

# A Six Dimension Service Quality Measurement of Health Care Sectors



P.S.Prema Kumar, G. Rambabu

**Abstract:** Out of all the service sectors, health care sector is one of the essential sectors. As the population is increasing day by day, there is lot of demand for the health care service providers from the birth to till the end of the breath of mankind. So, patients are looking towards the good healthcare service provider. This paper explains how to measure the service quality of health care sectors by using six dimensions based on the past research. They are safety and security, tangibles, responsiveness, assurance, empathy and reliability. Data was collected from the patients using a survey questionnaire. Factor analysis was done for the variable's reliability and convergence validity. Relative weight analysis also carried out to determine the priority of the service quality dimensions.

**Index Terms:** Confirmatory Factor Analysis, Health care service quality and Patient's satisfaction.

## I. INTRODUCTION

In the past there was research on service quality of health care sectors. Where the service quality is measured using different techniques. By responding properly to the expectations of the customer, administrators can have options to develop a model [1]. A twenty two instrument was developed by Parasuraman et al. [2] and the data was collected based on the developed instrument. There are likert items in the likert scale used to take the responses from the customers. This combination gives a quantifiable measure of a character [3]. Ioannis E. Chaniotakis proved that service quality effects on publicity and patient satisfaction of the health care sectors [4] and there was research on patient satisfaction [5]. LISREL 8.8. used to calculate the statistics related parameters like mean, standard deviation, and path diagram analysis etc[6]. A study was made on the service quality parameters which influence the patient satisfaction [7] and [8]. The main purpose of this study was to derive the SERVQUAL factors in health care sector. The study was guided by the service quality model which was prepared with six dimensions of health care service quality namely: Responsiveness, Safety & Security, Assurance, Tangibles, Empathy and Reliability. This study implemented a descriptive research design methodology.

**Revised Manuscript Received on 30 July 2019.**

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## II. IDENTIFICATION OF FACTORS AND SUB-FACTORS OF HEALTH CARE SERVICE QUALITY

### A.Safety and security:

The following sub-factors are considered under safety and security

- Personal privacy (SAS1)
- Confidentiality of patients' information (SAS2)
- Comfortable and safe Hospital Environment (SAS3)
- Correct Diagnosis (SAS4)

### B.Assurance:

The following sub-factors are considered under assurance

- Commitment (ASU1)
- Accountability (ASU2)
- Confidence in Diagnosis and Treatment (ASU3)
- Skill, ability and competency of providers (ASU4)

### C.Tangibles:

The following sub-factors are considered under tangibles

- Availability of Advanced Medical Equipment (TAN1)
- Availability of Advanced Skills and Knowledge Medical Staff (TAN2)
- Infrastructure Facilities (TAN3)
- Overall cleanliness of the hospital (TAN4)

### D.Empathy:

The following sub-factors are considered under empathy

- Polite Attitude of Employees (EMP1)
- Individual Attention (EMP2)
- Compassion (EMP3)
- Emotional Support (EMP4)

### E.Reliability:

The following sub-factors are considered under reliability

- Consistent and correct service delivery (REL1)
- Meeting deadlines for Medical and diagnostic services (REL2)
- Regular Monitoring of Health status (REL3)
- Clear Understanding of Specific patient needs (REL4)

### F.Responsiveness:

The following sub-factors are considered under responsiveness

- Service appropriateness (RES1)
- Promptness of service delivery (RES2)

- Service availability (RES3)
- Quick and simple process of admission and Discharge (RES4)

III. CONFIRMATORY FACTOR ANALYSIS

Confirmatory factor analysis (CFA) is a practical statistical method to verify the structure of a group of observed variables. To test the hypothesis CFA is adopted. Where there is a relationship obtained between observed variables and the existing latent constructs. The fit of the service quality model is compared with domain models using CFA [9]. The confirmatory factor analysis was executed through LISREL 8.8. If the ratio of Chi-square value to degrees of freedom is in the range 1.0-5.0 then it is a model fit. GFI, AGFI, NNFI, NFI and CFI are approximate fit indices in which if obtained value is above 0.9 indicate that it is a model fit. For another fit index, root RMSEA value less than 0.08, RMSR value less than 0.05 would indicate reasonable model fit. The threshold values of propriety indicators are shown in Table 1.

Table 1: Propriety Indicators for Ideal Figures

Indicators	Propriety Indicators	Ideal Figures
Absolute Propriety Indicators	$\chi^2/d.f$	1.0 – 5.0
	Goodness of fit index (GFI)	>0.90
	Adjusted goodness of fit index (AGFI)	>0.90
	Standardized root mean residual (SRMR)	≤0.05
	Root mean square error of approximation (RMSEA)	≤0.08
Relative Propriety Indicators	Non-normed fit index NNFI	≥0.90
	Normed fit index (NFI)	≥0.90
	Comparative fit index (CFI)	≥0.90

A. Conceptual Structural Model

The structural model is primarily concerned with the interrelations between the latent variables namely: Safety and Security, Assurance, Tangibles Empathy, Reliability and Responsiveness with Patient’s satisfaction.

H1: Responsiveness measures the patient satisfaction in Health care service quality

H2: Security and Safety measures the patient satisfaction in Health care service quality

H3: Assurance measures the patient satisfaction in Health care service quality

H4: Tangibles measure the patient satisfaction in Health care service quality

H5 Empathy measures the patient satisfaction in Health care service quality

H6: Reliability measures the patient satisfaction in Health care service quality

IV. DETERMINATION OF RELATIVE WEIGHTS

The patients in the health care providers were selected for survey, they were the actual agents required to measure the service quality. Therefore, twenty-four key factors were used for the questionnaire. On each of these twenty four factors, stakeholders were asked to specify the level to which that factor influences the patients to the healthcare service quality. Based on five-points the responses were recorded. Relative Importance Index (RII) helps in determine the role of a particular factor which makes the prediction of a criterion factor by itself and in combination with other factors. In the calculation of the RII, the below formula was used:

$$RII = \frac{\sum W}{A * N}$$

Where, W—weighting given to each answer by the patients (1 to 5) ; 1. Totally Disagree 2. Disagree 3. Neutral 4. Agree 5. Totally Agree

A—Higher response integer (5); and N—total number of patients answered.

V. CASE STUDY

This study consisted of the entire 304 stakeholders (Patients) undergone treatment in different hospitals in India. The study was made by collecting data through a structured questionnaire. The study figured out that service quality as perceived by customer’s satisfaction how well service relates expectations. The study recommends that the workforce to be the focus of perfection because it is the service team that influences service quality standards and more significantly it’s during the service rendered where the patient forms the last judgment on quality in service. In this research, the responses are taken from the patients of various private and government hospitals. Based on Likert scale of 5 point the survey was conducted for the factors mentioned in the above section. Those hospitals are distributed in various districts of the state and it is purely self-administered survey.

VI. RESULTS AND DISCUSSION

Results obtained are tabulated, gives the mean, standard deviation and the Cronbach’s Alpha. It is observed that for all the factors Cronbach’s Alpha values are greater than 0.85, which ensures the internal consistency and validity of the constructs [10]. The obtained data is shown in the table 2.

Table:2 Cronbach’s Alpha

Construct	Item	Mean	St.Dev	Cronbach’s Alpha
RES	RES1	4.148	0.8009	0.9044



	RES2	3.9737	0.717	0.9003
	RES3	3.9342	0.6862	0.9009
	RES4	4.2664	0.6172	0.903
SAS	SAS1	3.9178	0.7105	0.8991
	SAS2	3.9211	0.7132	0.9013
	SAS3	3.8257	0.836	0.9037
	SAS4	3.625	0.7945	0.9002
ASU	ASU1	4.102	0.574	0.9023
	ASU2	4.0362	0.6413	0.9031
	ASU3	4.0789	0.619	0.9039
	ASU4	4.1349	0.7523	0.9019
TAN	TAN1	3.1349	0.8853	0.9001
	TAN2	3.0197	0.9645	0.9028
	TAN3	3.0658	1.0093	0.9032
	TAN4	3.3816	1.0558	0.9033
EMP	EMP1	4.6349	0.5584	0.9064
	EMP2	4.5888	0.669	0.9054
	EMP3	4.6316	0.565	0.9053
	EMP4	4.6283	0.6267	0.9054
REL	REL1	4.0296	0.6312	0.9031
	REL2	3.9868	0.6447	0.9035
	REL3	4.1579	0.6252	0.9045
	REL4	4.0674	0.5366	0.904

The average variance extracted (AVE) for each of the constructs of RES, SAS, ASU, TAN, EMP and REL are 0.55, 0.56, 0.54, 0.67, 0.47 and 0.69 respectively are almost greater than threshold value of 0.5 as shown in the table 3 indicates latent variables had reliability and convergence validity. Composite reliability (CR) is greater than threshold value 0.7 indicates the overall reliability of the factors.

**Table3:** AVE and CR

Construct	Item	Standardized Factor Loadings	Composite Reliability	AVE
RES	RES1	0.51	0.83	0.55
	RES2	0.87		
	RES3	0.89		
	RES4	0.65		
SAS	SAS1	0.83	0.84	0.56
	SAS2	0.78		
	SAS3	0.6		
	SAS4	0.77		
ASU	ASU1	0.76	0.82	0.54
	ASU2	0.81		

	ASU3	0.77		
	ASU4	0.56		
TAN	TAN1	0.84	0.89	0.67
	TAN2	0.86		
	TAN3	0.87		
	TAN4	0.68		
EMP	EMP1	0.66	0.78	0.47
	EMP2	0.69		
	EMP3	0.78		
	EMP4	0.59		
REL	REL1	0.81	0.9	0.69
	REL2	0.79		
	REL3	0.85		
	REL4	0.88		

The model fitting process involves determining the goodness-of fit between the hypothesized model and the sample data. The Chi square goodness of fit metric from the software is obtained as 1025.64. Table 4 shows the propriety indicators from the research findings.

**Table 4: Propriety Indicators for Research Findings**

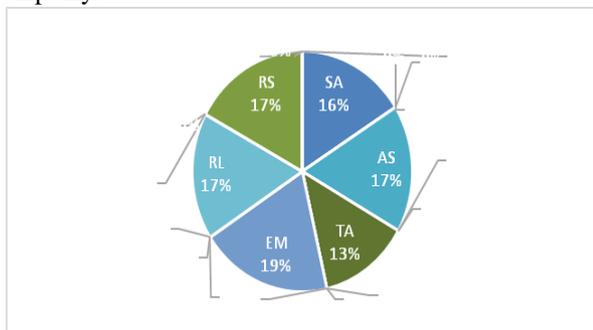
Indicators	Propriety Indicators	Research Findings
Absolute Propriety Indicators	$\chi^2 / d.f$	4.1
	GFI	0.78
	AGFI	0.73
	SRMR	0.052
	RMSEA	0.102
Relative Propriety Indicators	NNFI	0.91
	NFI	0.89
	CFI	0.92

It indicates a good model fit. The chi square tests the hypothesis where the model is consistent with the pattern of co-variation among the observed variables. In the case of the chi-square statistics, smaller rather than larger values indicate a good fit. Hence In this study, the confirmatory factor analysis with six constructs having twenty four items is a valid measurement model.

Therefore,



the measurement model of healthcare service quality suggests a reasonably acceptable fit to the data as there were enough evidences to accept all the propositions ( $H_1$ ,  $H_1$ ,  $H_3$ ,  $H_4$ ,  $H_5$  and  $H_6$ ) were supported. Hence, the obtained result confirms the factors of health care service quality. Using relative weights analysis as discussed above, RII is determined. The weights of all the six dimensions are obtained as shown in the fig 1. Highest weightage is given to empathy. It is observed that patients are giving more priority to empathy.



**Fig.1 Relative weight analysis**

### VII. CONCLUSION

In this paper a six dimension service quality measurement is made using the data taken from the patients of different health care providers. CFA was used to test the reliability and validity of the variables. Relative weight analysis was used to determine the priority of the factors selected for the service quality measurement. The methodology proposed in this study is useful to determine the overall service quality of the hospitals and to set priorities for improvement of the factors. The service quality factors and their priorities are useful to improve the Service quality by establishing the necessary design requirements for development of health care sectors.

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