

APPLYING SERVPERF SCALE TO EVALUATE QUALITY OF CARE IN TWO PUBLIC HOSPITALS AT KHANH HOA PROVINCE, VIETNAM

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Abstract

Quality of hospital care has been an increasing concern in Vietnam, especially in the overloaded situation at public hospitals in the whole country. Identifying related factors that influence the quality of hospital care is a critical work to improve the hospital performance and patient satisfaction. SERVPERF scale has been considered as a superior instrument for evaluating service quality, including in health care sector. Two public hospitals in Khanh Hoa province, Vietnam have been chosen to assess the application of a modified SERVPERF scale, namely Patient Satisfaction Scale (PSS), to evaluate the quality of care. Multidimensionality of the hospital care quality has been analysed using exploratory factor analysis with further examination of the scale's reliability and validity. Exploratory Factor Analysis resulted in five factors with pretty good internal consistency coefficients. Cronbach's alpha for the whole scale is high, at .880. Further regression analysis showed a significant convergent validity of the scale in terms of examining the association of overall service quality with the whole PSS. Assurance and Empathy are the most dimensions affecting the service quality of hospital care.

Key words: SERVQUAL, SERVPERF, Patient Satisfaction Scale, Public Hospitals, Quality of Hospital Care, Exploratory Factor Analysis.

1. BACKGROUND

Evaluating and improving quality of health care has been seen as a difficult and painful task, and in general, has not been successfully accomplished (Brook, McGlynn, & Shekelle, 2000, p. 281). Practically, quality of care contains two main components. The first is providing care of high technical quality. The second is the interaction between providers and patients as well as patients' participation in the treatment process (Brook, et al., 2000). These components have been stated in early 1980s by Grönroos (1984) as technical quality and functional quality. The functional quality in the context of hospitals' services is therefore patients' perspectives of healthcare service quality that has been widely considered as patient satisfaction. In traditional management of public hospitals in Vietnam, health care providers mainly focus on investment of technical aspects to improve the capacity of diagnosis and treatment for patients. As a result, the quality of hospital care in the context of the interpersonal relationship between patients

and hospital staff has been underfunctioned.

There are numerous sets of questionnaires developed and applied for measuring patients' satisfaction worldwide. Van Campen et al (1995) have reviewed different patient satisfaction instruments as the means for assessment of quality of care from the patient's perspectives. The authors found that among 113 instruments, only 41 instruments had reportedly been tested for reliability or validity, and eight instruments were tested twice or more often. However, based on five criteria for an instrument to be suitable for assessing quality of care from the patients' perspective (van Campen, et al., 1995, p. 114), the authors chose five instruments, namely the Patient Satisfaction Questionnaire (PSQ) by Ware et al; Client Satisfaction Questionnaire (CSQ) by Larsen et al; the Satisfaction with Physician and Primary Care Scale (SPPCS) by Hulka et al; the Patient Judgments of Hospital Quality Instrument (PJHQ) by Meterko et al; and the Service Quality Instrument (SERVQUAL) by Parasuraman et

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al. Among the five questionnaires, the authors recommended SERVQUAL as the basis to build the instrument (van Campen, et al., 1995, p. 127).

The PSQ is a 60-item questionnaire developed by Ware et al based on the eight dimensions of satisfaction: access/convenience, finances, availability of resources, continuity of care, quality/competence, humaneness, general satisfaction, and efficiency of care (Roberts & Tugwell, 1987). This questionnaire was redefined later to the Form II of 68-Likert-type items as shown in the paper published in 1983 (Ware, Snyder, Wright, & Davies, 1983). However, PSQ is not based explicitly on a theory of patient satisfaction and its validity is questionable (van Campen, et al., 1995, p. 115). The CSQ is a rather simple instrument with only eight items that is not based on a patient satisfaction theory. A unidimensional structure of CSQ is also a limitation to apply it to the hospital setting. The Hulka's SPPCS comprises three domains as professional competence, personal qualities, and cost/convenience under 50 items. Again, Hulka's instrument does not have a correspondent theory of patient satisfaction. Additionally, the limitation of this questionnaire to apply in hospital setting is that it does not cover enough dimensions of patient satisfaction and that it intends to evaluate home health care services (van Campen, et al., 1995, p. 119). The Meterko's PJHQ is one of few scales that was developed to measure the quality of care in hospitals. The 106-item questionnaire, however, is not based on an explicit theory (van Campen, et al., 1995, p. 120). Overall, the above four instruments are too long or too short, not appropriate for Vietnamese patients who are in moderate level of education and not familiar with rating questionnaires.

As stated earlier by van Campen (1995), SERVQUAL should be an important basis for developing the patient satisfaction questionnaire for the aim of assessing the quality of hospital care. In the exploratory research, based on the assumption that service quality involves the comparison of expectation and perception, Parasuraman et al (1985) proposed 10 determinants of service quality. These are Reliability, Responsiveness, Competence, Access, Courtesy, Communication, Credibility, Security, Understanding/ knowing the customers, and Tangibles; quite similar to other authors' dimensions of patient satisfaction

(Andaleeb, 1998; Duggirala, Rajendran, & Anantharaman, 2008; Sitzia & Wood, 1997; Ware, et al., 1983). Further, from these 10 determinants of service quality and through 10 steps in the process of scientifically developing an instrument, the final SERVQUAL reduced from a set of 97 items to 22 items, consistent with the final five dimensions of service quality, namely Tangibles, Reliability, Responsiveness, Assurance, and Empathy (A. Parasuraman, Zeithaml, & Berry, 1988). Each item was recast into two statements – one to measure expectations and one to measure perceptions using a seven-point scale ranging from “strongly agree” (7) to “strongly disagree” (1). As a result, there are a total of 44 questions which assess perceptions and expectations. The score differences between expectations and perceptions reflect the service quality. The 22-item SERVQUAL has been noted as a concise multiple-item scale with good reliability and validity that service providers can use to better understand the service expectations and perceptions of consumers separately and, as a result, improve their service (A. Parasuraman, et al., 1988, p. 30). The instrument has been designed to be applicable across the broad spectrum of services, including health care service. Many surveys have used SERVQUAL on numerous occasions and its reliability and validity have been demonstrated (A. Parasuraman, Berry, & Zeithaml, 1991), including in the health care services (Asubonteng, McCleary, & Swan, 1996; Babakus & Mangold, 1992; Choi, Lee, Kim, & Lee, 2005; Lam, 1997; Sohail, 2003). However, some concerns remain about the number of dimensions of service quality, treatment of expectations (Carman, 1990), use of gap score between perceptions and expectations (Buttle, 1996; Jain & Gupta, 2004), and linkage between quality and satisfaction (Asubonteng, et al., 1996).

Practically, there are two main concerns about the SERVQUAL raised among researchers. Firstly, it is thought that it takes too much time to answer a total of 44 questions. The second concern relates to the vagueness of the expectation (Jain & Gupta, 2004) and the fact that measuring perceptions and expectations simultaneously can cause boredom and confusion (Buttle, 1996). Because of these concerns, Cronin et al (1992) suggested an alternative tool, namely SERVPERF, by using the scale of performances to assess service quality. The authors concluded that a performance-based measure

of service quality may be an improved means of measuring the service quality construct, and there exists a significant relationship between service quality and consumer satisfaction. The SERVPERF has been proposed to assess overall service quality (Jain & Gupta, 2004) and to use measure patient satisfaction in connection with health care service quality (Panchapakesan, Rajendran, & Lokachari, 2010). Further, in a meta-analytic review of 17 years of research across five continents, Carrillat et al (2007, p. 485) concluded that both SERVQUAL and SERVPERF are adequate and equally valid predictors of overall service quality.

2. STUDY DESIGN

A cross-sectional design was used for this survey. The target population were in-patients who were already discharged within three months from the two public hospitals: Van Ninh District at the North and Cam Ranh City at the South of Khanh Hoa province. The patients were chosen based on the discharged patients list withdrawn from computer system of the two hospitals by convenient sampling technique.

The SERVPERF-based questionnaire, namely 26-item PSS, was administered to the patients by a health care staff who is working at the commune health center where the patients are living. Upon completing the questionnaire at home, the patients returned it to the commune health center in order to be sent back to the investigator. Some reminders directly at patients' home or by telephone were made if more than two weeks not receiving feedback from participants.

The sample size was predetermined at 150 for each hospital to reach an overall sample size of 300 as suggested by DeVellis (2012, pp. 102, 157) and Pett (2003, p. 48). This sample size is also consistent with the criterion of 5 - 10 participants per item (DeVellis, 2012; Floyd & Widaman, 1995; Pett, et al., 2003).

2.1. Developing the Scale

Before this survey undertaken, four focus groups among in-patients were conducted for the aim of exploring possible dimensions relating service quality in addition to the five dimensions explored by Parasuraman (1988) (the results not presented). The administrative procedure has been raised strongly and repeatedly among participants in the four focus groups. Therefore, we proposed an additional dimension of administrative procedure as the sixth one to the existing five-dimension SERVQUAL scale.

Furthermore, because of the advantage of SERVPERF over SERVQUAL as discussed above, the perception part is chosen as a basic frame to develop the scale to examine the service quality. In addition, unlike other business organizations, service quality in hospitals is determined not only by doctors but also by nurses, midwives, nursing-aids and other staff who work with each other very closely to solve patients' health problem. Therefore, some statements regarding responsiveness, reliability, assurance and empathy are written specifically for doctors, nurses and nursing-aids. Four statements related to the administrative procedure are also added to establish a total 26 items of the scale as shown in Table 1.

Table 1: Proposed dimensions of 26-item PSS modified from SERFPERF scale

<i>Dimensions</i>	<i>Items</i>
Tangibles (4 items)	Hospital has up-to-date medical equipment The clinical departments are clean There are enough beds for patients The hospital is too much crowded
Reliability (3 items)	When you have a problem, doctor shows a sincere interest in solving it When you have a problem, nurse/midwife shows a sincere interest in solving it The doctor made an accurate diagnosis.
Responsiveness (6 items)	It does not take too much time for you to be seen by doctor. The waiting time for lab examination and/or imaging diagnostic procedures is too long Nurses/midwives are always willing to help you Nursing aids are always willing to help you Doctors are too busy to respond to your requests Nurses are too busy to respond to your requests

<i>Dimensions</i>	<i>Items</i>
Assurance (6 items)	The behavior of hospital staff instills confidence in patients Doctors are consistently courteous to you Nurses/midwives are consistently courteous to you Nursing aids are consistently courteous to you Doctors have good professional skills Nurses/midwives have good professional skills
Empathy (3 items)	Doctor gives you individual attention Nurse/midwife gives you individual attention Hospital has operating hours convenient to all patients
Administrative procedures (4 items)	The administrative procedures of the hospital take too much time. The hospitalization procedures are simple. It takes too much time for the discharging procedure. The referral procedure is too complicated

There are 5 items that are negative words and therefore will be recoded before analysing. All items are listed in the questionnaire in a random order to minimize subjective bias by readers. The 26 items, namely from v1 to v26, presented in the questionnaire are shown in the appendix.

Different from the original format of item response of SERVQUAL scale, a 5-point Likert scale with neutral point was used in order to participants not being hard to make decision.

An item that evaluates the extent to which patients manifest their satisfaction with hospital service was also added for the aim of examining the construct validity of the scale. This item is also under the 5-point Likert format, arranging from very dissatisfied to very satisfied with a neutral point.

3. METHODOLOGY

EpiData version 3.1 was used to enter data, applying some procedures of "Check" function to minimize entry errors, such as "range or legal value", "jumps", "must enter". The analysis was based mainly on IBM SPSS version 19. Some regression analysis was double checked with Stata version 12 because of its advantage over SPSS (Welch, 2005).

Exploratory factor analysis was used to identify possible underlying dimensions that imply the construct of quality of hospital care. The structure matrix has been used to evaluate and refine the factors as strongly suggested by Pett (2003, pp. 152,168). However, the pattern

matrix also played a reference role in the situation where existed a multi-loading on the same factor. The decision will be made based on the factor loading in the pattern matrix. Another approach is to examine Cronbach's alpha to determine where items best fit when they load on multiple factors (Pett, et al., 2003, p. 187). Content area also another criteria to place an item appropriately to a factor. Regression analysis was made by predictors of scale factors and response of patient satisfaction variable to detect construct validity of the scale.

4. FINDINGS AND DISCUSSIONS

Among 300 questionnaires delivered, there were 289 participants returned completely, accounting for 96.3% response rate. There were nine participants who are under 18 years of age and therefore were excluded in the analysis, letting the remaining number of participants were 280.

Regarding missing data analysis, among 26 items comprising the scale, there is no item having more than 5% missing value. Further, only 0.7% observations having more than four missing values. Therefore missingness may be of little concern (Kline, 2011, p. 55). Listwise deletion for 26 items of the scale showed 242 observations to be analysed.

Baseline characteristics:

The Table 2 shows baseline characteristics of the sample without listwise deletion that includes 280 records.

Table 2. Baseline characteristics of the sample

Variable (N)	n	%
Hospital (N=280)		
Cam Ranh	139	49.6
Van Ninh	141	50.4
Gender (N=280)		
Male	99	35.4
Female	181	64.6
Age group ^a (N=275, missing 5)	46.2±18.9	
18-30	57	24.4
31-39	67	20.7
40-49	46	16.7
50-59	41	14.9
60 and over	64	23.3
Ethnicity (N=280)		
Kinh	278	99.2
Raglai	1	0.4
Other	1	0.4
Marital status (N=276, missing 4)		
Single	28	10.1
Married	214	77.5
Divorced	4	1.5
Widowed	30	10.9
Occupation (N=274, missing 6)		
Unemployed	34	12.4
Farmer	72	26.3
Fisher	25	9.1
Worker	25	9.1
Teacher	20	7.3
Government officer	20	7.3
Other	78	28.5
Health Insurance (N=280)		
Yes	193	68.9
No	87	31.1
Patient (N=277, missing 3)		
Yes	162	58.5
No (patient's relative)	115	41.5

Note: a: Mean±SD

Factor analysis:

Listwise deletion of 26 items comprising the scale results in 242 cases to be conducted for factor analysis. Examining correlation showed the Kaiser-Meyer-Olkin (KMO) test of 0.868 and Barlett's test of sphericity at significance of less than 0.0001, indicating an appropriate correlation matrix and sufficient sample size for factor analysis. All Measures of Sampling Adequacy

(MSA) are larger than 0.7 suggesting that the correlation matrix is factorable.

It is the fact that in health research, there is somewhat correlation among concepts or constructs (Pett, et al., 2003, p. 149). Further, SERVQUAL scale has been used and analysed based on the assumption that the five factors correlates with each other at some extent (A. Parasuraman, et al., 1991; A. Parasuraman, et al.,

1988). Therefore, the oblique technique direct Oblimin with Kaiser normalization was used for factor analysis using IBM SPSS version 19.0 with the extraction method of Principal Component Analysis (PCA). The criteria for retaining factors are eigenvalues larger than 1, percent of extracted variance (around 5% or more), and Scree plot. The cut-off for meaningful factor loadings is defined as greater than 0.30 at minimum or at least 0.45 as “fair” that is suggested by Pett (2003, p. 209) and Floyd (1995, pp. 294-295).

The factor analysis as mentioned above results in five factors extracted that accounts for 56.2% variance as shown in the Table 3. Each factor has eigenvalue greater than 1.

Table 3. Factor analysis

Factor	Extraction sums of squared loadings			Rotation Sums of squared Loadings
	Total (eigenvalue)	% of variance	Cumulative %	
1	7.427	28.565	28.565	5.910
2	3.905	11.905	40.470	3.714
3	1.509	5.820	46.272	2.500
4	1.382	5.317	51.589	3.406
5	1.209	4.649	56.238	3.245

The Scree Plot also supports a five-factor model as shown at Figure 1.

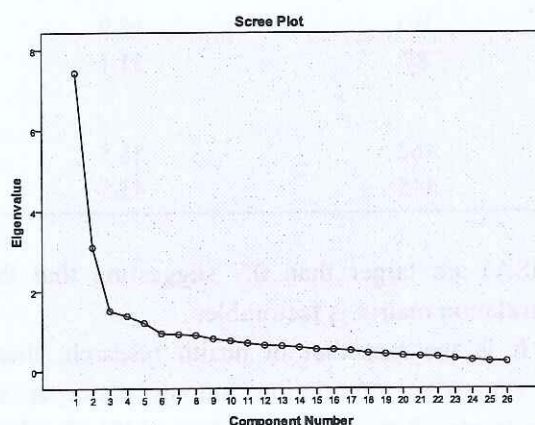


Figure 1. Scree plot for the 26-item PSS

The structure matrix and pattern matrix created by factor analysis oblique rotation are presented at Table 4 and Table 5, respectively.

The factor analysis consistently confirms the five-dimension structure of the 26-item PSS, despite of adding the administrative procedure as originally proposed. The items related to administrative procedures have been loaded on different factors depending on the contents of the procedures of administration. Further, the factor matrices suggest five factors with their corresponding items that are not the same as expected at Table 1. The reason might be rooted from the issue of cultural differences in the meanings of the dimensions of Assurance, Reliability, Empathy, Tangibles, and Responsiveness.

The item “Nursing aids are consistently courteous with you” was originally placed to the dimension of Assurance. However, factor analysis resulted in different loading significance. In the structure matrix, the item’s loading value on factor 5 (Empathy) is less than on factor 1 (Assurance) (.476 vs .479, Table 4). Conversely, in the pattern matrix, loading of this item is not significant (<0.3) on factor 1. As a result, this item should be placed on factor 5. The possible explanation may be based on the fact that in Vietnam, nursing aids, who are not medical professional persons and solely work as a cleaner and provide clothes and bed sheets for patients, are considered differently from doctors and nurses. Their role in the hospital therefore is seen as “empathy”, not as “assurance”.

The item “The clinical departments are clean” loaded more significantly on factor 1 than factor 3 in both matrices. However, because of its meaning, it should be placed on factor 3 as “Tangibles”.

The Responsiveness factor comprises items that largely relate to waiting times. The item “the hospital is too much crowded” was originally placed on the dimension of Tangibles. However, factor analysis resulted in the high loadings on Responsiveness factor at both matrices (.478 and .401, respectively). The explanation might be that crowdedness is by and large connected with waiting time to be served by hospital staff.

Table 4. Factor loadings from the rotated factor structure matrix for the 26-item PSS: Principal Axis Factoring with Oblimin Rotation (Kaiser Normalization)

PSS Items	Factors				
	1	2	3	4	5
<u>Assurance</u>					
V3. When you have a health problem, doctor shows a sincere interest in solving it	.569			.453	
V6 Nurses/midwives have good professional skills	.603			.451	
V7 The doctor made an accurate diagnosis	.685		.325		.309
V13 Nurses/midwives are consistently courteous with you	.709			.508	
V18 Doctors are consistently courteous with you	.606	.310			.530
V19 The behavior of hospital staff instills confidence in patients	.627			.325	.593
V22 Doctors have good professional skills	.748				
V24 Doctor gives you individual attention	.789				
V25 Nurse/midwife gives you individual attention	.667			.416	.396
<u>Responsiveness</u>					
V1 Doctors are too busy to response to your request promptly		.736			
V8 The administration procedures of the hospital take too much time		.666	.559		
V12 The waiting time for lab examination and/or imaging diagnostic procedures is too long	.347	.629	.345		
V15 It takes too much time for the discharging procedure		.704	.396		
V16 Nurses/midwives are too busy to response to your request promptly		.677			
V21 The hospital is too much crowded		.454			.367
V26 The referral procedure is too much complicated		.771			
<u>Tangibles</u>					
V5 There are enough beds for patients			.799		
V9 The Hospital has up-to-date medical equipment	.393		.589		
V14 The clinical departments are clean	.585		.478		.357
<u>Reliability</u>					
V4 Hospital has operating hours convenient to all patients				.667	
V10 When you have a health problem, nurse/midwife shows a sincere interest in solving it	.430			.757	.384
V11 Nurses/midwives are always willing to help you	.462			.707	.392
<u>Empathy</u>					
V2 Nursing aids are always willing to help you	.339			.488	.529
V17 It doesn't take too much time for you to be seen by doctor	.489				.697
V20 Nursing aids are consistently courteous with you	.479			.431	.476
V23 The hospitalization procedures are simple					.636

Note: Underlined values indicate a multi loading on two or more factors. Loadings under .30 omitted. Values in bold indicate the factor on which the item is placed.

Table 5. Rotated factor pattern matrix for the 26-item PSS: Principal Axis Factoring with Oblimin Rotation (Kaiser Normalization)

PSS Items	Factors				
	1	2	3	4	5
<u>Assurance</u>					
V3. When you have a health problem, doctor shows a sincere interest in solving it	.460			.314	
V6 Nurses/midwives have good professional skills	.493				
V7 The doctor made an accurate diagnosis	.667				
V13 Nurses/midwives are consistently courteous with you	.578			.304	
V18 Doctors are consistently courteous with you	.446				.356
V19 The behavior of hospital staff instills confidence in patients	.465				.445
V22 Doctors have good professional skills	.787				
V24 Doctor gives you individual attention	.833				
V25 Nurse/midwife gives you individual attention	.554				

Responsiveness

V1 Doctors are too busy to response to your request promptly	.789	
V8 The administration procedures of the hospital take too much time	.609	.477
V12 The waiting time for lab examination and/or imaging diagnostic procedures is too long	.567	
V15 It takes too much time for the discharging procedure	.656	.309
V16 Nurses/midwives are too busy to response to your request promptly	.734	
V21 The hospital is too much crowded	.401	.367
V26 The referral procedure is too much complicated	.736	

Tangibles

V5 There are enough beds for patients		.834
V9 The Hospital has up-to-date medical equipment		.522
V14 The clinical departments are clean	.471	.349

Reliability

V4 Hospital has operating hours convenient to all patients		.661
V10 When you have a health problem, nurse/midwife shows a sincere interest in solving it		.696
V11 Nurses/midwives are always willing to help you		.625

Empathy

V2 Nursing aids are always willing to help you	.415	.447
V17 It doesn't take too much time for you to be seen by doctor		.601
V20 Nursing aids are consistently courteous with you		.336
V23 The hospitalization procedures are simple		.654

Note: Underlined values indicate a double loading on two factors. Loadings under .30 omitted. Values in bold indicate the factor on which the item is placed.

Reliability analysis

Listwise deletion is used before conducting reliability test for the aim of the same sample size for all factors. The procedure resulted in 242 observations to estimate reliability for each extracted factor. Cronbach's alpha coefficients were examined to assess the reliability of factors as well as the whole scale in terms of internal consistency. Table 6 shows the values of Cronbach's alpha coefficients as a result of reliability analysis using SPSS version 19. The table showed the high and significant alpha coefficients at the factors of Assurance (.865), Responsiveness (.810), and Reliability (.726). The factor Empathy has an acceptable value of alpha coefficient (.624) and the factor Tangibles has the lowest value of Cronbach's alpha (.595).

Item-total correlation coefficients range from

.293 (v23) to .669 (v130). However, only one item (v23) having its item-total correlation coefficient of .293 that is considered as weak correlation (Pett, et al., 2003, p. 60), demonstrating a relative moderate strength of relationship between items as a whole.

There are three variables that increase Cronbach's alpha if items deleted. They are v21 of factor Responsibility, v4 of factor Reliability, and v23 of factor Empathy. The item v21 only increase very slightly (.813 vs .810) the internal consistency of factor Responsiveness so it might be retained. V4 is an important item in terms of exploring possible inconvenience of working time of hospital so it should not be deleted, while the deletion increased not too much the internal consistency of the factor (.796 vs .726). The last one, v23, is remained for the same reasons.

Table 6. Reliability analysis of 26-item PSS

Items in each factor	Item-total correlations	Alpha if item deleted	mean	SD
Assurance ($\alpha = .865$)				
V3. When you have a health problem, doctor shows a sincere interest in solving it	.518	.858	3.74	.757
V6 Nurses/midwives have good professional skills	.560	.854	3.54	.779
V7 The doctor made an accurate diagnosis	.544	.856	3.50	.811
V13 Nurses/midwives are consistently courteous with you	.669	.844	3.50	.795
V18 Doctors are consistently courteous with you	.597	.851	3.67	.771
V19 The behavior of hospital staff instills confidence in patients	.599	.851	3.49	.730
V22 Doctors have good professional skills	.585	.852	3.62	.754
V24 Doctor gives you individual attention	.659	.845	3.58	.748
V25 Nurse/midwife gives you individual attention	.637	.847	3.60	.740
Responsiveness ($\alpha = .810$)				
V1 Doctors are too busy to response to your request promptly	.515	.791	3.35	.962
V8 The administration procedures of the hospital take too much time	.638	.768	2.82	1.053
V12 The waiting time for lab examination and/or imaging diagnostic procedures is too long	.569	.781	2.82	.990
V15 It takes too much time for the discharging procedure	.630	.771	2.95	.921
V16 Nurses/midwives are too busy to response to your request promptly	.451	.801	3.37	.903
V21 The hospital is too much crowded	.375	.813	2.43	.905
V26 The referral procedure is too much complicated	.645	.767	2.96	1.016
Tangibles ($\alpha = .595$)				
V5 There are enough beds for patients	.374	.554	3.14	1.082
V9 The Hospital has up-to-date medical equipment	.461	.421	3.26	.888
V14 The clinical departments are clean	.389	.516	3.33	.929
Reliability ($\alpha = .726$)				
V4 Hospital has operating hours convenient to all patients	.411	.796	3.75	.788
V10 When you have a health problem, nurse/midwife shows a sincere interest in solving it	.641	.521	3.65	.781
V11 Nurses/midwives are always willing to help you	.606	.568	3.61	.766
Empathy ($\alpha = .624$)				
V2 Nursing aids are always willing to help you	.476	.505	3.50	.424
V17 It doesn't take too much time for you to be seen by doctor	.455	.518	3.17	.380
V20 Nursing aids are consistently courteous with you	.413	.551	3.38	1.000
V23 The hospitalization procedures are simple	.293	.630	3.22	.163

Note: Bold values show higher Cornbach's alpha coefficients if items deleted.

The Table 7 shows briefly reliability in terms of internal consistency for the whole scale ($\alpha = .880$), for separate factors, and factor correlation.

Table 7. Factor correlations and Factor Alpha coefficients for the 26-item PSS

Factor	Mean ^a	Var	1	2	3	4	5
1. Assurance (n = 9)	3.583	.586	(.865)				
2. Responsiveness (n = 7)	2.959	.933	.144	(.810)			
3. Tangibles (n = 3)	3.245	.940	.251	.118	(.595)		
4. Reliability (n = 3)	3.671	.606	.346	.008	.049	(.726)	
5. Empathy (n = 4)	3.316	.808	.303	.160	.138	.125	(.624)
Total scale (n = 26)	3.345	.757					(.880)

Note: a. Range: 1.00 to 5.00, Var: Variance; Reliability estimates are in the parentheses.

Validity analysis

The overall hospital quality is proposed to be examined by a single item scale asking participants' ranking their satisfaction with the hospital where they were served with a Likert 5-point response, ranging from very dissatisfied (1) to very satisfied (5). This scale is used to examine the convergent validity of the 26-item PSS. This is done by conducting regression of overall satisfaction on five factors extracted from factor analysis of the 26-item PSS.

At first, the correlation between the variable satisfaction and each of factors is examined to assess the relatedness of each other (Table 8). The result showed significant associations between satisfaction with the five factors of the scale with the highest correlations are with Assurance (.599) and Empathy (.496). The multicollinearity diagnosis test reveals VIFs (Variance Inflation Factors) below 5 indicating regression analysis is appropriate.

Table 8. Correlation analysis for the five factors with the variable of satisfaction

	Mean	SD	S	F1	F2	F3	F4	F5
Satisfied	3.55	.760						
F1 Assurance	3.59	.530	.599					
F2 Responsiveness	2.94	.660	.184 ^a	.266				
F3 Tangibles	3.24	.720	.385	.489	.201 ^b			
F4 Reliability	3.69	.611	.363	.596	.126 ^c	.412		
F5 Empathy	3.32	.613	.496	.639	.293	.360	.487	

Note: a: p = .02, b: p = .001, c: p = .027, otherwise, p < .001.

The regression analysis resulted in an adjusted R square at .377 that means the model accounts for 37.7% variability of quality of hospital care in terms of patient satisfaction with hospital services. It's worth noting that the model is statistically significant that demonstrates the convergent validity of the scale. However, only Assurance and Empathy factors have significant influence on the overall satisfaction with regression coefficients

of .642 and .237 (p values are .000 and .007, respectively).

The standardized coefficients at Table 9 indicate that the most affected factor on overall satisfaction is Assurance and then Empathy (.448 and .191, respectively). Therefore, to improve the quality of hospital care, it is fundamental to focus on the factor Assurance of nine items as showed in the Table 4.

Table 9. Regression Model for the 26-item PSS

Model	β	βs^*	p	R ²	Adj-R ²	F test
F1 Assurance	.642	.448	.000	.391	.377	F=28.97
F2 Responsiveness	-.010	-.009	.872			p=0.00...
F3 Tangibles	.124	.118	.054			
F4 Reliability	-.055	-.044	.512			
F5 Empathy	.237	.191	.007			
Constant	.284		.361			

Note: β : regression coefficient, SE: Standard error, βs : standardized coefficient, Adj-R²: adjusted R².

5. CONCLUSIONS

Applying a modified SERVPERF scale to evaluate service quality in hospital setting in Khanh Hoa province, Vietnam has revealed an encouraging result. The 26-item patient satisfaction scale has been factorized into five dimensions that are roughly named as Tangibles, Reliability, Assurance, Responsiveness, and Empathy but with different items' meanings. The scale has been demonstrated its reliability and

pretty good convergent validity.

The most dimensions that significantly affect quality of hospital care are Assurance and Empathy. Necessary strategies should be focused on these dimensions to improve the quality of care at public hospitals in Vietnam.

However, more empirical studies should be conducted to confirm the usefulness of the PSS in terms of its reliability and validity to put it into practice.

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Appendix

THE PATIENT SATISFACTION SCALE (PSS)

- V1. Doctors are too busy to response to your request promptly
- V2. Nursing aids are always willing to help you

V3. When you have a health problem, doctor shows a sincere interest in solving it

V4. Hospital has operating hours convenient to all patients

V5. There are enough beds for patients

V6. Nurses/midwives have good professional skills

V7. The doctor made an accurate diagnosis

V8. The administration procedures of the hospital take too much time

V9. The Hospital has up-to-date medical equipment

V10. When you have a health problem, nurse/midwife shows a sincere interest in solving it

V11. Nurses/midwives are always willing to help you

V12. The waiting time for lab examination and/or imaging diagnostic procedures is too long

V13. Nurses/midwives are consistently courteous with you

V14. The clinical departments are clean

V15. It takes too much time for the discharging procedure

V16. Nurses/midwives are too busy to response to your request promptly

V17. It doesn't take too much time for you to be seen by doctor

V18. Doctors are consistently courteous with you

V19. The behavior of hospital staff instills confidence in patients

V20. Nursing aids are consistently courteous with you

V21. The hospital is too much crowded

V22. Doctors have good professional skills

V23. The hospitalization procedures are simple

V24. Doctor gives you individual attention

V25. Nurse/midwife gives you individual attention

V26. The referral procedure is too much complicated