

SERVICE QUALITY SCALE FOR MEASURING HOSPITAL SERVICES FROM THE PERSPECTIVE OF IN-PATIENTS CHALLENGED BY NCDS

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Abstract

Hospitals are facing significant challenges in today's scenario because of the intense competition and changing perception of the patients towards hospital services. Depending on the condition of the patients and stage of the illness, hospital service providers should provide personalized services. Service providers should think of possible ways to make the patients feel comfortable with the main objective of speedy recovery from illness or disease. The objective of this research paper is to find out the constituent factors of hospital service quality for in-patients challenged by non-communicable diseases. In the present study, explorative and descriptive research design has been used. The questionnaire was administered to 85 in-patients with a random stratified sampling technique. The study was conducted in Bangalore hospitals who provide services to non-communicable diseases. Factor analysis and the multiple regression analysis techniques were used to analyze the data collected. The present study has recognized the factors to measure the hospital service quality with six dimensions, namely; Inspiring Confidence (6 Items), Responsiveness (4 Items), Contributing Factors (4 Items), Reliability (3 Items), Assurance (2 Items) and Tangibles (2 Items). The dimensions will help in identifying the gaps in each factor and helps the hospital authorities/top management to enhance the overall service quality of the hospital.

Keywords: Hospital Service Quality, Non-Communicable Diseases (NCDs), In-Patients.

Introduction

Service quality in the hospitals is one of the major concerns not only for hospital management but also to patients. Service providers should customize their services based on the requirements, conditions, contexts and the mindset of the patients. The providers should have the sensitivity regarding the requirement of services for both in-patients and out-patients vary from time to time. The identification of the determinants of the hospital service quality is one of the critical issues before services research (Johnston, 1995). Unlike other sectors, hospital sector directly deals with human lives and hence it's approach towards the patients and their caretakers should be entirely different from that of other sectors (Kritchanchai, D., 2012).

In-patients challenged by non-communicable diseases are chosen due to significant growth in these chronically occurring diseases because of complexity in life, change in lifestyle, modernization, urbanization, anxiety, unbalanced diet and stress. The compound annual growth rate of patients challenged by these illnesses from 2008-18 has increased to 18 percent for cardio vascular diseases, 16 percent for cancer and 19 percent for diabetes (IBEF 2015). Furthermore, patients challenged by these diseases are experiencing stress related to service quality, hospitalization and illness. Hence, they need altogether a different approach while delivering services and this has to be considered while determining the dimensions of service quality. Hence, the present study is an attempt to develop an instrument for measuring perceived in-patient service quality in the context of hospitals situated in Bangalore who provide services to patients challenged by NCDs.

Service Quality

Service quality is a process of assessing delivered service and customer's expectations and understanding as to how well a perceived service meets the client's expectations.

Hospital service quality consists of two dimensions such as technical and functional (Gronroos 1984), Technical side of the hospital service delivery refers to what exactly is delivered to the patients and functional side of the hospital services refers to aspects related to the delivery

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mechanism of the hospital services. Over the years, few more dimensions got added along with technical and functional dimensions such as end results of the service, different measures adopted to deliver the services, interpersonal, environment, enabling aspect and administrative aspect dimensions. Outcome of the service relates to the technical dimension that was suggested by Gronroos classification and the process (approaches or techniques) of service delivery and other dimension relates to the Gronroos functional (the way the services are delivered) side of quality. Service quality has multidimensions and has to be viewed from different angles in order to get a better insight about the concept. However, measuring service quality is a challenging proposition since the measurement depends in accordance with the expected benefits and the perceived results.

Hospital Service Quality Dimensions – Review of Literature

The literature reviewed in the present study offers various dimensions from different perspective and in different context in evaluating hospital service from the perspective of patients. The studies reveal distinction and a plenty of dimensions and methodology to develop the construct discussed. It has been argued that service quality is a simple Uni-dimensional construct in some aspects, but a compound multidimensional construct in others (Babakus and Boller 1992). SERVQUAL instrument for measuring patient satisfaction is the most widely used tool. From the above literature review, it is observed that some studies have proved the reliability of SERVQUAL model and few studies have confirmed 5 generic dimensions of SERVQUAL instrument. Whereas, in some studies researchers have modified the same instrument either by reducing the number of dimensions or by adding the dimensions.

It is also observed that some identifiable dimensions have been considered based on country specific cultural practices. Despite this variation, the 5 dimensions of SERVQUAL were used in the questionnaire or mentioned in some other form. Few studies have adopted or modified SERVQUAL and found SERVQUAL, as a standard instrument for measuring functional service quality, which was found to be reliable and valid in a hospital environment. Few studies have revealed that SERVQUAL items did not load onto their respective dimensions and the 5-component structure of scale did not support. With the exception of studies of Sohali (2003); Jabnoun and Chakar (2003); Rohin and Mahadevappa (2006); other studies have revealed SERVQUAL items did not load onto their respective dimensions and the 5-component structure of scale did not support. Parasuraman's SERVQUAL model has "Business aspect". In healthcare services, personal concerns have to be addressed delicately and "Personal aspect" is missing in the SERVQUAL model.

Research Gap

After reviewing the literatures related to hospital service quality, the following gaps have been identified:

- Very few studies are conducted on in-patient hospital service quality
- Different studies have used different dimensions of service quality
- Most of the studies have considered SERVQUAL model and few studies have modified the SERVQUAL model.
- None of the studies are specific to the diseases since the condition of the patients varies depending on the type of disease. Hence, service providers should consider this while providing the services.

Objectives of the Study

i. To find out the constituent factors of service quality applicable to patients challenged by non-communicable diseases.

ii. To develop the theoretical model to measure hospital service quality

Hypothesis of the Study

H₁: Factor 1, Inspiring Confidence has a significant impact on hospital service quality

H₂: Factor 2, Responsiveness has a significant impact on hospital service quality

H₃: Factor 3, Contributing Factors has a significant impact on hospital service quality

H₄: Factor 4, Reliability has a significant impact on hospital service quality

H₅: Factor 5, Assurance has a significant impact on hospital service quality

H₆: Factor 6, Tangibles has a significant impact on hospital service quality

Research Methodology

An empirical study was conducted using explorative and descriptive research design at hospitals providing services to patients challenged by non-communicable diseases in the city of Bangalore. The study initially conducted extensive literature review and Delphi technique to identify the variables of hospital service quality for the in-patients challenged by NCDs.

Sample and Sample Characteristics

The study has adopted a random stratified sampling technique and the data was collected from 125 in-patients/caretakers of which only 55 responses were considered for data analysis. The response rate is 55.2%. The sample characteristics are as follows:

Table 1 – Sample Characteristics of the Patients Challenged by NCDs

Demographic	Category/class	Percent
Type of chronic disease	Cancer	30.7
	Diabetes	38.2
	Cardiovascular	31.1
Gender	Male	60.0
	Female	40.0
Income	Deprived (<1.5 lakhs p.a)	9.9
	Aspirers (1.5-3.4 lakhs p.a)	16.3
	Middle Class (3.4 - 17 lakhs p.a)	41.7
	Rich (>=17 lakhs p.a)	32.1
Age group	<25	7.8
	26-35	2.5
	36-45	12.2
	46-55	32.2
	56-65	9.3
	>66	36.1
Time since suffering	<=1 year	32.7
	1-2 years	28.8
	2-5 years	14.4
	5-10 years	24.1

Sample Justification

The present research study has adopted the concept of “five subjects for one variable” (Hair et al., 2008) for determining the sample size for the explorative factor analysis. There are 24 variables in the research instrument for the study, hence the ideal sample size would be 120 (24x5=120). The sample size for the present study (n=125) exceeds this requirement by a margin of 5 samples. The sample size also exceeds the sample size of few other studies used by some of the scholars. The

sample size of 115 was determined for both stages; scale construction and scale validation (Bahia and Nantel 2000).

Development of the Hospital Service Quality Theoretical Model

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

Sample adequacy

To ensure that the data is suitable for factor analysis, two tests such as Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and the Bartlett's test of Sphericity are performed (Pallant, 2007). 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. It can be considered as adequate if the KMO value is greater than 0.6 (Kaiser and Rice, 1974).

As indicated from the below Table 2, it is observed that KMO value was acceptable, as its value was found to be 0.754 which is indicative of a data set considered to be highly desirable for factor analysis (Kim and Mueller, 1978).

The multivariate normality of the set of distributions was tested by using the Bartlett's test of sphericity. This method also tests whether the correlation matrix is an identity matrix. The factor analysis would be meaningless with an identity matrix. A significance value of $p=0.00$ shows that the data do not produce an identity matrix or differ significantly from identity (Kim, et al., 1978). The analysis focusing on the Bartlett's Sphericity of the distribution allowed rejecting the hypothesis according to which the matrix would be unitary (Approx. Chi-square 62041.527, degree of freedom 276, $p 0.0000$). This analysis indicates that the data is thus approximately multivariate normal and acceptable for factor analysis.

Table: 2 - KMO and Bartlett's Test

KMO and Bartlett's Test			
Kaiser-Meyer-Olkin Adequacy.	Measure of Sampling		.754
Bartlett's Test of Sphericity	Approx. Chi-Square		1.00527
	Degree of Freedom		576
	Sig.		.000

Exploratory Factor Analysis

EFA (Exploratory factor analysis) is a method for data exploration and to find out the structure of factors to be analyzed. The main objective of running a factor analysis is to minimize the number of variables "while the amount of information in the analyses maximized" (Stewart, 1981). The sole purpose of exploratory factor analysis is to determine the number of factors that explain the correlations (Kinnear and Gray 2010). Data interpretation and data parsimony is the underlying principle of factor analysis (Zikmund, 2003). In this instance, items are reduced to common interrelated and meaningful dimensions with a very limited information loss (Hair et al., 2006).

The final 24 observed variables after initial analysis were considered as input for factor analysis. After completing the pre-requirements for conducting factor analysis, the next step is to select the factor extraction method, rotational method and criteria for the number of factors to extract.

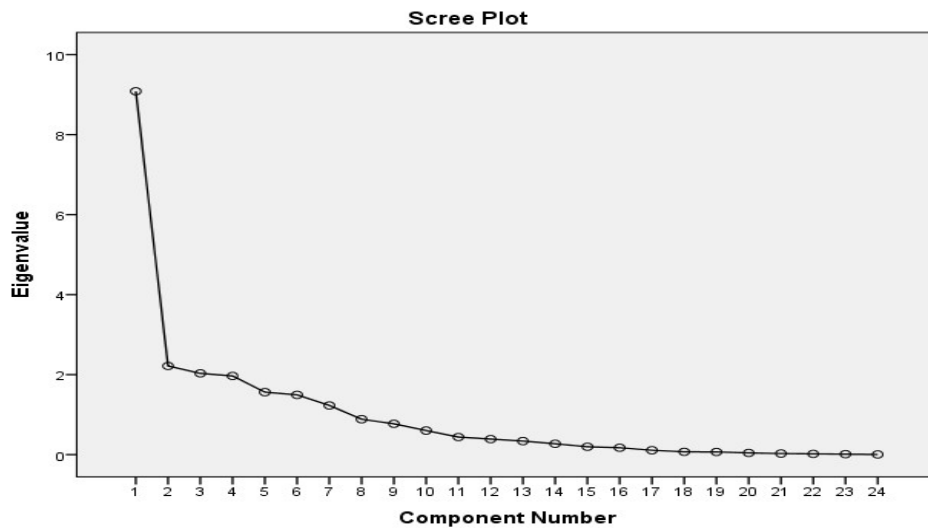
Factor Extraction and Rotation Methods

The extraction refers to the process of obtaining underlying factors. The Principal component analysis is the most common method of factor analysis (Kinnear & Gray, 2010; Cooper & Schindler, 2008) and the most common technique of factor rotation is the varimax rotation (Kinnear & Gray, 2010; Zikmund et al., 2010). The principal component method is followed and Varimax rotation is adopted to reduce the data into a lesser number of variables.

Number of Factors to Extract

The hospital service quality was tested using principal component factor analysis with varimax rotation. Gilbert et al., (2004) and Akbaba (2006) had also considered principal component and varimax procedure in their respective studies. A hybrid strategy, Kaiser’s criteria and scree test criteria are adopted to extract factors. The first criterion method, latent root is used to extract the factors having latent roots or eigen value more than one are considered as meaningful factors in the present study. The figure 1 indicates the scree plot that is derived by plotting the eigen values next to the number of factors in the order of extraction and also shows the cutoff point to assess the extracted factors.

Figure 1 - SCREE PLOT



With Principal component analysis six factors were retained depending on the Eigen values and variance explained as per the Table 3. The six extracted factors explain 76.482 of the variances.

Table 3: Factor structure extracted from Exploratory Factor Analysis with Eigen values and variance explained

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	9.085	37.853	37.853	9.085	37.853	37.853	4.391	18.297	18.297
2	2.216	9.235	47.089	2.216	9.235	47.089	3.795	15.810	34.108
3	2.031	8.463	55.552	2.031	8.463	55.552	3.300	13.750	47.858
4	1.967	8.196	63.747	1.967	8.196	63.747	2.432	10.134	57.992
5	1.563	6.511	70.258	1.563	6.511	70.258	2.373	9.886	67.878
6	1.494	6.224	76.482	1.494	6.224	76.482	1.832	7.632	75.510
7	1.230	5.124	81.605	1.230	5.124	81.605	1.463	6.095	81.605
8	.885	3.689	85.295						
9	.771	3.212	88.507						
10	.602	2.509	91.015						
11	.439	1.831	92.846						
12	.388	1.615	94.462						
13	.338	1.409	95.870						
14	.271	1.130	97.001						
15	.197	.822	97.823						
16	.172	.717	98.540						
17	.109	.453	98.993						
18	.070	.294	99.287						
19	.067	.279	99.566						
20	.042	.175	99.741						
21	.027	.114	99.856						

22	.018	.075	99.931						
23	.013	.053	99.983						
24	.004	.017	100.000						
Extraction Method: Principal Component Analysis.									

Interpretation of Factor Matrix

Total variance explained (76.482) by the six components exceeds the 60 percent threshold commonly used in social sciences to establish satisfaction with the solution (Hair et al., 1995). Three items did not fit the criteria and were not considered for further analysis. A total of 21 items under six factors derived from the factor analysis as shown in Table 4.

Factor Extraction Results of Service Quality Measurement items

Table 4: Rotated Component Matrix (Varimax with Kaiser Normalization)

Rotated Component Matrix ^a	Component					
	1	2	3	4	5	6
1. Doctors provides full information regarding the treatments to the patient.	0.868					
5. Behavior of hospital staff instills confidence and trust in patients.	0.768					
12. The nurse understands the individual problems and concerns of patients.	0.738					
9. The doctor always provides proper and convincing knowledge regarding the condition of the patient	0.645					
17. The teamwork among the doctors, nurses and staff in the hospital is very good	0.644					
14. Hospital staff always keeps patients’ best interest at heart.	0.543					
21. You had not suffered from hospital infection after 24 hours of admission		0.839				
4. Doctors gives priority to help the patients despite being busy.		0.764				
3. Nurses in the hospital are always willing to respond to the patients.		0.747				
19.Overall reputation of the hospital is excellent.		0.548				
8. Hospital has latest equipment and facilities to provide the treatments.			0.885			
2. This hospital will give prompt services to the patient			0.777			
13. The doctors very well understand the problems and concerns of the patients			0.605			
22.The hospital is open to preventive methods such as Yoga and Homeopathy			0.499			

16. The service provided by the hospital do not change much even if there is a change in the doctor, nurse or a staff				0.863		
10. The services of the hospital are affordably priced.				0.554		
15. The caring attitude of the hospital staff is not fluctuating				0.523		
6. Patients in general feel safe in their transactions with the hospital					0.912	
7. Always the hospital staff are positive in their behavior					0.697	
18. The records and diagnosis system of the hospital is always error free.						0.799
11. The overall ambience of the hospital made up of well-dressed staff and good physical facilities makes it worth visiting.						0.542
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 8 iterations.						

Extracted Factors

The next step is to interpret and give meaningful names to the factors which is considered to be a significant aspect (Hair, et al., 2008). The process of giving names to the six extract factors is based on the nature of the variables, judgements given by the experts and academicians and scrutiny of the previous research studies. The extracted six factors, namely: Inspiring Confidence, Responsiveness, Contributing factors, Reliability, Assurance and Tangibility.

Reliability of the Hospital Service Quality Theoretical Model

Reliability is the extent to which the instrument is able to yield the same results even after taking repeated measurements of the same individuals under the same conditions (Hair, 2006). The characteristics of a good measurement can be evaluated by adopting reliability and validity tools that involves measuring accurate and applicable results (Malhotra, 2004; Cooper and Schindler, 2001). The important reason for conducting validity and reliability is to develop a measurement that reproduce a true score of the variables being measured (Churchill and Iacobucci, 2002). The Cronbach's alpha that is considered to be appropriate with 5-point Likert scale data is the test used to measure the reliability of the instrument (Hair, et al., 1998; Green et al., 2000; Pallant, 2007). Several studies have considered reliability to test their modified service quality scale that ranged from 0.6 to 0.96, although it decreases to 0.60 in exploratory research (Malhotra, 1993; Dabholkar, Thorpe & Rentz 1996; Sureshchanar, et al., 2002; Jabnoun et al., 2005; Akbaba, 2006; Caro & Garcia, 2007; Chowdhary & Prakash, 2007). In the present study, the researcher had used Cronbach alpha coefficient which is the most common method for assessing reliability and 0.6 will be used as the minimal accepted level (Cronbach 1951).

The results of the test showed that the hospital service quality scale is a very much reliable instrument registering an overall Cronbach alpha value of 0.911.

Reliability Statistics

Cronbach's Alpha	N of Items
.911	24

The reliable measures of the six extracted critical factors of Hospital service quality are illustrated in Table 6. The six factors have high Cronbach's alpha values as displayed below and all of these factors contribute the largest part of the variance of the hospital service quality theoretical model.

Table 6 Reliability Results of Hospital Service Quality Dimensions

DIMENSIONS	ALPHA RELIABILITY
1. Inspiring Confidence (6 Items)	0.896
2. Responsiveness (4 Items)	0.826
3. Contributing Factors (4 Items)	0.767
4. Reliability (3 Items)	0.722
5. Assurance (2 Items)	0.877
6. Tangibles (2 Items)	0.720

The range of Cronbach alpha for the dimensions of hospital service quality was 0.72 to 0.896, adhering to the minimum value of 0.70 as suggested by Nunnally (1978).

Cronbach's alpha has been shown to be Alpha of 0.911 which indicates good internal consistency reliability.

Validity of the Hospital Service Quality Theoretical Model

The validity of a measure refers to the extent to which research instrument (questionnaire) measures what is intended to be measured. Content or face validity of the instrument would be ensured if the questionnaire is appropriately designed through a comprehensive review of relevant literature, in-depth interviews and then fine-tuned based on the suggestions from various experts and professionals (Kaplan & Saccuzzo, 1993).

The ANOVA test was administered to validate the scale. As illustrated in the table 7, the results of the theoretical model indicate that all the dimensions of hospital service quality, statistically important and these dimensions are significantly describing the model.

Table 7 Results of ANOVA

ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	607.493	6	101.249	1078.555	.000 ^b
Residual	186.717	1989	.094		
Total	794.210	1995			

a. Dependent Variable: Overall service provided by the hospital is consistently good

b. Predictors: (Constant), REGR factor score 6 for analysis 1, REGR factor score 5 for analysis 1, REGR factor score 4 for analysis 1, REGR factor score 3 for analysis 1, REGR factor score 2 for analysis 1, REGR factor score 1 for analysis 1

9. Multiple Regression Analysis

Multiple regression analysis is used to measure perceived quality at a range of facility types for in-patients and out-patients (Rao et al. 2006). In a study by Rao et al., 2006, multivariate regression analysis is performed to find the significance of the hospital service quality dimensions in explaining the variance in the overall perception of the hospital environment.

Table 8 that shows Regression analysis results for service quality dimensions displays the standardized beta coefficients that provides the relative importance. The most important dimensions are determined by the dimension with the largest coefficient in terms of its influence on overall service quality perceptions. The second most influential dimensions and so forth is represented by the next largest coefficient.

Summary of regression analysis considering service quality dimensions as predictors and overall perception of service quality as criterion variable is shown in Table 7. As observed from Table 7, the overall regression model was significant ($F=1078.555$, $p<0.00$). With reference to the relationship between individual dimensions and overall service quality rating, the adjusted R square which is equal to 0.764 was statistically significant. As per the below table of Model summary, it was suggested that the hospital service quality dimensions explained 76 percent of the variance in the patients' overall rating. It means that 24 percent of overall hospital service quality was explained by something other than the service quality dimensions.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.875 ^a	.765	.764	.30639

a. Predictors: (Constant), REGR factor score 6 for analysis 1, REGR factor score 5 for analysis 1, REGR factor score 4 for analysis 1, REGR factor score 3 for analysis 1, REGR factor score 2 for analysis 1, REGR factor score 1 for analysis 1

**Table 8 Regression Analysis Results for Service Quality Dimensions
Regression Coefficients – Effect of Six Factors on In-Patient Service Quality Coefficients^a**

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	2.150	.007		313.476	.000
Inspiring Confidence	.173	.007	.274	25.157	.000
Responsiveness	.337	.007	.534	49.119	.000
Contributing Factor	-.017	.007	-.026	-2.427	.015
Reliability	.388	.007	.615	56.557	.000
Assurance	.097	.007	.154	14.154	.000
Tangibles	-.031	.007	-.050	-4.573	.000

a. Dependent Variable: Overall service provided by the hospital is consistently good

As observed from Table 8, the overall perceived hospital service quality was influenced by six dimensions with “Reliability” as the most significant, beta coefficient = 0.615.

the patients tend to make service quality judgements based on these six dimensions in order of importance as shown in the regression equation. “Reliability” factor has achieved the strongest association with the overall perception of hospital service quality.

“Responsiveness”, “Inspiring confidence”, “Assurance”, “Tangibles” and “Contributing” were decisive factors in making up overall service quality perception. Among all the variables in the regression, “Contributing factors” appeared to have least association (with beta coefficient = 0.026) with overall service quality. This shows that the patients perceive “Contributing factors” i.e., latest equipment and facilities, providing prompt services, understanding the problems and concerns of the patients and the hospital’s openness to preventive methods such as Yoga and Homeopathy as the least important for influencing their service quality perceptions.

The results show that the patients gave importance to all of the hospital service quality dimensions in judging the overall service expected by the patients. Reliability has drawn maximum importance followed by Responsiveness, Inspiring Confidence, Assurance, Tangibles and Contributing factors.

Results of Hypothesis Testing

Hypothesis	t Value	P Value	Results
H ₁ : Inspiring Confidence has a significant impact on in-patient service quality	25.157	.000	Accepted
H ₂ : Responsiveness has a significant impact on in-patient service quality	49.119	.000	Accepted

H ₃ : Contributing Factors has a moderate impact on in-patient service quality	-2.427	.015	Accepted
H ₄ : Reliability has a significant impact on in-patient service quality	56.557	.000	Accepted
H ₅ : Assurance has a significant impact on in-patient service quality	14.154	.000	Accepted
H ₆ : Tangibles has a significant impact on in-patient service quality	-4.573	.000	Accepted

Conclusion

Service quality in hospitals is a subjective, multi-dimensional and complex concept. The present study illustrates the steps for developing the Hospital Service Quality theoretical model. By adopting exploratory factor analysis, six critical factors of in-patient service quality challenged by non-communicable diseases were identified. Multiple regression technique was used to find out the effect of critical factors such as reliability, responsiveness, inspiring confidence, assurance, tangibles and contributing factors on hospital service quality from the perspective of in-patient challenged by non-communicable diseases. The results of the present study show that all the factors of service quality have a significant effect on in-patient service quality. While, the “Reliability” factor is found to be the most vital factor to assess the overall service quality from the perspective of the in-patient challenged by NCDs. Other factors which follow “Reliability” factor are Responsiveness, Inspiring Confidence, Assurance, Tangibles and Contributing factors. The services rendered by the providers should be customized and personalized based on the conditions of the patients. For instance, patients challenged by non-communicable diseases such as cancer, diabetes, cardio vascular diseases and so are very sensitive because of the illness and disease conditions. Such patients are more anxious and stressed, hence along with the clinical ailments proper interventions need to be provided with personalized services. The implementation of the model would help in narrowing down the gaps and also helps the administrators to enhance the quality of services provided in the hospital.

Patients experience stress upon hospitalization and these factors cause them more stress. Therefore, doctors, nurses and other staff should be properly trained and have required qualification in order to effectively handle challenges experienced by patients within the hospital area. They should be trained to provide good quality of services consistently, inspire trust, by keeping up the promises with little fluctuations in quality and consistency in caring. The caring attitude of the hospital staff, affordable prices of the services and consistency in delivering services are effective in influencing patient’s general evaluation on the hospital service quality.

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