good, this tool calls for further validation across the country.

Conclusion:

It seems that BEPSS, as a newly developed instrument with highly satisfactory psychometric properties, can be used for the assessment of emergency department's patient satisfaction.

Table 5: Correlation coefficients between domains and delay before admission

	Waiting time	EDS	EDE	PCS	GPS	PFC
Waiting time	1					
EDS	-0.319*	1				
EDE	-0.206*	0.662*	1			
PCS	-0.066	0.666*	0.511*	1		
GPS	-0.205*	0.704*	0.633*	0.710*	1	
PFC	-0.251*	0.730*	0.760*	0.531*	0.653*	1

* Significant at P<0.01 level. Emergency department staff (EDS), emergency department environment (EDE), physician care satisfaction (PCS), general patient satisfaction (GPS), and patient's family satisfaction (PFS).

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Appendix 1: Brief emergency department patient satisfaction scale

Brief Emergency Department Patients' Satisfaction Scale (BEPSS)	1	2	3	4
Emergency department staff (EDS)				
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				
5. Admission staff guided me appropriately				
6. The behavior of the admission staff was suitable				
Emergency department environment (EDE)				
7. The environment of the emergency room was calm and quiet				
8. Emergency room was well equipped				
9. The environment of the emergency room was hygienic				
Physician care satisfaction (PCS)				
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				
General patient satisfaction (GPS)				
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 room				
18. The emergency room of this hospital is well functioning				
Patient's family satisfaction (PFS)				
19. The family of the patient are respected in this hospital				
20. Family can spend an appropriate amount of time besides the patient				

Permission to use this measure is not required; however, seek permission if any item is modified for use in research. For each item, the following response scale should be used: 1 = completely disagree, 2 = mildly disagree, 3 = mildly agree, 4 = completely agree.