



## Original Article

## Structural Equation Modeling of Associations Between Quality of Services and Satisfaction, Loyalty, and Trust of Patients Referring to Health and Medical Centers

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## ABSTRACT

**Background:** Today, the hospital's priority is to attract and retain customers. Recent research has shown that the provided quality of services can influence customer reuse, loyalty, trust and satisfaction. The purpose of this study was to investigate the relationship between service quality and loyalty, trust and satisfaction of patients in health and medical centers of Guilan University of Medical Sciences through structural equation modeling.

**Methods:** The present study was conducted on 384 people referred to Guilan University of Medical Sciences. Service quality was assessed using a questionnaire on 5 dimensions of infrastructure, space, object, interaction and process quality. The validity of the research instrument was assessed by factor analysis and its reliability was estimated by Cronbach's alpha coefficient. The conceptual model of research was tested through structural equation technique in SmartPLS software.

**Results:** Infrastructure ( $r = 0.51$ ), object ( $r = 0.2$ ), atmosphere ( $r = 0.11$ ), interaction ( $r = 0.09$ ), and process quality ( $r = 0.14$ ) had direct and significant impact on satisfaction. Satisfaction as a mediator variable was also positively influenced trust ( $r =$  and loyalty).

**Conclusion:** The results of this study revealed that Infrastructure quality followed by object quality had greatest impact on satisfaction.

**Keywords:** Quality of service, Loyalty, Trust, Satisfaction

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## Introduction

Nowadays, in order to achieve organizational goals, customers' satisfaction play salient role and neglecting this issue will lead to failure of organization. Customer satisfaction leads to loyalty and consequently increases company reputation as well as future profit for company. Customer Satisfaction is achieved when the actual customer's desire and their need are met in a timely manner. Customers trust on organization to meet their expectations

and needs, so the organization has a moral obligation to meet those expectations (1).

Previous researches indicated that the issue of trust has played an important role in social studies. As competitiveness elevates, organization strategies across industries shift from focusing on attracting new customers to fostering customer confidence. In addition, trust includes benefits such as loyalty, repurchase, positive attitude, long-term commitment, desire to continue a relationship or a combination of these factors (2). Even in the case of failure,

the service that cooperatively produced by the company and the customer enhances mutual understanding and promotes loyalty by strengthening the relationship between the customers and company (3). Service quality is one of the most important and critical issues that considered as one of the effective tools in creating competitive advantage and improving the performance of organizations. Previous surveys on market-based customer service have shown that providing high quality service leads to customer satisfaction, loyalty, and trust, which ultimately increases market profitability (4). According to Yeh's theory, outstanding service should be defined by customer expectations and desires. If the service is very attractive to the supplier but cannot satisfy the customers, the services are not considered prominent (5). In this regard, the concept of service quality can be defined in several dimensions including infrastructure quality, object quality, space quality and interaction quality. The conceptual relationship between service quality and customer demands, including satisfaction, trust and loyalty, has been investigated in various studies up to this point (6-9). However, in health area, despite the complexity of patient needs as the main clients of the health organization, there are no research to investigate the interaction of different quality elements, clinical needs and psychological consequences of clients. Structural equation modeling is a multivariate statistical framework that is used to model the complex relationships between indirect and direct observed variables. Indeed, SEM is a general framework that involves the solution of linear equation systems simultaneously and include other techniques such as regression, factor analysis, path analysis and latent growth curve modeling (10). Given the importance of public clinical centers in providing health services including health care, prevention and rehabilitation to clients and meeting their needs, the purpose of this study was to investigate the relationship between service quality and customer satisfaction and loyalty through structural equation modelling.

## Methods

This study was a descriptive-analytical study that conducted on patients of public hospitals and health centers of Guilan University of Medical Sciences, Rasht, Iran. Considering the fact that the sample size is unlimited, according to Morgan's table, 384 subject were selected as statistical sample. Also, in order to eliminate the effects of defective and incomplete questionnaires, about 10% more questionnaires were

distributed among individuals. Finally, out of 408 distributed questionnaires, 390 valid and complete questionnaires were collected for statistical analysis. Patients were selected from available health care centers.

In this study, infrastructure quality variables were measured using Chen-Lin (11) questionnaire based on a Likert rating scale (5-item) consisting of 4 questions. The quality of the object was measured using Seo and Park's questionnaire (12) based on the Likert 5-items Rating Scale consisting of 4 questions. Space quality variables were measured using Grosbart questionnaire (13) based on a Likert 5-items rating scale consisting of 4 questions. Interaction quality variables were measured using questionnaire from Seo and Park (12) based on a Likert 5-point rating scale consisting of 4 questions. Satisfaction variable was measured using Yeh questionnaire (5) based on a Likert 5-items grading scale consisting of 4 questions. Trust was measured by a questionnaire from Seo and Park (12) based on a Likert 5-item scale consisting of 4 questions and finally, loyalty was measured using a questionnaire from Chen et al. (11), based on a Likert 5-point grading scale including 4 questions. Absolute and relative frequency were used to describe the data. Confirmatory factor analysis was used to assess validity structure of the items and the factor loadings of each item were reported in relation to the intended hidden variables. Cronbach's alpha coefficient was applied to assess reliability. A value greater than 0.7 considered for reliability. Structural Equation Modeling (SEM) was used to analyze the theoretical model and test the hypothetical model. Goodness of fit index was used to evaluate the model fitting. Data analysis was performed with Smart PLS 2 software. In the present study, the GOF criterion for general model fitting was 0.779 indicating strong fit of the model.

## Results

The majority of respondents (56%) were male. In terms of education, 71% had a university degree (including 54% post diploma and bachelors, 17% masters and PhDs) and 29% had undergraduate and diploma degrees. The majority of respondents (57%) were between 31 to 50 years of age, followed by those over 50 (25%) and under 30 (18%), respectively. Table 1 shows the values of Cronbach's alpha coefficients and descriptive indices of quality dimensions as well as indices of satisfaction, trust, and loyalty. All dimensions were significantly different from desirable condition.

The factor loading score between the dimensions of quality, satisfaction, trust, loyalty with the relevant items in the questionnaires are presented in Table 2. Factor loadings of all constructs were higher than 0.4 which indicate sufficient structural validity of questionnaire constructs.

**Table 1.** Mean, Standard Deviation and Cronbach's Alpha Coefficient of the Questionnaires

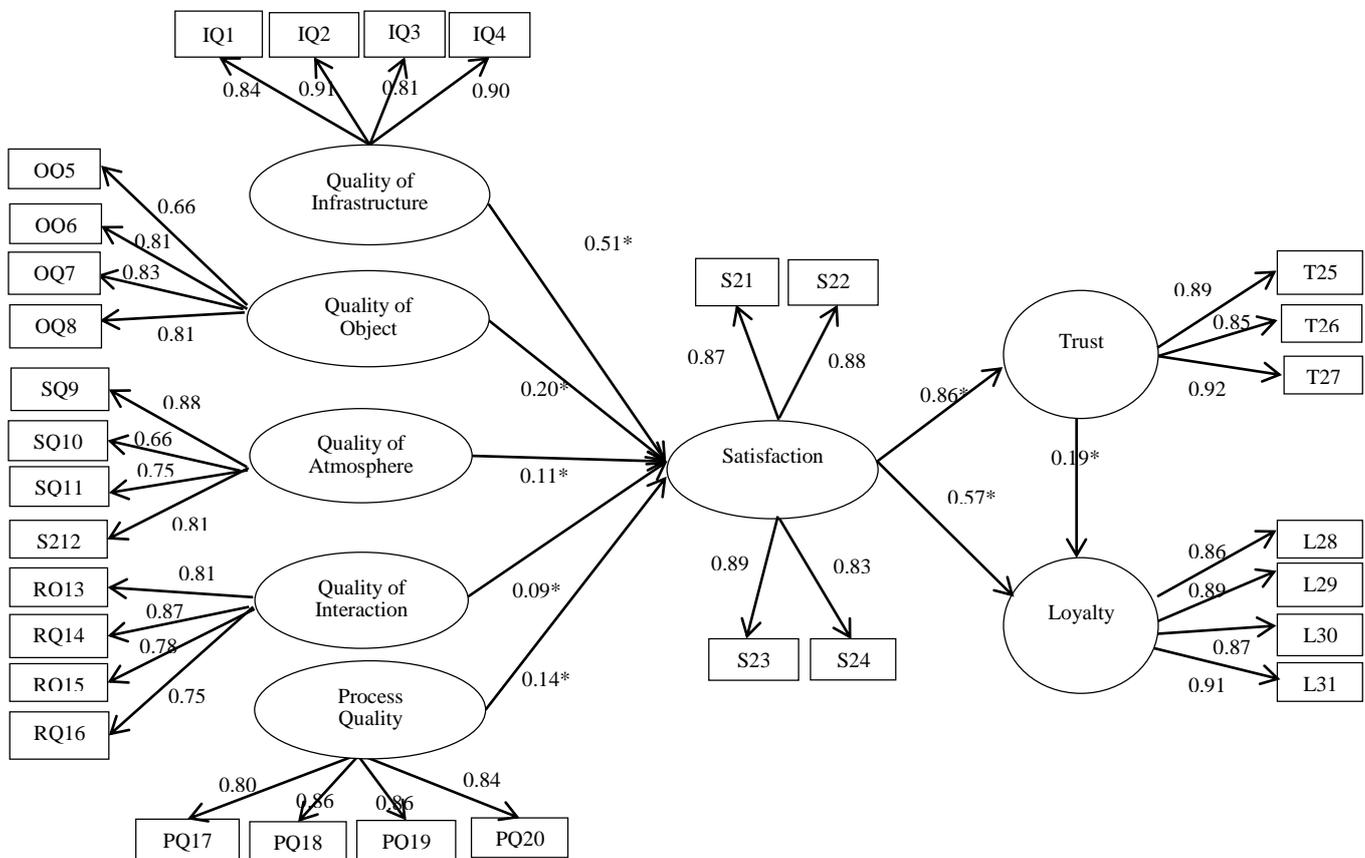
Variables	Cronbach's alpha coefficients	Mean	Standard deviation
Quality of infrastructure	0.937	3.26	1.23
Quality of objects	0.805	3.57	1.11
Quality of atmosphere	0.880	3.27	1.08
Quality of interaction	0.920	2.99	1.19
Quality of process	0.907	3.35	1.14
Satisfaction	0.922	3.37	1.22
Trust	0.901	3.11	1.13
Loyalty	0.914	3.07	1.33

**Table 2.** Loading Factor Scores of the Study Components with Relevant Items

Variables	Items	Factor load	T statistics
Infrastructure quality	Quality of services in Guilan University of Medical Sciences makes all patients joyful.	0.84	22.22
	I usually come with friends or family for valuable service at Guilan University of Medical Sciences	0.91	51.24
	Whenever I decide to choose a hospital, Guilan University of Medical Sciences is available	0.81	19.84
	I love Guilan University of Medical Sciences because of its various services	0.90	48.07
Object quality	I hope that using the services of Guilan University of Medical Sciences will work properly for a long time	0.66	8.25
	Very quick and timely service delivery is one of the characteristics of Guilan University of Medical Sciences	0.81	19.62
	The information and products I need can be found at Guilan University of Medical Sciences	0.83	34.35
	Content and services uploaded by Guilan University of Medical Sciences are pleasant for me	0.81	24.51
Atmosphere quality	The ease of commuting and having parking provokes me in selecting Guilan University of Medical Sciences	0.81	15.91
	The stunning appearance of Guilan University of Medical Sciences as well as staff appearance motivate me to select this center	0.88	35.56
	Trees and green area around Guilan University of Medical Sciences attract me to this center	0.66	9.56
	The green space around Guilan University of Medical Sciences shows respecting my interest	0.75	14.50
Quality of interaction	Guilan University of Medical Sciences shares information in a convenient format	0.81	19.04
	Guilan University of Medical Sciences has a high degree of activity in information and interindividual exchanges	0.87	35.90
	Guilan University of Medical Sciences creates exchange between host and members	0.78	15.92
	Guilan University of Medical Sciences has a high speed of service providing	0.75	10.88
Quality of process	The service of this organization is reliable	0.80	16.77
	It provides all the required health care	0.86	27.91
	It is convenient for me to understand the services provided by this organization	0.86	28.83
	By attending this organization, I achieve my therapeutic goals.	0.84	37.98
Satisfaction	The organization searches and evaluates its competitors to provide better customer service	0.87	34.62
	The staff communicates with customers with a smile, providing words with kindness	0.88	21.36
	The organization provides information to ensure customers' expectations and their status	0.89	34.91
	It encourages customers to feedback negative performance	0.83	26.11
Trust	Performance of Guilan University of Medical Science in dealing with you has been straightforward	0.89	34.33
	Guilan University of Medical Sciences clarify the secret of the business-related function for the patient	0.85	28.35
	Guilan University of Medical Sciences is honest about problems with patient service	0.92	47.47
Loyalty	I spend a lot of time using the service of this organization over other brand communities	0.86	30.40
	I transform this positive information to others	0.89	34.43
	I recommend this organization to others	0.87	31.44
	I recommend this center to my friends and others to use for their health care	0.91	59.89

Figure 1 shows the conceptual hypothetical model of study with relevant path coefficients. Table 3 indicates the

t-statistic values and test results of the corresponding studied hypotheses.



**Figure 1.** Structural equation model and path coefficients

**Table 3.** Path Coefficients and Results of Research Hypotheses

Hypothesis	T-statistic values	Path coefficient values	The result of the hypothesis
The quality of infrastructure has a positive impact on satisfaction	6.51	0.51	Confirmed
Object quality has a positive effect on satisfaction	3.48	0.20	Confirmed
The quality of space has a positive effect on satisfaction	3.22	0.11	Confirmed
The quality of interaction has a positive effect on satisfaction	2.22	0.09	Confirmed
The quality process has a positive effect on satisfaction	2.51	0.14	Confirmed
Satisfaction has a positive effect on trust	34.40	0.86	Confirmed
Satisfaction has a positive effect on loyalty	3.15	0.57	Confirmed
Trust has a positive effect on loyalty	2.01	0.19	Confirmed

The first paths in Figure 1 revealed the direct relationship between quality dimensions and satisfaction. Obtained values of path coefficients were positive and significant which indicate direct effect of quality dimensions on satisfaction. Satisfaction had a positive and significant effect on trust ( $r = 0.86$ ) and loyalty ( $r = 0.57$ ), and also trust had a positive and significant effect on loyalty ( $r = 0.19$ ).

### Discussion

The present study indicated a positive and significant relationship between service quality with loyalty, trust and patient satisfaction in patients referring to health and medical centers of Guilan University of Medical Sciences. This finding is in accordance with the results of Sharma et al. (14), Tayebi et al (7) and Hosseini et al (2). They showed a positive and significant relationship between these components. Infrastructure quality has a significant effect on satisfaction, indicating a direct impact between the two variables (6,14-16). The results of totian and Ansari research hypotheses (2016) showed that customer orientation has a significant and positive effect on social responsibility as well as perceived quality of services (8). Also, the results of Zareie and Musazadeh (2015) revealed that perception of service quality had a positive and strong effect on patient loyalty and about 47% of variance of patient loyalty was explained by dimensions of service quality (9).

The five quality factors (perception of price paid, quality of physical environment, visit quality, Information provided to the patient and the appointment process) were key determinants of outpatient loyalty in the educational studied hospitals. The results of Tayebi et al. (2012) investigation revealed a positive and significant relationship between service quality and service loyalty (6, 7).

This study suffered from some limitation: One of the restrictions was inconvenient sampling technique that may result in sampling bias. Only those patients with higher satisfaction may participate in the study. However, we tried to select sample from both health and medical centers that may better show the variability of sample perception and viewpoint. The time period of the research can also influence the results. The results could be more generalizable if longer period for the time domain of the research were considered. Also, based on the results of the hypotheses, the following hypothesis-based suggestions can be made.

It is recommended that Managers of Guilan University of Medical Sciences increase patient satisfaction through advertising, recognizing their loyal customers and flexibility

in their demands, offering better services such as reducing service time, participating in service plans, attending to personal services and fulfilling their promises and finally improve performance and motivate patients and give patients a sense of security. Employee's encouragement is also suggested to share information with competitors by building a sense of trust between staff and bosses. Creating trust in the organization is achieved through adherence to integrity, the exchange of views and values within the organization, the fairness of the staff, and the prioritization of shared goals over patient goals. It is recommended that in order to respond quickly to patients, different facades in different areas of the main building of the hospital should be provided, in this case, response to patients' needs is also speed up. Not only does this increase responsiveness, it also enhances the quality of patient care. Given that easy access to and communication with the physician is of particular importance in the quality of service, it is therefore recommended to have a more effective communication with the patient and to teach and Hospital should educate effective time management to its staff and emphasizes on issues that improve service quality. Considering that reliability and assurance of patients' health and comfort is the main process in the hospital system and makes patients comfortable Which provides convenience and comfort in the workplace of employees and ultimately leads to the provision of working conditions to provide better service quality for their patients and it makes patients feel comfortable when communicating with staff. Therefore, it is recommended to take measures in this regard to increase customer confidence and satisfaction. Primary office activities such as admissions can affect patients' perceptions of other dimensions of hospital service quality. The last hospital process that a patient faces when leaving the hospital is a discharge process that can be remembered as the latest hospital experiences. Therefore, facilitating the official processes and especially the admission process can create a positive impression of the hospital in patients' minds and lead to their satisfaction.

The communication dimension, among the main dimensions, has been the priority of patients. This dimension refers to the relationship between hospital service providers and patients and corresponds to the empathy dimension in the SERVQUAL model. Therefore, the importance of solving the patient's problem, respecting the patient and empathy with the patient are suggested to increase customer satisfaction. The results of this study can inform health care providers about the needs of patients so that they can plan to improve the quality of services.

**Conclusion**

The results of this study revealed that Infrastructure quality followed by object quality had greatest impact on satisfaction. Given that service quality is directly related to service delivery and the level of skilled and expertise of service providers, it is important to employ, train and empower personnel, especially physicians, nurses, staff and managers

**Ethical consideration**

The current study was approved by the Research Committee of North Rasht Strategic Nonprofit Institute, Rasht, Iran. Necessary introduction letters were obtained from the university, and written informed consent forms the study health care providers.

**Conflicts of interests**

Authors declared no conflict of interest.

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