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DEVELOPMENT OF MEASUREMENT SCALE FOR PERFORMANCE OF HEALTH CARE ORGANIZATION THROUGH STRUCTURAL EQUATION MODELING

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ABSTRACT

The purpose of this research was to look at the link between healthcare service quality characteristics, service quality performance, and patient loyalty to healthcare companies. Data were gathered from 50 Andhra Pradesh healthcare institutions. To test the psychometric qualities (reliability & validity) of measuring scales, a confirmatory factor analysis was conducted. To test the hypotheses Structural Equation Modelling was used. To examine their effect on healthcare service quality, five healthcare service quality activities are considered: efficiency, safety, tangibles, empathy, and degree of improvement. In turn, it was determined if service quality had an impact on the organization's operational performance. The study's findings will be valuable to healthcare providers by encouraging them to embrace service quality items, resulting in improvements in both service quality and organizational performance.

Keywords: healthcare, psychometric, confirmatory factor analysis.

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1. INTRODUCTION

Myers' (1969) [1] Healthcare Service Quality (HSQ) has been measured with numerous parameters in earlier research by Donabedian [2], Vuori [3], Bowers *et al.* [4] Shelton P. [6], Jun *et al*. [5]. However, other researchers, such as Bower's *et al.* [4], Scobie [7], Evans & Lindsay [8], Lee, S.M. [9], and Lee [10], have since updated and modified HSQ measuring items depending on their study objectives. HSQ is the product of several contingent events that happen throughout therapeutic operations. At the same time the processes are supplied by personnel (Health care personals, Hospital workers, etc.), the outcomes are determined by the patient's state following therapy. As a result, the patient evaluates these two characteristics differently. Furthermore, because the degree of what the patient experiences before and after therapy changes, each patient's assessment of HCSQ may be different.

Patient happiness and loyalty are useful determinants of healthcare organization performance. The patient's loyalty to the institution must be addressed while designing quality assurance and improvement activities. Dawn *et al*., 2003 [12], Sixma *et al.*, 1998 [11]. From the standpoint of healthcare professionals, gauging patient satisfaction with services may show if treatments are effective at a satisfactory level and high spot the possible areas for quality enhancement. Al-Abri and colleagues (2014) [13]. Furthermore, studies have shown that satisfied patients were adhering to treatment, leading to improved outcomes over the period, even though patient satisfaction towards a favourable health outcome has not been conclusively proven, Kennedy *et al.,* (2014) [14]. Wartman *et al.,* (1983) [15]; Shirley *et al*., (2013) [16]. Improving patient happiness has also been demonstrated to be an effective approach to boost patient referrals and retention, Marquis *et al.,* (1983) [17], so increasing health institutions' market presence and income.

Nonetheless, how to measure service quality that leads to customer satisfaction in healthcare organizations has been a topic of controversy in the literature for years, with assessing patient loyalty stated to be a difficult task. The major issue with measuring the rating of healthcare services is their subjective and complex character; how a patient defines their happiness is impacted by their aspirations and based on their set of "moral values, expectations and their ways of thinking, experiences," and similarly with patient satisfaction concerns about measuring instruments' validity and/or reliability have arisen when evaluating patient happiness and the quality of healthcare. Many tools have been developed to assess the calibre of healthcare services and patient satisfaction surveys; however, even though these existing tools had reliability and good validity, their scope was constrained due to issues with customization, omission of the hospital environment, privacy and security, and professionalism. The aim of this research is to look at the relationship between service quality constructs, service quality, and patient happiness in healthcare companies. The study will specifically address two objectives: (1) determining the impact of service quality parameters on service quality and (2) determining the impact of service parameters on patient satisfaction. Despite the extant literature on healthcare service quality, earlier research appears to have concentrated on service quality in general while ignoring healthcare organizations. Furthermore, healthcare practitioners' levels of mindfulness may still be low; additional research on topics such as healthcare service quality within such organizations is needed. Furthermore, little study has been done on the connection between patient satisfaction, operational effectiveness, and

healthcare service quality in healthcare delivery organizations. This study aims to fill these knowledge gaps. The significance of this work is that it may be implemented as a role model tool for service quality research in healthcare organizations. The stakeholders and staff in healthcare companies can utilize the findings of this work as a role model tool when dealing with day-to-day activities of patient with satisfaction.

2. LITERATURE REVIEW

As stated by Parasuraman *et al.* (1998) [19], "empathy" was one of the six traits identified by Carmen (1990) [18] along with "reliability", "tangibles", "convenience", "safety" and "cost". The qualities Bowers *et al.* (1994) [4] identified as enhancing the quality of healthcare services included dependability, receptiveness, communication, convenience, understanding of and consideration for the patient and reliability. A method for estimating the quality of health-related services was put forth by Jun *et al.* (1998) [5] based on patient insights. They presented eleven scopes: tangibles, dependability, technology, responsiveness, courtesy, competence, communication, caring, collaboration, accessibility, patient outcomes and customer understanding. On the basis of the SERVQUAL paradigm, Mostafa (2005) [20] and Yesilada and Direktor (2010) [21] suggested measuring the quality of healthcare services using empathy, dependability, and tangibles. Additionally, Ranjbar *et al.* [22] and Kalepu [23] employed the SERVQUAL model to research healthcare quality.

Donaldson (1999) [24] proposed that the numerous quality concepts of healthcare service specified by IOM should be included in the quality measurement of healthcare services (2001) Quality measurements may include, for example, the following: the dissemination of healthcare information to the public, the time-based controls and reports on healthcare services, the recording of data for quality improvement programmes, comparing facilities and people to standards, and protecting the right-to-know with relation to treatment choices made by patients or their families.

Shelton D.L. (2000) [25] employed four criteria to classify medical facilities and equipment: efficiency, accessibility, communication, perceived quality, care, medical facility and gadgets. Empathy, responsiveness, dependability assurance, and care service improvement were the categories Doran and Smith (2004) [26] used to categories healthcare service quality evaluation components. Administrative conveniences like waiting times for medical exams, speedy payment processes, and equipment efficiency were mentioned by Choi *et al.* (2005) [27]. One of the service quality concerns expressed by employees and medical professionals was the capacity of doctors and supporting staff to adequately inform the medical procedures to patients with friendly and helpful attitudes. While Shelton (2000) [25] and Doran and Smith (2004) [26] studies stayed close to SERVQUAL, Choi et al., 2005 [27] added waiting times and charging of health care services to the list.

Convenience, tangibles, effective pricing, values, punctuality, policy and execution to promote quality, comprehension of the expectations of customers, and health care institution competences were all included in Scobie *et al.*'s (2006) [7] list of parameters needed for estimating the quality of healthcare services. The illness-oriented aspect, the patient- oriented aspect, the medical procedure- oriented aspect, the duty- oriented aspect, the centre of the overall aspect, and the expert-centered aspect were Evans and Lindsay's six parameters for evaluating the status of hospital services in 2009 [8]. The scope of Scobie *et al.'*s [27] study on a healthcare institution's capability or competency was increased. A collection of metrics for evaluating the quality of healthcare services depending on the method of treatment provided (the health-care deliverer aspect) and patient. She also identified five key parameters for assessing health institute executioners. The next set of dimensions in HEALTHQUAL include the degree to which care services have improved, concrete quality components, efficiency quality components, safety quality components, and empathy quality components.

Don Hee Lee (2017) [28] developed a complete collection of HEALTHQUAL (healthcare service quality) measuring measures concentrating on care procedures and outcomes.

Hwang *et al.* (2020) [29] investigated the satisfaction of Vietnamese Cardiovascular Diseases (CVDs) patients, constructed a measuring scale for CVDs inpatients and outpatients, and investigated the parameters related with satisfaction with CVDs treatment services.

Things like inputs which includes essential commodities like health personal, systems, and equipment, patients, and/or pharmaceuticals, have an influence on decisions regarding delivering healthcare services. It is critical to consider how these resources are used to treat patients (whether they are well or ill) and to address the patient experience, which includes requirements for compassionate personnel, cozy and safe facilities, and cutting-edge technology and systems. As a result, healthcare organizations use resource measurement to inform their inventory and allocation decisions. Because efficiency has a good and strong relationship with resource utilization, it may also have an impact on the improvement of care services, which are the most important component for patients.

2.1 Literature Gap

Several research deficits exist in the field of enhancing the efficacy and quality of healthcare organisations, such as:

a) Absence of a comprehensive framework for improving performance and quality in healthcare organisations: There is no comprehensive framework to direct and integrate these initiatives, despite the abundance of research on performance and quality improvement in healthcare organisations.
b) Infrequent application of structural equation modelling in healthcare organisations: Although structural equation modelling (SEM) is a powerful

instrument for analysing complex interactions between variables, healthcare organisations have not frequently employed it to improve efficiency and quality.

c) Limited consensus on the factors that influence performance and quality in healthcare organisations: There is limited consensus on the factors that influence performance and quality in healthcare organisations, and more research is required to determine which factors are most important and how they interact.

d) Patient-reported outcomes (PROs) are a valuable source of information about the impact of healthcare on patients' lives, but they are not extensively utilised by healthcare organisations to evaluate performance and quality.

Technology, such as electronic health records (EHRs) and telehealth, has the potential to revolutionise healthcare organization's performance and quality improvement. These voids in the literature underscore the need for more extensive and multidisciplinary research on enhancing the performance and quality of healthcare organisations. By addressing the aforementioned voids, researchers and healthcare providers can obtain in-depth knowledge of the factors that influence healthcare outcomes and develop strategies for enhancing performance and quality in a variety of settings.

2.2 Service Quality In Healthcare Organizations

It is crucial for a healthcare practitioner to have precise knowledge of the patient's needs in order to achieve accreditation and certification to the organizations according to Solayappan and associates (2011) [30].

Various healthcare organizations and / or global accreditation and certification systems embraced diverse quality measuring tools. There are several categories and methods used to classify and evaluate healthcare service accreditation and certification. Healthcare accrediting organizations estimates what type of care treatment courses needed for medical personal and other infrastructural facilities need for everybody who are all involved with hospital.

Despite the fact that prior studies focused on evaluating HCSQ using various methodologies (SERV QUAL, SERV PERF models, etc.), there is a scarcity of research.

This study used the same healthcare service quality measuring items as Lee's (2006) [27] study, including empathy, tangibles, safety, efficiency, and improvement of care services in connection to patient loyalty. Patient loyalty is the result of high clinical quality combined with a positive patient experience. Organizations that can offer strong results while also providing high patient happiness will be well-positioned to develop profound patient loyalty. The following HEALTHQUAL assessment elements are taken into account in the study.

Table-1. Measurement items of health quality.

Construct	Measurement Variable
Empathy	employee politeness (EY1)
	Providing details (EY2)
	pay attention to the patient (EY3)
	Recognize and take into account the patient's circumstances (EY4)
	A feeling of proximity and kindness (EY5)
	Hospital is aware of the patient's preferences (EY6)
	The medical facility has empathy for the patient's issues. (EY7)
Tangibles	level of security for sophisticated medical equipment (TA1)
	degree of securing skilled and knowledgeable medical personnel (TA2)
	Amount of practical amenities (TA3)
	Cleaning level of employee uniforms (TA4)
	general cleanliness of the medical facility (TA5)
Safety	The degree to which a therapeutic setting is both cosy and secure (SAl)
	Amount of confidence in medical professionals to avoid mistake (SA2)
	The extent to which nurses are seen to be error-free (SA3)
	Level of assurance regarding this hospital's medical expertise (SA4)
	The degree to which a hospital setting is immune to infection (SA5)
	Patients' level of comfort and safety in the surroundings (SA6)
Efficiency	beliefs towards the avoidance of needless medicine (EF1)
	Efforts made to demonstrate effective treatment options (EF2)
	Affordable medical costs (EF3)
	Cost for medical series prodded is appropriate (EF4)
	Comfort level of treatment procedures (EF5)
	Efforts made to cut out on unneeded procedures (EF6)
Degree of improvement	Efforts made to cut out on unneeded procedures (D1)
	Gratitude and support for the medical staff's finest efforts (D2)
	As a consequence of work and therapy, one's health has improved (D3)
	Degree of patient condition improvement following this hospital treatment (D4)
	Level of justifications for the patent to stop associated sickness (D5)
	Effort level and readiness to prevent disease (D6)
	Disease improvement as a result of care at this hospital (D7)
	Communities' levels of disease prevention (D8)
Operational Performance	Availability of Beds (OP1)
	Waiting time of the Patients (OP2)
	Loyalty of the patients (OP3)
	Length of Stay (OP4)
	Cost of Treatment (OP5)

3. RESEARCH METHODOLOGY

Structural equation modeling (SEM) is a statistical tool, which is used to determine the performance of a healthcare organization by examining the relationships between multiple variables that influence the performance. In the context of healthcare organizations, SEM can be used to test theoretical models that describe the relationships between variables such as organizational culture, leadership style, staff satisfaction, patient satisfaction, and financial performance. This can help to identify the key factors that contribute to high performance, and provide insights into areas that may need improvement. There is a lot of literature that supports the use of SEM in healthcare organizations. Studies have shown that SEM can be used to identify the key factors that influence performance, and that it can be a valuable tool for healthcare organizations in their efforts to improve quality and patient outcomes.

Overall, SEM is a useful method for understanding the complex relationships between variables in healthcare organizations, and for determining the key factors that contribute to high performance. By using SEM to test theoretical models, healthcare organizations can gain valuable insights into the areas that need improvement and develop effective strategies for enhancing performance.

3.1 Developing a Measurement Scale for Performance of a Healthcare Organization using Structural Equation Modeling (SEM) Involves Several Steps

Identify the study query: The first step in developing a measurement scale is to identify the research question you want to answer. This could be a question about the factors that influence performance and quality in healthcare organizations, or a question about how to assess performance and quality.

Develop a theoretical framework: Once you have identified your research question, the next step is to develop a theoretical framework to guide your study. This framework should outline the relationships between the variables of interest and provide a basis for developing your measurement scale.

Choose a measurement model: SEM provides several measurement models that can be used to develop a measurement scale. These models include the confirmatory factor analysis (CFA) model, the second-order factor analysis (SOFA) model, and the bifactor analysis (BFA) model. Choose a model that is appropriate for your research question and theoretical framework.

Select and operationalize variables: Next, select the variables you want to include in your measurement scale and operationalize them. This means defining each variable in a way that is measurable and consistent across participants or settings.

Choose appropriate psychometric methods: Choose appropriate psychometric methods to assess the validity and reliability of your measurement scale. This could include methods such as internal consistency reliability, test-retest reliability, inter-rater reliability, and construct validity.

Collect and analyze data: Once our measurement scale is developed, the next step is to collect data from healthcare organizations and analyze it using SEM. This will allow you to test your measurement model and estimate the fitness of your model to the collected data.

Evaluate and refine the measurement scale: depending on the outcomes of your SEM results, evaluate and refine measurement scale as needed. This may involve adjusting the model, modifying the variables, or collecting additional data.

Validate and implement the measurement scale: Finally, validate measurement scale using additional data and implement it in healthcare organizations to assess performance and quality.

By following these steps, you can develop a measurement scale for improving performance and quality in healthcare organizations using SEM. This scale can be used to monitor changes over time and guide quality improvement initiatives in healthcare organizations

3.2 Conceptual Framework and Hypothesis Development

Figure-1 depicts the conceptual framework that illustrates the linkages under examination. Empathy, Tangibles, Safety, Efficiency, Degree of Improvement, and operational performance as one output construct comprise the framework's five input predictor components.

3.2.1 Development of hypothesis

Empathy and healthcare service quality

H_1: Empathy applies a non-negative effect on service quality in Healthcare institutions.

Tangibles and healthcare service quality

H_2: Tangibles applies a non-negative effect on service quality in Healthcare institutions.

Safety and healthcare service quality

H_3: Safety applies a non-negative impact on service quality in Healthcare organizations

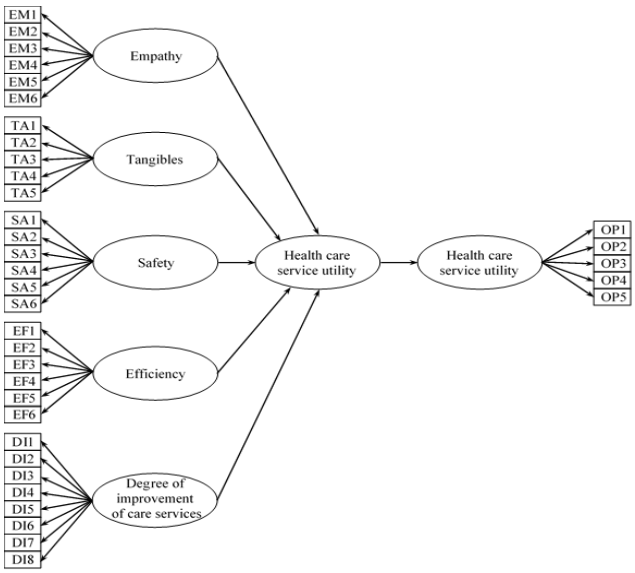

Figure-1. Proposed measurement items for health care service quality and operational performance.

Efficiency and healthcare service quality

H_4: Efficiency applies a non-negative impact on service quality in Healthcare organizations

Degree of improvement and healthcare service quality

H_5: Degree of Improvement applies a non-negative impact on service quality in Healthcare organizations

Healthcare service quality and operational performance

H_6: Healthcare service quality has a positive impact on the operational performance of healthcare organizations

3.3 Data Collection

The research study is quantitative in nature, with data collected from respondents using a standardized survey questionnaire. Because the study was evaluating correlations across diverse variables, a quantitative study was used. Previous research measurement scales were operationalized. Six questions developed from the literature were used to assess efficiency. Six tailored questions were used to assess safety. Five questions were used to assess tangibility. Seven questions were used to assess empathy. Eight questions were used to assess the degree of improvement. The aforementioned six components comprise the quality of healthcare services. Loyalty was assessed using three questions modified from and scored on a 5-point scale. Response selections for Efficiency, Safety, Tangibles, and Empathy Degree of Improvement were recorded on a 5-point scale starting from very low significance (1) to very high significance (5).

When conducting data during the study a number of moral related issues were taken into consideration. This study safeguards the questioned person interest to keep him open to public or keep him anonymous. We also protect his privacy, his interest to participate or not and also kept his information with utmost care so that in future this survey will not hurt him in any angle.

The study's target population was private hospitals in Andhra Pradesh, India. In the beginning, 400 questionnaires were handed to patients in 50 hospitals in Andhra Pradesh. Out of these, 350 were returned, with 56 being removed due to mistakes. As a result, in the final analysis 294 questionnaires were utilized, yielding a satisfactory of 73.5% response rate.

Table-2. Demographic and survey data.

S. No.	Items	Number	%
1	**Gender**		
	Male	133	45.2
	Female	161	54.8
2	**Type**		
	In-Patient	140	47.6
	Out-Patient	110	37.4
	Emergency	44	15.0
3	Occupation		
	Govt Employee	79	26.9
	Students	51	17.3
	Private Employee	52	17.7
	Entrepreneur	40	13.6
	Professional	12	4.1
	Un employed	50	17.0
	Others	10	3.4
4	No of visits to the Hospitals		
	I Visit	113	38.4
	II Visit	138	46.9
	More than II Visits	43	14.6
5	**Age Group**		
	<16 Years	15	5.1
	16- 26 Years	20	6.8
	26-36 Years	35	11.9
	36-46 Years	53	18.0
	46-56 Years	32	10.9
	56-66 Years	61	20.7
	>66 Years	78	26.5

The respondents were either owners or managers of these healthcare enterprises. According to the demographic features, 45.2% (n = 133) of healthcare organizations participating in the survey were males, while 54.8% (n = 161) were females. With regard to the type, 47.6% (*n* = 140) of the participating stakeholders are inpatients, 37.4% (*n* = 110) were out-patients, 15% (*n* =

44) belong to emergency cases. Furthermore, 26.9% (*n* = 79) of respondents are government employees, 17.3% (*n* = 51) students, 17.7% (*n* = 52) were Private employees, 4.1% (n=12) are professionals, 17% (n=50) are unemployed and 3.4% (n=10) are others. In respect of the number of visits, 38.4% (n=113) are first time came to the hospital, 46.9 % (138) patients second time visited the hospital and 14.6% (43) patients visited the hospital more than two times. In respect of age group 5.1% (*n* = 15) the participating stakeholders are below 16 years age, 6.8% (*n* = 20) were between 16-26 years age, 11.9% (*n* = 35) 26-36 age group, 18% (n=53) are between 36-46 years age group, 10.9% (*n* = 32) are between 46-56 years age group, 20.7% (*n* = 61) are in the age range of 56-66 Years and 26.5% (n=78) belongs to >66 years of age.

Table-3. Measurement of variables and the result of reliability test.

Construct	Measurement Variable	Mean	Stdev	Cronbach's Alpha
Empathy	EY1	3.3571	1.2685	0.8062
	EY2	3.4354	1.2561	
	EY3	3.2143	1.2685	
	EY4	3.5102	1.3082	
	EY5	3.3571	1.3544	
	EY6	3.3299	1.318	
	EY7	3.3912	1.2719	
Tangibles	TA1	3.3401	1.3972	0.7122
	TA2	3.5442	1.2758	
	TA3	3.5408	1.2892	
	TA4	3.585	1.2818	
	TA5	3.3231	1.2803	
Safety	SA1	3.3707	1.3019	0.7725
	SA2	3.2857	1.2692	
	SA3	3.4184	1.2926	
	SA4	3.2959	1.2574	
	SA5	3.3741	1.3204	
	SA6	3.4218	1.2954	
Efficiency	EF1	3.415	1.3159	0.8020
	EF2	3.5102	1.1965	
	EF3	3.4592	1.2919	
	EF4	3.5238	1.1616	
	EF5	3.4966	1.2846	
	EF6	3.3469	1.2456	
Degree of Improvement	DI1	3.3469	1.3558	0.8388
	DI2	3.3571	1.2793	
	DI3	3.4388	1.2453	
	DI4	3.4014	1.3072	
	DI5	3.3605	1.3034	
	DI6	3.3844	1.2605	
	DI7	3.4592	1.2324	
	DI8	3.3469	1.3019	
Operational Performance	OP11	3.3435	1.3145	0.7784
	OP22	3.6429	1.2632	
	OP33	3.5986	1.3202	
	OP44	3.5102	1.3744	
	OP55	3.4014	1.2566	

3.4 Model Variables

The components were measured using a 5-point Likert scale on the questionnaire. Based on previous research, scales to measure each of the components were constructed. Minitab 14 was used for item analysis in the study. The standard deviation for each variable varies from 1.1616 (TA1) to 1.3972, and the means for each variable vary from 3.2143 (EM3) to 3.6429 (OP22) (Table *). (EF4). Reliability was evaluated using Cronbach's alpha. The coefficients of dependability for each construct were higher than the standard in basic research for exploratory components, which is 0.70.

4. RESULTS AND ANALYSIS

Lisrel 8.8 was used for statistical analysis to estimate the impact of the influence of the observable parameters and associated latent constructs on long-term company success. Lisrel is generally utilized in confirmatory research for theory building. Confirmatory factor analysis, route analysis, and second-order factor analysis are three major uses of SEM. Furthermore, SEM allows for the examination of the linear correlations between manifest variables and latent components. Further, it generates accessible parameters to estimate the links between unnoticed variables. In general, SEM permits numerous relationships to be examined simultaneously in a multiple relationships single model rather than investigating each interaction independently. When examining several latent constructs with a range of observable variables, the software will be used to evaluate the suggested structural model, providing benefits over regression-based techniques. The technique consists of two steps, including the estimation of both the external measurement model and the internal structural model. Furthermore, this programme has earned recognition and favour in social sciences and technical studies as the best instrument for doing multivariate analysis. Lisrel 8.8 is used for measurement model analysis and structural modelling.

4.1 Measurement Model

It's critical to evaluate the validation of reliability & internal consistency of both the hidden variables and the visible variables (as determined by the questionnaire). While single observed and construct reliability tests are used to assess consistency, convergent and discriminant validity tests are used to assess validity.

The greater the number of standardized factor loadings, the greater the correlation between variables. The connection was weak if factor loadings were less than 0.3, acceptable if they were between 0.3 and 0.6, and strong if they were greater than 0.6. The factor loadings in the study ranged from 0.59 to 0.91.

Table-4. Average Variance Extracted (AVE) and Composite Reliability (CR) of the constructs.

Main constructs	Items	Loadings	Error	AVE	CR
Empathy (EM)	EY1	0.78	0.63	0.5002	0.8747
	EY2	0.77	0.62		
	EY3	0.78	0.62		
	EY4	0.77	0.65		
	EY5	0.78	0.66		
	EY6	0.9	0.54		
	EY7	0.75	0.66		
Tangibles (TA)	TA1	0.88	0.64	0.3932	0.7604
	TA2	0.67	0.78		
	TAS	0.68	0.75		
	TA4	0.59	0.81		
	TAS	0.63	0.77		
Safety (SA)	SA1	0.71	0.74	0.3908	0.7931
	SA2	0.74	0.73		
	SA3	0.74	0.75		
	SA4	0.67	0.73		
	SAS	0.64	0.76		
	SA6	0.63	0.74		
Efficiency (EF)	EF1	0.86	0.57	0.5163	0.8647
	EF2	0.77	0.59		

	EF3	0.79	0.62		
	EF4	0.75	0.58		
	EF5	0.78	0.63		
	EF6	0.82	0.57		
Degree of Improvement (DI)	DI1	0.84	0.62	0.5257	0.8711
	DI2	0.77	0.64		
	DI3	0.8	0.61		
	DI4	0.82	0.61		
	DIS	0.9	0.52		
	DI6	0.78	0.62		
	DI7	0.78	0.61		
	DI8	0.82	0.56		
Operational Performance (OP)	OP11	0.89	0.53	0.5671	0.8665
	OP22	0.88	0.52		
	OP33	0.9	0.52		
	OP44	0.91	0.56		
	OP 55	0.7	0.69		

Given that it keeps the standardized loadings of the observed variables, CR is seen to be a more accurate measure of internal consistency. The CR for all structures ranged from 0.7604 to 0.8747. The Average Variance Extracted (AVE) of each latent construct was estimated to ensure that the variables were convergent. The latent constructs in the model must consider the AVE value, which varied from 0.3908 to 0.5671 of the variance from the observed variable. These findings validated the measurement model's convergent validity and acceptable internal consistency. The investigation yielded correlation among the constructs, which is shown below.

Table-5. Investigation yielded correlation among the constructs.

Constructs	EM	TA	SA	EF	DI	OP
Em	1					
TA	0.73	1				
SA	0.8	0.98	1			
EF	0.93	0.79	0.83	1		
D	0.96	0.72	0.86	0.98	1	
OP	0.91	0.72	0.78	0.94	0.97	1

There is high and significant correlation is obtained among the constructs

4.2 Model Evaluation Criteria

The goodness-of-fit between the hypothesized model and the sample data is determined throughout the model fitting process. The goodness-of-fit indicators used to evaluate model fitness are described below (CFA)

Table-6. Propriety indicators of CFA.

Model fit indices	Acceptable fit indices	CFA (Measurement model)
Chi-square or degree of freedom (d/f)	< 3.00	1.66
Goodness of fit index (GFI)	> 0.90	0.84
Adjusted Goodness of fit index (AGFI)	> 0.9	0.82
Normed Fit Index (NFI)	> 0.9	0.95
Comparative fit index (CFI)	> 0.90	0.98
Incremental fit index (IFI)	> 0.90	0.98
Relative Fit Index	> 0.90	0.94
Root mean square error of approximation (RMSEA)	< 0.08	0.048
Standardized RMR	<0.05	0.048

The process of model fitness involves knowing the goodness-of-fit between the hypothesized model and the data sample. The goodness-of-fit indicators that are used to evaluate model fitness in (CFA) are described below

Chi-Square Goodness of Fit (χ^2/d.f)

It estimates the relation between theoretical specification and empirical data in a Confirmatory Factor Analysis. When the value of Chi Square increases the

fitness of identified model deteriorates. On this study (χ^2/d.f) is obtained as 1.66 indicates satisfactory fit

Goodness-of fit Index

The first standardised fit index was the goodness-of-fit index (GFI). GFI levels close to 0 indicate extremely poor model fit, whereas GFI values near 1.0 may suggest a strong model fit. GFI = 0.84 in this research denotes an acceptable fit.

Adjusted goodness-of-fit index

The only way the AGFI varies from the GFI is by accounting for the amount of degrees of freedom in the given model. In this investigation, an acceptable match is indicated by an AGFI of 0.82.

Normed Fit Index (NFI)

The range of NFI id between 0 to 1. NFI of one indicates a perfect fit. In this study, NFI = 0.95 shows goodness of fit.

Incremental fit index (IFI)

It ranges between 0 to 1. An Incremental index of one indicates a perfect fit. In this study, IFI = 0.98 indicates a good fit.

Relative Fit Index (RFI)

values ranging from 0 to 1 with values closing to 1 indicates superior fit. In this study, RFI = 0.94 indicates good fit.

Comparative Fit Index (CFI)

The CFI values ranging from 0 to 1, when values nearing to "1" indicates good fitness. CFI values which are above 0.90 are associated with a well fitted model. In this study, CFI = 0.98 indicates good fit.

Root Mean Square Error of Approximation (RMSEA)

RMSEA indicates how nicely a model fits to a population as opposed to merely the estimate sample. Better fit is indicated by lower RMSEA values. Previous studies claim that values around 0.08 are a sign of good fit. In this investigation, a satisfactory match is indicated by RMSEA = 0.048.

Standardized RMR (SRMR)

Higher RMR values show a poor fit, while lower RMR values lead to a better fit. Suggested value of RMR is < 0.05. In this study, RMSEA = 0.048 indicates good fit

Overall Measurement Model Fitness

While the chi-square seems satisfactory, and the verification of chi-square divided by degrees of freedom (df) is also necessary. It is recommended that majority of the metrics are good. Hence, this model may be considered as good fit.

The convergent and discriminant validity of theoretical conceptions may be may be indicated by the CFA findings. Empathy, concretes, safety, efficiency, degree of improvements, and operational performance of healthcare services were the six elements that made up this paradigm. The bulk of fit indices from the study of CFA analysis indicates that GFI and AGFI fall below the necessary level.

4.3 Evaluation of the Structural Model

Estimation of Path Coefficients (β) and T-statistics:

The path coefficients in Lisrel and the standardized coefficients in regression analysis exhibited similarity. Using the β value, the importance of the hypothesis was examined. The predictable variation in the dependent construct was denoted by the symbol (β) for a unit variation in the independent construct(s). Every path in the proposed model had its values computed; higher β values indicate the more significant the impact on the endogenous latent components. The significance level of the β value has to be confirmed, though, using the T-statistics test.

Hypothesized Path	Standardized Beta	T-Statistics
Empathy -> Health care Service quality	0.95	10.14
Tangibles -> Health care Service quality	0.75	8.00
Safety -> Health care Service quality	0.84	7.56
Efficiency -> Health care Service quality	0.98	11.06
Degree of Improvement -> Health care Service quality	1.00	10.69
Health care Service quality -> Operational Performance	0.71	12.39

In H1, it is predicted that the empathy factors would significantly (β = 0.95, T = 10.44, >=1.96) influence healthcare service quality of the organization.

In H2, it is predicted that the tangibles would significantly (β = 0.75, T = 8.00, >=1.96) influence healthcare service quality of the organization.

In H3, it is predicted that the safety factors would significantly (β = 0.84, T = 7.56, >=1.96) influence healthcare service quality of the organization.

In H4, it is predicted that the Efficiency factors would significantly (β = 0.98, T = 11.06, >=1.96) influence healthcare service quality of the organization.

In H5, it is predicted that the Degree of improvement factors would significantly (β = 1.00, T = 10.69, >=1.96) influence healthcare service quality of the organization.

In H6, it is predicted that the health care service factors would significantly (β = 0.71, T = 12.39, >=1.96) influence operational performance of the organization

In this paper, the work indicates that the variables were all significant, with standardized factor loadings starting from 0.59 to 0.91. Thus, the fit statistics for this model confirmed the recommended structure of healthcare service quality metrics. As a result, the six components of

degree of improvement of health-care services empathy, tangible, safety, efficiency, and operational performance may be used to successfully quantify HEALTHQUAL.

5. RESULTS AND DISCUSSIONS

All hospital customers, not only patients and employees, must be treated in a safe and joyful atmosphere by healthcare organizations. Patients should feel that the treatment procedure is comfortable to them. To know the feedback of the patient's complaint boxes must be made available so that the patients can provide their feedback which is essential for detecting the incontinence caused by existing procedures and to take effective measures to curb such practices. As a result, healthcare firms may increase patient happiness by providing excellent treatment that surpasses consumer expectations.

In this research, a set of HEALTHQUAL estimation items was introduced, and a comparative evaluation of quality assessment was conducted depeding on healthcare service quality and operational performance. The study's findings need fresh insights into the relative value of quality goods. Because customers' demands may be met when suppliers acknowledge them, organizational leaders must have a thorough awareness of and plans for the quality elements that consumers value. The created HEALTHQUAL scale offers a diagnostic tool for impartially assessing the calibre of hospital care services. In order to compare hospital performance on care quality measures and continually improve care quality, HEALTHQUAL may be utilized as an objective framework. Based on literature studies, empirical research, and the quality standards set by accreditation and certification organizations, this study helps build healthcare service quality (HEALTHQUAL) measuring items. Data collection through international certification systems should be considered in future research. HEALTHQUAL is an integrated paradigm that must assess health care service quality from the standpoint of the patient, the hospital, and accreditation agencies.

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