

Development of HospitalQual: A Service Quality Scale for Measuring In-patient Services in Hospital

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ABSTRACT

Service quality has become a major concern for both the hospitals and the patients. The increase in competition coupled with the increased patients' perception of service quality makes it difficult for hospitals to provide services that meet patient satisfaction. Recognition of the importance of service quality is the need of the hour in order to provide better services to the patients. The objectives of the present study are to identify the critical factors of inpatient service quality in a hospital and to develop the HospitalQual theoretical model to measure inpatient service quality. The present study was explorative and descriptive in its nature. An empirical study was conducted in a public hospital located in Hyderabad, India. The data was collected through a self administered questionnaire from 246 in-patients with a purposive sampling technique. The statistical techniques such as factor analysis and the multiple regression were used in the data analysis. The study has identified the factors to measure the inpatient service quality and developed a comprehensive instrument i.e. "HospitalQual" with seven dimensions, namely; medical, nursing, support, administrative services, patient safety, communication and hospital infrastructure. In addition, the supportive services are found to be the most important factor to predict the overall inpatient service quality, followed by nursing services, administrative services, medical services, patient communication patient safety and hospital infrastructure. The application of HospitalQual would help to identify the gaps in each of the dimensions over a period of time and enable hospital administrators to monitor, control and improve the inpatient service quality in a hospital.

Keywords: *hospital, hospitalqual, service quality*

1. INTRODUCTION

Service quality has become a major concern for both the hospitals and the patients. Hospital today is very different from what it was a couple of decades ago. The increase in competition coupled with the increased patients'

perception of service quality makes it difficult for hospitals to provide services that meet patient satisfaction. Recognition of the importance of service quality is the need of the hour in order to provide better services to the patients. Identification of the determinants of service quality is one of the burning issues before services research (Johnston, 1995). The identification of determinants of service quality is necessary in order to measure, control, and improve customer perceived service quality.

The healthcare industry has viewed itself as operates differently from other industry (Kritchanchai, D., 2012). In the globalized competitive hospital environment, service quality has been increasingly identified as the main factor in distinguishing between services and building competitive advantage. Unlike in the earlier days when hospitals were judged by the medical services they provided, they are now also judged on the quality of service they give, that is, personalized services rendered by courteous, caring and friendly staff. Hospitals will do even better if they could possibly combine high tech with a high touch. Service quality is designed to measure functional quality i.e. the manner in which the health care service is delivered to the patient. However, functional quality in a health care setting cannot be sustained without accurate diagnoses and procedures. Such technical quality is the focus of research that is being conducted by a number of healthcare professional organizations, including Joint Commission International (JCI), National Accreditation Board for Hospitals & Health care Providers (NABH) and Quality Council of India (QCI) etc. For the long-run success of a health care organization, both functional and technical quality have to be monitored and managed effectively (Babakus Emin & W Glynn Mangold, 1992). Hence, the need to focus on the management aspects of hospitals has become more relevant than before. Measuring service quality as perceived by patients is one step to improve management of the hospitals. In this context, it is very

essential to study the service quality in Indian hospitals. The present study is an attempt to develop an instrument for measuring perceived in-patient service quality in the context of Indian hospitals.

2. SERVICE QUALITY

The well-documented service quality model i.e. SERVQUAL of Parasuraman et al. (1985) has been created a revolution in measuring the customers' perceptions towards the service delivered by the provider in various service sectors. Along with all service sectors, the model is also widely used for measuring service quality in health care including hospitals. According to SERVQUAL model, service quality occurs when expectations are met (or exceeded) and a service gap materializes if expectations are not met (Parasuraman et al., 1985). The gap score for each statement is calculated as the perception score minus the expectation score. A positive gap score implies that expectations have been met or exceeded and a negative score implies that expectations are not being met. Gap scores can be analyzed for individual statements and can be aggregated to give an overall gap score for each dimension.

Early studies during 1980s concentrated on determining what service quality meant for customers and developing strategies to meet customer expectations (Parasuraman 1985). The early pioneers of services marketing in Europe, especially the Nordic School, argued that service quality consists of two or three underlying dimensions. Lehtinen and Lehtinen (1985) referred to physical and interactive quality while Gronroos (1984) identified the dimensions such as technical, functional and firm's image. Building on the pioneering work of the Nordic School of services management and particularly Christian Gronroos, Parasuraman et. al. established service quality as the core of services marketing. Their landmark article in 1985 conceptualized service quality as a gap between consumers' expectations and perceptions (Parasuraman et al., 1985) and inspired many other researchers to examine the service quality construct within a marketing premise (Berry et al., 1985). In later years, Parasuraman et al. (1988) published empirical evidence from five service industries that suggested that five dimensions more appropriately capture the perceived service quality construct.

3. SERVICE QUALITY DIMENSIONS IN HOSPITAL – A REVIEW

Ever since the development of Parasuraman's SERVQUAL, the researchers continue to debate the determinants of service quality which is still an important issue remain unanswered. Practitioners continue to look for advice and suggestion as to what constitute service quality for their offers and furthermore, if they tend to reposition their offers by varying some characteristics of their offers, for example, by increasing or reducing tangibility or customer contact, etc. (Nimit Chowdhary, Monika Prakash, 2007). However, it is essential to examine the factors influencing the service quality (Zakaria, H. et al, 2010).

The application of SERVQUAL has been widely used in hospital to measure the service quality. Some of the

researchers have modified the SERVQUAL dimensions, whereas the others have been developing the new service quality dimensions to fit their study. Lim and Tang (2000) added the dimensions such as accessibility/affordability and Tucker and Adams (2001) also added caring and outcome dimensions. Johnston (1995), has increased SERVQUAL model to 18 dimensions, whereas Reidenbach and Sandifer-Smallwood (1990) differed with Johnston and they reduced to seven dimensions; patient confidence, empathy, quality of treatment, waiting time, physical appearance, support services and business aspects.

Apart from these additions and deletions in the detentions of service quality by various scholars, there is another group of scholars those who have derived measurement scales with an attempt to quantify the quality of service provided by a hospital (Hulka et al., 1970; and Fitzpatrick, 1991). Hulka et al. (1970) used statements based on just three dimensions: personal relationship, convenience, and professional competence. Thompson (1983) based his work on seven dimensions: tangible, communications, relationships between staff and patients, waiting time, admission and discharge procedures, visiting procedures, and religious needs while Baker (1990) concentrated on consultation time, professional care, and depth of relationship. Other researchers, Tomes and Ng (1995) conducted content analysis with a total of eight dimensions and renamed the dimension as empathy, understanding of illness, relationship of mutual respect, dignity, food, physical environment, and religious needs.

Camilleri and O'Callaghan (1998) consider the professional and technical care, service personalization, price, environment, patient amenities, accessibility and, catering as suitable dimensions in measuring hospital service quality. Andaleeb (1998) on the other hand, limits his set of variables to only five dimensions: communication, cost, facility, competence, and demeanor. Jun et al. (1998), conducted focus group interviews, identifies the 11 dimensions such as tangibles, courtesy, reliability, communication, competence, understanding customer, access responsiveness, caring, patient outcomes, and collaboration. Five dimensions identified by Hasin et al. (2001) which includes communication, responsiveness, courtesy, cost, and cleanliness. Yet, Walters and Jones (2001) introduced elements, namely: security, performance, aesthetics, convenience, economy, and reliability to measure the service quality in hospital. John (1989) recommends four dimensions of health care service quality: curing, caring, access, and physical environment. Jabnoun and Chaker (2003) used the ten-dimensions: tangibles, accessibility, understanding, courtesy, reliability, security, credibility, responsiveness, communication, and competence. Further, Tracey S. Dagger et.al (2007) used interpersonal quality, technical quality, environment quality, and administrative quality; Huseyin Arasli et.al, (2008) used empathy, giving priority to the inpatients needs, relationships between staff and patients, professionalism of staff, food, and the physical environment; Jayesh P. Aagja, Renuka Garg, (2010) used admission, medical service, overall service, discharge process, and social responsibility and Panchapakesan Padma, et.al (2010) used infrastructure, personnel quality, process of clinical care, administrative procedures, safety indicators, hospital image, social responsibility, and

trustworthiness of the hospital dimensions to study the service quality in hospital.

4. RESEARCH GAP

From the literature review the following gaps are identified:

- There are hardly studies concentrated on inpatient service quality in hospital.
- The construct of hospital service quality has different factors in different studies.
- The studies on service quality in the hospital done mostly adopting the SERVQUAL model.
- The majority of the studies has been done in the context of developed countries, which cannot be generalized to the Indian context. It has been contended that constructs of service quality that are developed in one culture might not be applicable in another culture (Kettinger et al., 1995; Karatepe et al., 2005).

5. OBJECTIVES OF THE STUDY

The objectives of the present study are:

1. To identify the critical factors of inpatient service quality in a hospital
2. To develop the HospitalQual theoretical model to measure inpatient service quality

6. HYPOTHESES OF THE STUDY

The following hypotheses are framed in the study:

- H₁: Medical Service has a significant effect on inpatient service quality
 H₂: Nursing Services have a significant effect on inpatient service quality
 H₃: Supportive Services have a significant effect on inpatient service quality
 H₄: Administrative Services have a significant effect on

inpatient service quality

H₅: Patient Safety has a significant effect on inpatient service quality

H₆: Patient Communication has a significant effect on inpatient service quality

H₇: Hospital Infrastructure has a significant effect on inpatient service quality

7. RESEARCH METHODOLOGY

The present study is explorative and descriptive in its nature. An empirical study was conducted in a public hospital located in Hyderabad, India. Since it became impossible to conduct the focused group discussion (FGDs) with the inpatients, the study initially conducted twenty in-depth interviews to identify the variables of inpatient service quality. Apart from this, people from industry and academia were consulted and also utilized the existing literature in the process of identifying the variables of service quality. However, the inpatients' interviews were used as the focal point, because the study was intended to identify the service quality dimensions from the inpatient's perceptions. The study is adopted a purposive sample method and the data was collected from 246 inpatients through a self administered questionnaire.

7.1 Sample and Sample Characteristics

The respondents of the study were inpatients, those who were about to discharge after the stay of at least three days and above from the public hospital. The rationale for choosing the inpatients with this criterion is that those patients would have experienced all kinds of services provided by the hospital. The 300 questionnaires were administered to the inpatients in the general wards and rooms. The researcher explained the objectives of the study and instructions to respondents. As a result the response rate was 82% with the total valid sample standing at 246. The sample characteristics are as shown in the **Table 1**.

Table 1 Sample Characteristics

Variable	Classification	Frequency	Percentage (%) (based on the sample size of 246)	Variable	Classification	Frequency	Percentage (%) (based on the sample size of 246)
Gender	Female	104	42.27	Annual Income	< 1 Lakh	30	12.19
	Male	142	57.72		1-2 Lakh	40	16.6
Age	< 18	12	4.87		2-3 Lakh	58	23.57
	19-30	60	24.39		3-4 Lakh	68	27.64
	30 to 50	96	39.02		> 4 Lakh	50	20.32
	50 to 70	68	27.64		Cardiology	48	19.51
	>70	10	4.06	Cardio Thoracic surgery	32	13	
Education	Illitrates	18	7.31	Disease Profile of the respondents	Nurology	28	11.38
	Schooling	60	24.39		Gastroenterology	34	13.82
	Undergraduate	75	30.48		Gynaecology	12	4.87
	PG and above	93	37.80		Urology	15	6.09
Occupation	Labour	13	5.28		Nephrology	10	4.06
	Private Employee	103	41.86		Orthopedics	23	9.34
	Government Employee	58	23.57		Nuclear medicine	8	3.25
	Business	72	29.26		General medicine	36	14.63

7.2 Sample Justification

The study has followed the concept of “five subjects for one variable” suggested by Hair et al., (2008), for the determination of the total number of subjects in the sample of the explorative factor analysis. Since there are 39 attributes identified for the study, the ideal sample size should be 195 (39 X 5= 195). The sample of the present study (n= 246) exceeds this requirement by a margin of 51 samples. The sample size of the present study also exceeds the sample size, which is used by some of the scholars those who have developed the scale. The studies used the sample sizes of 201 to purify initial instruments containing about 59 number of items (Churchill et al., 1974; Saxe and Barton, 1982). The study conducted by Parasuraman et al. (1988) used the sample size of 200, Dabholkar et al. (1996) used a sample size of 227 for both stages - scale construction and scale validation and Bahia and Nantel (2000) used a sample size of 115 for both stages.

8. DEVELOPMENT OF THE HOSPITALQUAL THEORETICAL MODEL

The HospitalQual theoretical model was developed based on generally accepted psychological principles of instrument design. (e.g. Nunnally, 1970; Churchill, 1979; Hinkin, 1998).

8.1 Sampling adequacy

Kaiser-Meyer-Olkin (KMO) is a measure of sampling adequacy statistic which indicates the proportion of variance in variables that might be caused by underlying factors. This index ranges from 0 to 1, reaching 1 when each variable is perfectly predicted without error by the other variables. The KMO value must exceed 0.50 for both the overall fit and each individual variable, and the value above 0.8 is considered meritorious (Hair et al., 2008). The KMO measurable value for the sample adequacy of the present study is 0.860.

Table 2 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.860
Bartlett's Test of Sphericity	Approx. Chi-Square	1.05102
	Df	620
	Sig.	.000

8.2 Exploratory Factor Analysis

According to Hair et.al (2008), the primary purpose of factor analysis is to define the underlying structure among the variables by analyzing the structure of the interrelationships (correlations) among the large number of variables (Hair et al. 2008). The final 39 observed variables after preliminary analysis were considered as input for factor analysis. After fulfilling the prerequisites for conducting factor analysis, the next stage is to select the factor

extraction method, rotational method and criteria for the number of factors to extract.

8.3 Factor Extraction and Rotation Methods

In factor analysis, the extraction refers to the process of obtaining underlying factors or components. Principal component factor analysis is more appropriate when data reduction is the primary concern and new meaningful underlying variables are being identified. In the present study the principal component analysis followed and adopted a Varimax rotation to reduce the data either into a smaller number of variables or set of uncorrelated measures.

8.4 Number of Factors to Extract

There are multiple criteria for deciding number of factors to extract. The present study followed a hybrid strategy to extract the factors by following two criteria: Kaiser's criteria (Latent root criterion) and screen test criteria which are commonly used in the social science research to extract factors.

The study used latent root methods as the first criterion to extract the factors. By this criterion the only factors having latent roots or eigenvalue greater than 1 are considered as factors.

The scree plot (**Figure 1**) that is derived by plotting the eigenvalues against the number of factors in their order of extraction and the shape of the resulting curve shows the cutoff point to evaluate the extracted factors.

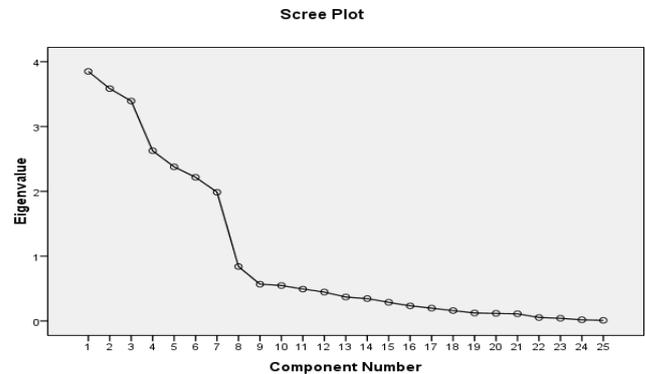


Figure 1 Screen Plot

The result of the total variance and eigenvalues of seven factors is shown in **Table 3**. The table presents the total variance explained by the factor analysis solution and gives an indication about the number of useful factors. The first column under “initial eigenvalues” gives the eigenvalues for all the possible factors in a decreasing order. The second column titled “extraction sums of squared loadings” gives information on factors with eigenvalues greater than 1 after factor extraction. The last part of the table, titled “rotated sums of squared loadings” gives the information on the extracted factors after rotation. The value under the column “Cumulative %” indicates that the seven extracted factors explain 80.167 % of the variance.

Table 3 Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.851	15.404	15.404	3.851	15.404	15.404	3.492	13.969	13.969
2	3.586	14.345	29.749	3.586	14.345	29.749	3.415	13.659	27.628
3	3.394	13.578	43.327	3.394	13.578	43.327	3.050	12.200	39.828
4	2.627	10.507	53.834	2.627	10.507	53.834	2.814	11.257	51.085
5	2.378	9.514	63.348	2.378	9.514	63.348	2.527	10.109	61.195
6	2.218	8.871	72.219	2.218	8.871	72.219	2.425	9.700	70.895
7	1.987	7.948	80.167	1.987	7.948	80.167	2.318	9.272	80.167
8	.839	3.357	83.524						
9	.567	2.270	85.793						
10	.547	2.190	87.983						
11	.492	1.970	89.952						
12	.445	1.782	91.734						
13	.370	1.479	93.213						
14	.345	1.379	94.591						
15	.288	1.151	95.742						
16	.233	.934	96.676						
17	.198	.790	97.466						
18	.160	.640	98.106						
19	.123	.493	98.599						
20	.117	.468	99.068						
21	.111	.444	99.512						
22	.054	.214	99.726						
23	.041	.165	99.891						
24	.018	.074	99.965						
25	.009	.035	100.000						

Extraction Method: Principal Component Analysis.

8.5 Interpretation of Factor Matrix

The study used the three criteria to determine the factor structure. They are: (1) Factor loadings more than +0.40 remained for further analysis in the study (2) items which cross load more than one factor were excluded and (3) the

difference between the cross loadings should be minimum 0.20 (Hair et al., 2008). Fourteen items did not fit these criteria and were dropped from subsequent analysis. A total of 25 items grouped under seven dimensions emerged from the factor analysis as shown in the **Table 4**.

Table 4 Rotated Component Matrix^a

	Component						
	1	2	3	4	5	6	7
MS1	.961						
MS2	.846						
MS3	.956						
MS4	.934						
NS1		.931					
NS2		.933					
NS3		.785					
NS4		.798					
SS1			.955				
SS2			.913				
SS3			.854				
SS4			.952				
AS1				.770			
AS2				.623			
AS3				.872			
AS4				.843			
PS1					.919		
PS2					.977		
PS3					.974		
PC1						.813	
PC2						.914	
PC3						.938	
HI1							.883
HI2							.932
HI3							.796

Extraction Method: Principal Component Analysis.
 Rotation Method : Varimax with Kaiser Normalization.
 a. Rotation converged in 6 iterations.

8.6 Extracted Factors

Interpreting the nature of variables and assigning meaning to the factors is an extremely important consideration in determining the number of factors to extract (Hair, et al., 2008). The process of naming the seven extracted factors is based on

the nature of the variables, judgments by the experts and academicians and examination of the previous research studies. The extracted seven factors, namely: *Medical Service, Nursing Services, Supportive Services, Administrative Services, Patient Safety, Patient Communication, and Hospital Infrastructure.*

Table 5 Final Results of Factor Analysis

Variables	1	2	3	4	5	6	7
Factor 1: Medical Service (MS)							
MS1 Doctor was prompt in attending your need	0.96						
MS2 Doctors listen carefully to your problem	0.84						
MS3 You are satisfied with the time spent by doctors with you during your hospitalization	0.95						
MS4 Adequate information was provided by the doctor about treatment procedures and outcomes	0.93						
Factor 2: Nursing Services (NS)							
NS1 Nurse was prompt in attending to your need		0.93					
NS2 Nurse was given your prescribed medication on time		0.93					
NS3 Nurse was courteous		0.78					
NS4 Nurse was helpful		0.79					

Table 7. Results of ANOVA

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Between People		655.431	823	.796		
Within People	Between Items	1202.316	6	200.386	249.008	.000
	Residual	3973.793	4938	.805		
	Total	5176.109	4944	1.047		
Total		5831.540	5767	1.011		

Grand Mean = 3.3968

9. MULTIPLE REGRESSION ANALYSIS

The multiple regression was used to determine the total effect of the seven factors (dimensions) on the inpatients' service quality (or how well the seven dimensions predicted inpatient service quality) and to assess the relative importance of the individual dimensions. For the regression model the seven extracted factors were considered as the independent variables and the level of overall inpatients' service quality as the dependent variable. The summated scales of each factor were calculated by averaging all values of scale items within the particular factor (Hair et al., 2008). A multiple regression analysis was subsequently conducted to test the hypotheses from H1 to H7. The coefficient of determination "R" is found to be high enough. The adjusted R2 was 0.86 (p < 0.001) yielding seven dimensions

contributing significantly towards explaining the variance in the level of overall inpatient's service quality in hospitals.

9.1 Results of Hypotheses Testing

The proposed hypothesis are tested using multiple regression analysis as shown in the **Table 8**. The model assesses the effect of Medical service, Nursing services, supportive services, administrative services, Patient safety, Patient communication, and Hospital Infrastructure on the overall inpatient service quality of hospitals.

The results of regression analysis shown in the **Table 8** indicates that all the factors have a significant effect on overall inpatient service quality with positive standardized coefficient values. Hence, the proposed seven hypotheses significantly affect the level of inpatient service quality is supported. The summary of hypotheses results is shown in the **Table 9**.

Table 8 Regression Coefficients - Effect of Seven Factors on Inpatient Service Quality Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	R Square
	B	Std. Error	Beta			
1 (Constant)	3.048	.310		9.844	.000	.86
MS	.062	.029	.075	2.145	.032	
NS	.66	.029	.079	2.242	.025	
SS	.082	.029	.099	2.836	.005	
AS	.078	.036	.077	2.197	.028	
PS	.059	.038	.055	2.246	.023	
PC	.068	.032	.074	2.101	.036	
HI	.045	.038	.041	9.168	.000	

a. Dependent Variable: IPSQ

Table 9: Results of Hypothesis Testing

Hypothesis	t value	P value	Results
H1: Medical Service has a significant effect on inpatient service quality	2.145	0.032	Accepted
H2: Nursing Services have a significant effect on inpatient service quality	2.242	0.025	Accepted
H3: Supportive Services have a significant effect on inpatient service quality	2.836	0.005	Accepted
H4: Administrative Services have a significant on inpatient service quality	2.197	0.028	Accepted
H5: Patient Safety has a significant effect on inpatient service quality	2.246	0.023	Accepted
H6: Patient Communication has a significant effect on inpatient service quality	2.101	0.036	Accepted
H7: Hospital Infrastructure has a significant effect on inpatient service quality	9.169	0.000	Accepted

10. CONCLUSION

The present study explains the process of developing the HospitalQual theoretical model. The exploratory factor analysis resulted in seven critical factors of perceived inpatient service quality in the hospital. Multiple regression analysis was used to test the hypotheses about the significant effect of extracting critical factors i.e. medical service, nursing service, support services, administrative services, patient safety, patient communication, and hospital infrastructure on overall inpatient service quality in the hospital. The test proved that all the factors have a significant effect on inpatient service quality. In addition, the supportive services are found to be the most important factor to predict the overall inpatient service quality, followed by nursing services, administrative services, medical services, patient communication, patient safety, and hospital infrastructure.

The application of HospitalQual would help to identify the gaps in each of the dimensions over a period of time and enable hospital administrators to monitor, control, and improve the inpatient service quality. Thus, the HospitalQual will help in pinpointing the areas of managerial attention and action to improve inpatient service quality in hospitals. The present study has limitations of generalizability of the research findings across hospitals in other parts of the state and the country. However, the HospitalQual theoretical model needs to be validated for the generalization with advanced statistical tools like Structure Equation Modeling (SEM). In essence, the study highlighted the critical factors of service quality and demonstrated in the context of inpatient hospital services.

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