Research

A Study of SERVQUAL Model on Satisfaction and Loyalty of Discharged Dialysis Patients in China

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Abstract

Objective: This study applies the Service Quality Gap (SERVQUAL) model and the inpatient satisfaction questionnaire issued by the National Medical Management Center. It investigates the medical experience and satisfaction levels of discharged dialysis patients. The aim is to provide references for hospitals to enhance service quality. Methods: The study selected 306 dialysis patients discharged from a tertiary hospital in Taiyuan, Shanxi Province, China, between January 2022 and July 2024. Based on the SERVQUAL model, three scales were developed. Questionnaires were distributed online via Questionnaire Star. Statistical software was used for descriptive statistics, reliability and validity tests, correlation analysis, confirmatory factor analysis, and structural equation modeling. Results: Service quality significantly impacts satisfaction. Service quality also significantly impacts loyalty. Satisfaction significantly impacts loyalty. Satisfaction mediates the relationship between service quality and loyalty. Conclusion: Using the SERVQUAL model for satisfaction evaluation helps hospitals identify service weaknesses. It improves patients' medical experiences and increases satisfaction and loyalty. Additionally, the study suggests strengthening nurse-patient communication and optimizing medical procedures to reduce waiting times, thereby further improving patient satisfaction and loyalty.

Keywords: Dialysis Patients, SERVQUAL Model, Satisfaction, Loyalty

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Introduction

1. Research Background

Patient satisfaction and loyalty are critical components of healthcare service quality, particularly in specialized treatments such as dialysis, where patients often require long-term, ongoing care. As healthcare providers increasingly focus on improving service delivery, understanding patient perceptions of service quality becomes essential to enhancing both patient outcomes and institutional success. The SERVQUAL model, developed by Parasuraman et al. (1988) is widely recognized for its ability to measure service quality across various sectors, including healthcare. By evaluating the gap between patient expectations and perceptions of service quality, the SERVQUAL model provides insights into the critical factors that drive patient satisfaction.

In the context of dialysis care, patient satisfaction is especially important due to the chronic nature of kidney disease and the frequent need for dialysis treatments. Discharged dialysis patients, who transition from intensive treatment regimens to less frequent follow-up care, face unique challenges that may influence their perceptions of healthcare service quality. Understanding the factors that contribute to their satisfaction and loyalty can guide healthcare providers in designing services that improve both patient experiences and retention.

This study aims to examine the application of the SERVQUAL model to assess satisfaction and loyalty among discharged dialysis patients in China. With an aging population and a rising prevalence of chronic kidney disease in China, the need for effective dialysis services is greater than ever. By exploring how service quality impacts the satisfaction and loyalty of dialysis patients, this study seeks to provide valuable insights for improving healthcare delivery in China's dialysis centers.

2.Research Motivation

Patient satisfaction is a result-based patient perception indicator that reflects their overall evaluation of medical services. Due to its multifaceted nature, the determinants of patient satisfaction include not only the quality of medical services, but also multidimensional factors such as patient demographics (Andaleeb, 2001). Due to its complexity and universality,

scholars at home and abroad have conducted extensive research on patient satisfaction and established effective scales and key dimensions through empirical studies (Otani et al., 2012). These studies provide a theoretical basis for analyzing patient satisfaction and help hospitals identify specific areas that need improvement.

At the same time, the concept of loyalty has been introduced into healthcare management and is increasingly recognized by healthcare service providers. Research has shown that healthcare institutions that prioritize patient loyalty can benefit from various factors, such as reducing patient churn, lowering the cost of acquiring new patients, and enhancing hospital brand image (Zeithaml et al., 1996). Loyal patients are more likely to adhere to medical advice, improve the effectiveness of medical services, and overall health outcomes (Choi et al., 2004). Therefore, this study integrates satisfaction and loyalty, specifically examining the relationship between multiple factors, with the aim of providing valuable insights for hospital management practices.

Objective of Research and Significance

1. Objective of Research

This study aims to evaluate the satisfaction and loyalty of discharged dialysis patients using the SERVQUAL model and the inpatient satisfaction questionnaire. It provides insights for hospitals to improve service quality.

The specific research goals are as follows: Based on domestic and international theories and evaluation methods of customer and patient satisfaction, this study aims to refine and optimize satisfaction evaluation tools and indicators, and innovate evaluation methods for patient satisfaction in large general hospitals (Hu et al., 2020).

By constructing a patient satisfaction index model, this research aspires to establish a more scientific and reasonable patient satisfaction evaluation system for large general hospitals, providing specific references for improving service quality and formulating development strategies.

2. Research Significance

The main significance of this study is to use the SERVQUAL model to analyze the field of improving the quality of medical services, and through a survey of inpatient satisfaction, to gain a deeper understanding of their medical experience and satisfaction, ultimately providing decision support for improving the quality of medical services. In addition, this study proposes several innovative points:

Innovative research topic: This study focuses on the satisfaction evaluation of inpatients in large comprehensive hospitals, filling the research gap in this topic in China.

Innovative research variables: This study introduced variables such as waiting time, medical communication, treatment effectiveness, willingness to seek medical treatment again, word-of-mouth promotion, and loyalty behavior to explore the relationship between satisfaction, service quality, and loyalty.

Innovative research method: Structural Equation Modeling (SEM) is used for data analysis to provide more accurate statistical inference results.

Innovative research perspective: This study explores the mediating role of satisfaction in the relationship between service quality and loyalty, explores the formation mechanism of satisfaction, and provides new ideas for hospital management.

Literature review

1. SERVQUAL Model

The SERVQUAL model, developed by Parasuraman et al. (1988), measures service quality across industries, including healthcare. It identifies five dimensions: tangibility, reliability, responsiveness, assurance, and empathy. The model highlights the gap between customer expectations and perceptions of service quality.

The SERVQUAL model has been widely applied in healthcare settings, especially hospitals, where it has provided significant theoretical support for improving service quality. Babakus and Mangold (1992) noted that the model has helped hospital administrators better understand patient needs and optimize service delivery. By focusing

on these five dimensions, healthcare providers can identify areas for improvement, ensuring better patient experiences and higher satisfaction.

2. Patient Loyalty

Patient loyalty refers to a patient's willingness to return to a healthcare provider. It has attitudinal and behavioral components. Attitudinal loyalty involves emotional attachment and trust, while behavioral loyalty is shown through repeated use of services. (Dick & BasuK, 1994).

Gremler and Brown, (1999) defined patient loyalty as a positive attitude toward a medical institution, along with the intention to choose that institution for future care. Nesset and Helgesen (2009) emphasized that loyalty is a crucial indicator of service quality, as it directly affects patient retention and the long-term success of healthcare organizations. High patient loyalty not only fosters continued care but also increases the likelihood of patient referrals, which are essential for the sustainable growth of healthcare institutions.

3. Patient Satisfaction

Patient satisfaction has become a fundamental indicator of healthcare service quality. Press (2002) argued that patient satisfaction reflects how well medical services meet patients' expectations and needs. As healthcare has shifted toward a more patient-centered approach, satisfaction has become a key measure of service quality. (Otani et al., 2009). Andaleeb (2001) emphasized that satisfaction is a subjective evaluation that encompasses both the quality of care and the improvements in health outcomes.

Bleich et al. (2009) highlighted the close relationship between patient satisfaction and service quality. Many healthcare systems worldwide use patient satisfaction as a critical indicator for assessing service performance, incorporating it into quality management systems to enhance overall care. As a result, patient satisfaction is integral not only for assessing healthcare delivery but also for driving continuous improvement in service quality.

4. Service Quality and Patient Loyalty

Research has consistently demonstrated that service quality plays a key role in fostering patient loyalty. Zarei et al. (2012) found that improvements in service quality lead to increased

patient loyalty in healthcare settings. Similarly, Fatima et al. (2018) showed that high-quality service positively influences patient loyalty, particularly in the context of healthcare delivery in Pakistan.

In dental care, Hashem and Ali (2019) emphasized that service quality is a major factor in patient loyalty, noting that healthcare providers must continuously evaluate and improve service quality to meet evolving patient expectations. Tianur and Ali (2019) also found a strong link between service quality and patient loyalty in healthcare, predicting that enhancing service quality would lead to greater patient retention.

Supaprawat et al. (2021) further stressed that healthcare providers should closely monitor patient feedback to improve service quality. By doing so, they can build patient trust and loyalty, ultimately contributing to the organization's reputation and success.

5. Service Quality and Patient Satisfaction

The relationship between service quality and patient satisfaction is well-established in healthcare research. Kuo et al. (2011) suggested that effective service strategies can significantly improve patient satisfaction. In a study of dental patients in Thailand,

Supaprawat et al. (2021) found that service quality had a significant impact on patient satisfaction. Similarly, Aliman and Mohamad (2016) highlighted that healthcare providers can increase patient satisfaction by improving their responsiveness and service capabilities to better meet patient needs.

Eren et al. (2020) argued that although improving service quality may incur higher costs in the short term, the long-term impact on patient satisfaction is invaluable. By improving service quality, healthcare providers can enhance patient experiences, which ultimately results in improved patient loyalty and retention.

6. Patient Satisfaction and Patient Loyalty

Patient satisfaction is a strong predictor of patient loyalty. Amin and Nasharuddin (2013) found a direct link between patient satisfaction and the intention to return to a healthcare provider, which can be viewed as a form of patient loyalty Supaprawat et al. (2021) further reinforced this by demonstrating that patient satisfaction significantly affects patient loyalty in dental care settings in Thailand.

A wealth of studies has established that there is a significant positive correlation between patient satisfaction and loyalty. Oliver (1999) suggested that loyalty in healthcare extends beyond repeat behavior and includes emotional attachment to a medical institution. In the medical field, this emotional dependence manifests in trust and confidence in healthcare providers, which drives patients to seek care from the same institution repeatedly. For instance, Zarei et al. (2012) found that high-quality medical services foster patient loyalty by creating trust and satisfaction, leading patients to continue choosing the same healthcare provider for future treatment.

In healthcare organizations, patients are no longer just recipients of care; they are considered customers whose satisfaction is vital for the organization's success. As with other industries, patient satisfaction is crucial for the survival and growth of healthcare institutions. Total Quality Management (TQM) programs are essential for healthcare systems to meet the needs of patients and other stakeholders. Satisfied patients are more likely to stay loyal, and their loyalty is key to ensuring long-term organizational success (Sadeh, 2017)

This literature review highlights the significant relationships between the SERVQUAL model, patient satisfaction, and patient loyalty in healthcare settings. The SERVQUAL model serves as a valuable tool for measuring service quality and identifying areas for improvement. Research shows that service quality is not only essential for patient satisfaction but also directly influences patient loyalty. By continuously improving service quality, healthcare providers can enhance both patient satisfaction and loyalty, leading to improved healthcare outcomes and organizational success. This framework is

particularly crucial in the context of dialysis care, where long-term patient engagement and satisfaction are key to maintaining high-quality service delivery.

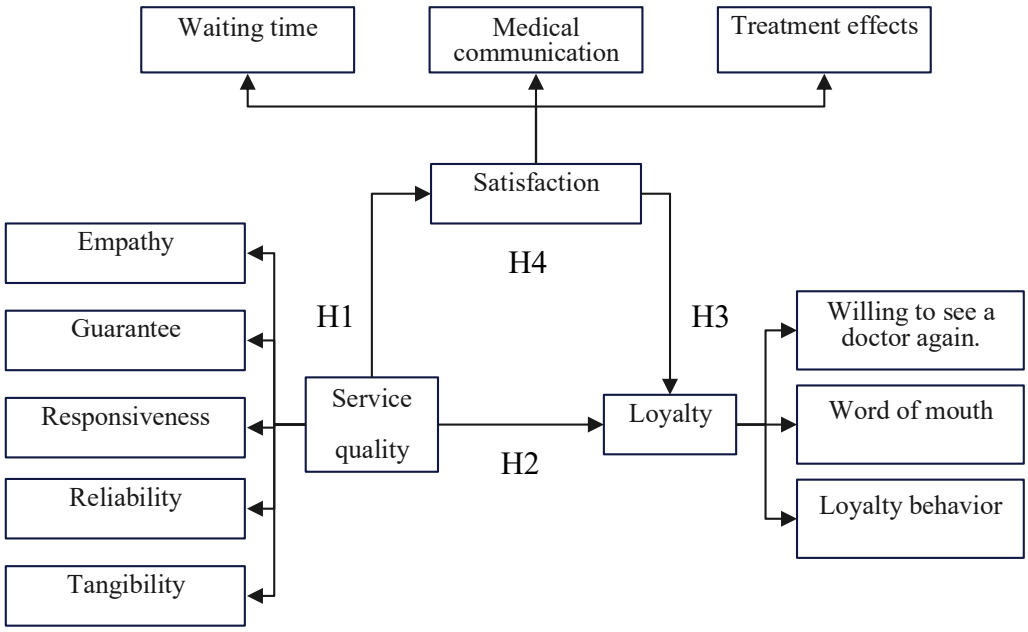
Measures

This study employs surveys and empirical research as its primary methods. Based on a literature review, key variables were identified, and a questionnaire was designed around five dimensions: tangibility, reliability, responsiveness, assurance, and empathy. This questionnaire serves as the foundation for constructing the research model, laying an important groundwork for drawing conclusions and guiding future research directions.

1.Research Framework

The theoretical framework of this study is based on a literature review that explores the relationships between service quality, satisfaction, and loyalty. Synthesizing existing literature, the study examines the mechanisms of these relationships, their formation, development, and mutual influence. Specifically, the study proposes four hypotheses. The following figure illustrates the model:

Figure 1 Research framework



2. Questionnaire Design

The questionnaire was designed based on the SERVQUAL model, dividing the content of the inpatient satisfaction questionnaire issued by the National Medical Management Center into five dimensions: tangibility, reliability, responsiveness, empathy, and assurance. Additionally, loyalty was measured through three aspects: willingness to seek medical treatment again, word-of-mouth publicity, and loyalty behavior. Satisfaction was measured through three aspects: waiting time, medical communication, and treatment effects. Each dimension was further divided into several questions, totaling 40 items. Demographic information, including gender, age, education, and payment method, was also collected. (National Health and Family Planning Commission Medical Management Service Guidance Center, 2024) Each question was rated on a 5-point Likert scale, ranging from "very dissatisfied" to "very satisfied."

The questionnaire design was based on the SERVQUAL model, with specific questions derived from the inpatient satisfaction survey published by the National Medical Management Center. The questionnaire was distributed via platforms such as WeChat, email, and Questionnaire Star, collecting a total of 306 valid responses.

The measurement model for each variable is as follows:

Tangibility: 4 items (e.g., "The hospital's physical facilities are clean and comfortable.")

Reliability: 3 items (e.g., "The hospital provides services as promised.")

Responsiveness: 3 items (e.g., "Hospital staff are willing to help patients.")

Empathy: 7 items (e.g., "Hospital staff show genuine care for patients.")

Assurance: 5 items (e.g., "Hospital staff are professional and competent.")

Satisfaction: 3 items (e.g., "I am satisfied with the overall quality of care.")

Loyalty: 3 items (e.g., "I would choose this hospital again.")

The validity and reliability of each variable were assessed using appropriate statistical methods. The Cronbach's alpha coefficients for all dimensions were above 0.8, indicating good reliability. The KMO value was 0.954, and the Bartlett's test of sphericity was significant ($p < 0.001$), indicating good validity.

3. Sampling Plan

306 dialysis patients from a tertiary hospital in Taiyuan, Shanxi, Chinese Mainland, from January 2022 to July 2024 were selected as the survey subjects. The inclution criteria were: ① 18 years old and above , ② no cognitive impairment or mental illness ③ infromed consent was obtained and participation was voluntary .Given the particularity of dialysis patients and the limitations of the study, the sample size is set at 306 participants, which meets the statistical requirements for sample size.Taking the pre-test questionnaire as an example, the ratio of the number of questions to the number of pre-test samples is 1:5 to 1:10 (Tinsley & Tinsley, 1987) The reason for choosing this city is that the dialysis patient population is relatively concentrated in this area, and the healthcare resources and service quality are relatively stable, which aids in investigating the impact of various service quality dimensions on patient satisfaction and loyalty.

4. Data Analysis Methods

Appropriate statistical software was used to conduct descriptive statistics, reliability and validity tests, correlation analysis, second - order confirmatory factor analysis, and structural equation modeling on the data.

Statistical software packages were used to analyze and process the data, and descriptive statistics, reliability and validity tests, correlation analysis, confirmatory factor analysis and structural equation modeling were performed.

5. Research Hypothesis

Based on the research framework, this study proposes the following hypotheses:

H1: Service quality has a marked and positive impact on satisfaction

H2: Service quality has a striking and positive impact on loyalty

H3: Satisfaction has a remarkable and positive impact on loyalty

H4: Satisfaction mediates the impact of service quality on loyalty

Research Results

1. Reliability analysis

Table 1 Cronbach reliability analysis

Cronbach reliability analysis		
Dimensions	**Number of items**	**Cronbach alpha coefficient**
Tangibility	4	0.886
Reliability	3	0.939
Responsiveness	3	0.896
Guarantee	5	0.959
Empathy	7	0.969
Willingness to seek medical treatment again	3	0.972
Word of Mouth	3	0.978
Loyalty Behavior	3	0.984
Waiting Time	3	0.978
Medical Communication	3	0.977
Treatment Effects	3	0.976

The reliability coefficient values of all dimensions are greater than 0.8, indicating that the reliability of the research data is good.

2. Validity analysis

Table 2 KMO and Bartlett test

KMO value		0.954
Bartlett's test of sphericity	Approximate Chi-Square	20885.372
	df	780
	p value	0

The KMO value is 0.954, greater than 0.8, indicating that the research data is suitable for information extraction, which indirectly reflects good validity.

3. Confirmatory factor analysis

Table 3 Model fit indicators

Common indicators	Chi-square degrees of freedom ratio χ^2/ df	GFI	RMSEA	RMR	CFI	NFI	TLI
Judgment criteria	<3	>0.9	<0.10	<0.05	>0.9	>0.9	>0.9
value	3.594	0.709	0.092	0.024	0.911	0.881	0.904

Most of the model fit indices are acceptable, indicating that the model has good adaptability.

Table 4 Factor loading table

Topic			**Estimate**	**SE**	**CR**	**P**	**STD Estimate**
Willingness to seek medical treatment again	<---	Loyalty	1				0.951
Loyalty Behavior	<---	Loyalty	0.984	0.032	31.006	***	0.972
Word of mouth	<---	Loyalty	0.981	0.031	31.23	***	0.978
Empathy	<---	Quality of Service	1.034	0.082	12.612	***	0.925
Ensure	<---	Quality of Service	1.08	0.089	12.146	***	0.899

Topic			Estimate	SE	CR	P	STD Estimate
Responsiveness	<---	Quality of Service	0.913	0.08	11.47	***	0.946
Reliability	<---	Quality of Service	1.134	0.09	12.6	***	0.905
Tangibility	<---	Quality of Service	1				0.769
Waiting time	<---	Satisfaction	1.168	0.048	24.5	***	0.886
Medical Communication	<---	Satisfaction	0.983	0.032	30.403	***	0.967
Treatment Effects	<---	Satisfaction	1				0.973
Q1_Row1	<---	Tangibility	1				0.822
Q1_Row2	<---	Tangibility	1.086	0.06	18.026	***	0.879
Q1_Row3	<---	Tangibility	1.061	0.066	16.014	***	0.805
Q1_Row4	<---	Tangibility	1.253	0.081	15.436	***	0.784
Q2_Row1	<---	Reliability	1				0.885
Q2_Row2	<---	Reliability	1.17	0.043	26.927	***	0.952
Q2_Row3	<---	Reliability	1.207	0.049	24.466	***	0.914
Q3_Row1	<---	Responsiveness	1				0.756
Q3_Row2	<---	Responsiveness	1.409	0.08	17.512	***	0.927
Q3_Row3	<---	Responsiveness	1.408	0.082	17.143	***	0.909
Q4_Row1	<---	Guarantee	1				0.841
Q4_Row2	<---	Guarantee	1.078	0.053	20.466	***	0.882
Q4_Row3	<---	Guarantee	1.067	0.048	22.274	***	0.922
Q4_Row4	<---	Guarantee	1.126	0.048	23.641	***	0.95
Q4_Row5	<---	Guarantee	1.114	0.049	22.752	***	0.932
Q5_Row1	<---	Empathy	1				0.861

Topic			Estimate	SE	CR	P	STD Estimate
Q5_Row2	<---	Empathy	1.026	0.045	22.741	***	0.903
Q5_Row3	<---	Empathy	1.085	0.044	24.553	***	0.934
Q5_Row4	<---	Empathy	1.108	0.045	24.414	***	0.932
Q5_Row5	<---	Empathy	1.117	0.045	25.036	***	0.942
Q5_Row6	<---	Empathy	1.134	0.044	25.91	***	0.956
Q5_Row7	<---	Empathy	1.159	0.059	19.679	***	0.839
Q6_Row1	<---	Willingness to seek medical treatment again	1				0.956
Q6_Row2	<---	Willingness to seek medical treatment again	0.947	0.024	39.019	***	0.955
Q6_Row3	<---	Willingness to seek medical treatment again	0.989	0.023	42.65	***	0.969
Q7_Row1	<---	Word of Mouth	1				0.975
Q7_Row2	<---	Word of Mouth	1.006	0.02	49.156	***	0.967
Q7_Row3	<---	Word of Mouth	0.989	0.021	47.897	***	0.964
Q8_Row1	<---	Loyalty Behavior	1				0.979
Q8_Row2	<---	Loyalty Behavior	0.987	0.018	53.665	***	0.971
Q8_Row3	<---	Loyalty Behavior	1.04	0.017	60.81	***	0.982
Q9_Row1	<---	Waiting time	1				0.974
Q9_Row2	<---	Waiting time	1.022	0.018	57.434	***	0.984
Q9_Row3	<---	Waiting time	0.893	0.021	43.457	***	0.952

	Topic		Estimate	SE	CR	P	STD Estimate
Q10_Row1	<---	Medical Communication	1				0.959
Q10_Row2	<---	Medical Communication	1.044	0.022	47.848	***	0.98
Q10_Row3	<---	Medical Communication	1.063	0.025	42.812	***	0.965
Q11_Row1	<---	Treatment Effects	1				0.955
Q11_Row2	<---	Treatment Effects	1.022	0.024	42.888	***	0.969
Q11_Row3	<---	Treatment Effects	1	0.023	42.635	***	0.969

* p <0.05 ** p <0.01 *** p <0.001

Regarding the measurement relationship: for each measurement relationship, the absolute value of the standardized factor loading is greater than 0.6 and shows significance, which means that there is a good measurement relationship.

4. Descriptive statistics

Table 5 Frequency analysis results

Name	Options	Frequency	Percentage (%)	Cumulative percentage (%)
Gender:	Male	144	47.059	47.059
	Female	162	52.941	100
Age	Under 20 years old	3	0.98	0.98
	20-~29 years old	25	8.17	9.15
	30~39 years old	45	14.706	23.856

	40~49 years old	73	23.856	47.712
	50~59 years old	78	25.49	73.203
	Over 60 years old	82	26.797	100
Education	Junior high school and below	108	35.294	35.294
	High school or technical secondary school	77	25.163	60.458
	Bachelor degree or college degree	111	36.275	96.732
	postgraduate	10	3.268	100
Your payment method for this visit is:	Personal Payment	22	7.19	7.19
	Provincial Health Insurance	88	28.758	35.948
	City Medical Insurance	90	29.412	65.359
	New Rural Cooperative Medical Scheme	106	34.641	100
Total		306	100	100

From the table above, we can see that 52.94% of the samples are " female " and 47.06% are male. The proportion of "over 60 years old" is 26.80%. 36.27% are "undergraduate or junior college". 35.29% are junior high school or below. In terms of the distribution of payment methods for medical treatment, the proportion of "New Rural Cooperative Medical Care" is 34.64%.

5. Correlation analysis

Table 6 Pearson correlation analysis

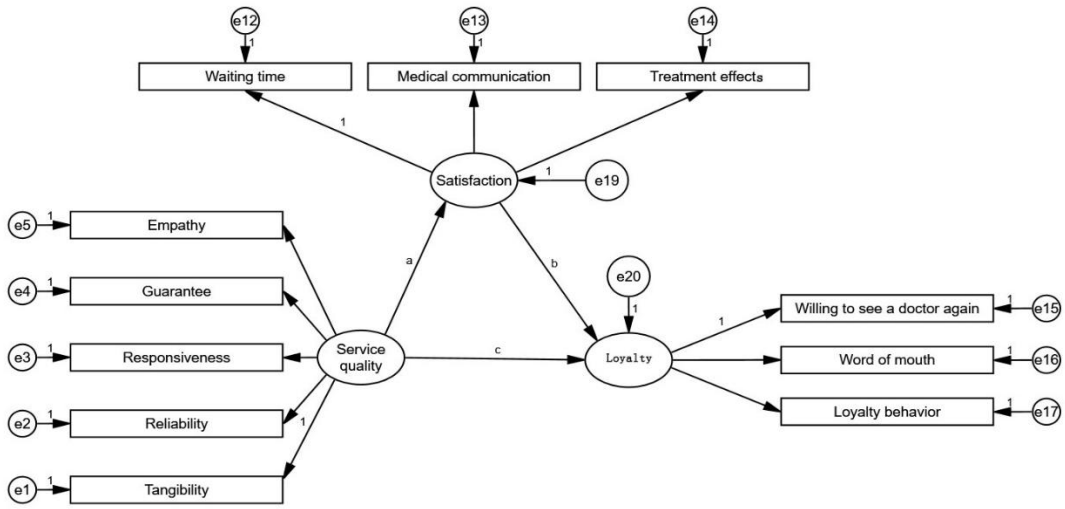
	Tangibility	Reliability	Responsiveness	Guarantee	Empathy	Willingness to seek medical treatment again	Word of Mouth	Loyalty Behavior	Waiting Time	Medical Communication	Treatment Effects
Tangibility	1										
Reliability	0.630**	1									
Responsiveness	0.649**	0.822**	1								
Guarantee	0.683**	0.763**	0.794**	1							
Empathy	0.677**	0.806**	0.811**	0.818**	1						
Willingness to seek medical treatment again	0.458**	0.434**	0.549**	0.531**	0.542**	1					
Word of Mouth	0.433**	0.482**	0.581**	0.524**	0.564**	0.916**	1				
Loyalty Behavior	0.445**	0.417**	0.547**	0.489**	0.524**	0.889**	0.941**	1			
Waiting Time	0.429**	0.373**	0.501**	0.462**	0.454**	0.811**	0.809**	0.830**	1		
Medical Communication	0.452**	0.392**	0.515**	0.493**	0.509**	0.883**	0.890**	0.906**	0.849**	1	
Treatment Effects	0.455**	0.409**	0.533**	0.519**	0.521**	0.880**	0.885**	0.909**	0.851**	0.917**	1

* $p < 0.05$ ** $p < 0.01$

Correlation analysis was used to study the strength of the correlation using the Pearson correlation coefficient. Specific analysis showed that tangibility was significantly correlated with reliability, responsiveness, assurance, empathy, willingness to seek medical treatment again, word-of-mouth publicity, loyalty behavior, waiting time, medical communication, and treatment effect. The correlation coefficients were 0.630, 0.649, 0.683, 0.677, 0.458, 0.433, 0.445, 0.429, 0.452, and 0.455, respectively. The correlation coefficients were all greater than 0, which means that tangibility was significantly correlated with the other 10 items. There is a positive correlation between the 10 items, and so on.

6. Structural equation

Figure 2 Structural equation



7. Model fit indicators

Table 7 Model fitting indicators

Common indicators	Chi-square degrees of freedom ratio $\chi 2 / df$	GFI	RMSEA	RMR	CFI	NFI	TLI
Judgment criteria	<3	>0.9	<0.10	<0.05	>0.9	>0.9	>0.9
Value	3. 166	0.929	0.084	0.015	0.9 80	0.9 71	0.973

The model - fitting indicators basically meet the standards, showing good adaptability.

8.Path analysis

Table 8 Path analysis

Path			Estimate	SE	CR	P	STD Estimate
Satisfaction	<---	Quality of Service	0.766	0.081	9.472	***	0.576
Loyalty	<---	Satisfaction	0.824	0.036	22.646	***	0.928
Loyalty	<---	Quality of Service	0.084	0.03	2.764	**	0.071

*** *p* <0.05 ** *p* <0.01 *** *p* <0.001**

The standardized path coefficients of the impact of service quality on satisfaction, satisfaction on loyalty, and service quality on loyalty are all greater than 0 and significant.

Service quality positively impacts satisfaction (standardized path coefficient 0.576, $z = 9.472$, $p < 0.05$). Satisfaction positively impacts loyalty (standardized path coefficient

0.928, z = 22.646, p < 0.05). Service quality also positively impacts loyalty (standardized path coefficient 0.071, z = 2.764, p < 0.05).

9.Mediation effect test

Table 9 Mediation effect test

Effect type	Parameter	Estimate	Lower	Upper	P
Total Effect	Service Quality ⟶ Loyalty	0.715	0.549	0.89	0
Indirect effects	Service Quality ⟶ Satisfaction ⟶ Loyalty	0.631	0.488	0.789	0
Direct Effect	Service Quality ⟶ Loyalty	0.084	0.019	0.171	0.008

All three effects hold, and mediation is established and partial.

Discuss

The results of this study show that there is a significant positive correlation between inpatient satisfaction and loyalty, and the impact of service quality on patient satisfaction is of great significance. Through path analysis, it was found that factors such as service quality and patient expectations have a significant impact on the satisfaction of hospitalized patients. Among them, service quality is considered the core factor affecting patient satisfaction. Research has found that service quality has a significant positive impact on patient satisfaction and loyalty, which is consistent with existing related studies. The medical experience of patients is directly related to the quality of hospital services. The high-quality services provided by hospitals can effectively improve patient satisfaction and thus enhance patient loyalty to the hospital. Despite high patient satisfaction, research has also shown low patient loyalty, which may reflect high demand for hospital services in the actual treatment process, and patients may still choose to change hospitals due to low dependence on other hospitals, despite the quality of hospital services, to meet these expectations.

A key finding of this study is that satisfaction plays a mediating role in the relationship between service quality and loyalty. Specifically, when patients are satisfied with aspects of their treatment, such as waiting time, medical communication, and treatment outcomes, they are more likely to return to the same healthcare provider for follow-up care. This supports the notion that satisfied patients are more likely to exhibit loyal behaviors, including word-of-mouth recommendations and repeat visits. (Gremler & Brown, 1999).

The impact of referrals has been proven to be an important factor driving patient satisfaction. Suggestions from family and friends can effectively increase patients' trust in hospitals and improve their evaluation of hospital services. Hospitals should pay attention to and cultivate good patient reputation, improve service quality, enhance patient trust, and promote patient recommendation behavior.

The study also found a significant relationship between patients' expectations and their satisfaction. This discovery suggests that hospitals need to fully consider patients' personal expectations when providing services, optimize service processes and environments based on patients' specific needs, and improve patients' overall medical experience. Hospitals should not only focus on the quality of medical services, but also strive to manage patients' expectations, ensure that patients have reasonable expectations for medical services, and strive to exceed these expectations in the service process, thereby improving patient satisfaction.

Conclusion

Specific analysis showed that tangibility was significantly correlated with reliability, responsiveness, assurance , empathy , willingness to seek medical treatment again, word-of-mouth publicity, loyalty behavior, waiting time, medical communication, and treatment effect. The research findings reveal that service quality exerts a conspicuous and positive impact on satisfaction , customer loyalty, separately.Aside from that, satisfaction imposes a remarkable and positive impact on loyalty, thereby plays mediating the impact of service quality on loyalty.

In summary , the study of satisfaction and loyalty of inpatient dialysis patients not only has important academic value, but also has significant practical significance. By using the SERVQUAL model to evaluate patient satisfaction, it can help hospital managers find the weak links in the service process, and then improve the patient's treatment experience by improving service quality. With the intensification of competition in the medical market, patient loyalty has gradually become a competitive advantage for medical institutions to maintain their competitive advantage. Improving patient loyalty can not only enhance the competitiveness of hospitals, but also promote long-term cooperation between patients and hospitals, thereby achieving a win-win situation between medical institutions and patients.

Suggestions

According to the research results, hospitals should design service processes with a patient-centered approach and adhere to the principle of "patient first, sincere care".

Reduce or integrate unnecessary outpatient or inpatient procedures to shorten and save costs.

There is time to carry out necessary procedures in order to improve the timeliness and effectiveness of medical services. With the improvement of modern living standards, patients and their families have increasingly high expectations for hospital environment and logistics services, making the impact of hospital environment and logistics services on patient satisfaction more significant.

According to the survey results, it is recommended that hospitals increase their investment in hospitals.

Designate dedicated personnel to clean the environment and logistics infrastructure to ensure a clean processing environment. In addition, supervise and inspect daily cleaning

In key areas such as restrooms and elevators, the dining quality of self-service restaurants should be strengthened.

Improvement should be made and personalized services should be provided based

on the specific situation of the patient situation. Introduce information technology, provide convenient ordering services, strengthen observation of patient conditions, provide timely health education, and maintain good health.

Communicating with the patient's family and adjusting the education plan as needed will help provide more appropriate nursing services. Medical staff should learn to use effective language that patients can understand and master to communicate effectively with them. Understand the patient's important questions and patiently answer them

It will make patients feel that their needs are valued, which is the establishment of good communication.

The sampling objects of this study were selected from dialysis patients in a tertiary hospital in Shanxi Province , which cannot represent the characteristics of all inpatients . Follow - up research could expand the sample size and cover a greater number of hospitals. There are many factors that affecting inpatient loyalty.This study only explored the related factors ,Future research could incorporate more variables to offer a more robust theoretical foundation for the high - quality development of hospitals.

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