

Designing a conceptual model for quality measurement in supply chain of health care services

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Abstract. Quality measurement of services is the fundamental prerequisite for quality improvement. Patients' satisfaction in health system is an important factor and having flexibility and the ability to change in order to response clients' needs are the symbols for organizations' survivance and development. For this reason, different models are designed and used for quality measurement. There is a need for an effective tool in identifying relevant criteria to develop a systematic service quality measurement process. This study aims to present a model for service quality measurement process.

Service quality in health care is complex and may vary even within the industry. It involves multiple criteria, uncertain and qualitative factors that are difficult to measure. By doing a literature review, the aspects of service quality measurement in health care sector were identified. After refining the aspects, data gathering from patients was done by the use of random sampling method. In order to analyze data, Structural equation modeling was used.

The results of the study show that the aspects of proposed model have high validity and reliability in measuring the quality of services in health care sector.

Reliability, responsiveness, assurance, unanimity, atmosphere and perception, outcome and social responsibility can be mentioned as the quality aspects of services in health care sector.

Keywords: supply chain of service quality, health care, Structural equation modeling.

1. Introduction:

One of the developing industries in hospital services field is health care which has the important role among all kinds of services. This importance is because of the relationship between hospital services and all society members. The other reason is that hospitals and other health care providers are responsible for treatment, care and health maintenance of people. Unfortunately although this field has a great importance but the way of offering services may sometimes lead to people's dissatisfaction because the tasks of these organizations are very critical and even small faults can cause tremendous harms [1].

Controlling and measuring the quality of health care services are the first important steps in offering services properly. Evaluation is the greatest requirement in hospitals all over the world [2]. On the other hand, attracting and maintaining patients as the customers' of health care system have become more difficult comparing to the past and the reason for this fact is increasing in people's awareness about health care issues

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also increasing in the number of health care organizations. These factors provide more alternatives for demanders of health care services and in this competitive market, the key element for success is trying more to satisfy clients.

By increasing the complexity of health care, the demand for improving patient safety and monitoring the quality of services has become a critical issue [3].

In order to improve the quality of care, health specialists should be trained in the field of how to offer care in an effective and efficient manner. But these specialists always face with difficulties in evaluating their experiences and this is mostly because of not being aware and know ledged about the methods of quality measurement. Medical institute has defined the quality of health care as following: "the degree of offering services that increases the possibility of achieving the determined objectives" [3].

The aim of quality measurement in health care services is to determine which output has had better performance. It should be mentioned that although there are many methods for measuring service quality but without using standards data for comparing organizations or comparing the output of one organization in different time scales, these measurements cannot lead to any improvement. On the other hand if these methods are being used inappropriately, any innovative improvement in health care quality can be achieved. For example specialists may focus on only one group and forget about other groups in quality improvement of services. This fact can lead to a kind of error in research [4].

Therefore, Quality measurement is mentioned as a strategic method by which the organizational performance is evaluated, clients' satisfaction is improved and operational efficiency is increased. This measurement requires identifying specific criteria for each organization. In this study we would achieve an integrated system of evaluation criteria on the basis of conceptual models of service quality measurement. The objectives of this study are as bellow:

- Determining the aspects and factors of service quality measurement in health care sector
- Offering a model for service quality
- Measuring unidimensionality
- Measuring the validity and reliability of the model

2. Material and Methods:

The process of doing this research has based on three fundamental steps: First, literatures available in the field of service quality measurement have been reviewed in order to perceive all the definitions and identify the aspects of research comprehensively. For this purpose, 60 studies were reviewed that the quality criteria mentioned by some of them are shown in Table 1 [5, 6, 7, 8, 9, 10].

Table 1. The summary of some researches done in the field of service quality criteria

Author	year	criteria
Parasuraman & Barry	1985	Physical environment, reliability, responsiveness, competency, politeness and openness of personnel, availability, communication, perceiving customers' need
Parasuraman & Barry	1988	Physical environment, reliability, commitment, availability, access, communication, perceiving customers' need, flexibility, sincerely, warranty services
White & Galbraith	2000	Physical environment, performance, technology, validity, openness, friendly manner, worrying about customers' need
Brady & Cronin	2001	Outcome, interaction, environmental quality
Gronroos	2001	Technical quality of results, practical quality of the process, reputation of the organization
Tucker & Adams	2001	SERVQUAL aspects, outcome, surveillance and worrying about customers' need
Yang & Peterson	2004	Reliability, responsiveness, competency, easy to use, safety and validity
Kang & James	2004	SERVQUAL aspects
Chu-Mei	2004	Interaction between personnel-customer, physical

		environment, outcome
Fowdar	2005	SERVQUAL aspects, outcome, professionalism, competency
Choi YKS, Lee H	2005	Technical quality, operational quality, Physical environment, official quality
Kang	2006	SERVQUAL aspects, Outcome quality

Most of the studies in the field of service quality measurement have used SERVQUAL method but regarding to the criticisms opponent to this model, preliminary refining of criteria has been done by the use of available literature reviews [11]. The results of this step were 9 aspects and 28 criteria [11, 12, 13].

The second step after doing free interviews with experts in order to refine aspects of the study was provision of paired compares questionnaire and distributing them among fourteen experts, managers and some of the hospital or health care sector workers educated and experienced in management skills. They were asked to grade the aspects on the basis of nine dots time scale. The output of this step was identifying 7 aspects and 21 criteria (table 2).

Table 2. Final aspects of the proposed model for service quality measurement

aspect	Criterion
reliability	Providing services properly in the first request of the customer (providing services in the right time) along with reliability of personnel in managing and resolving customers' problems.
responsiveness	Having the constant persuasion to help the customers. Being ready to respond customers' needs. Providing services quickly and without any hesitates.
warranty services	Having educated and competent personnel in responding customers' needs, providing safe and secure care, being kind and modest while communicating with customers
sincerely	Perceiving the customer needs, paying attention to him/her, and communicating in a intimate and friendly manner
Physical environment	Having modern equipments, decent and neat personnel, providing a pleasant environment for offering services
outcome	The effectiveness of services, the appropriate cost of services
Social responsibility	Paying attention to customers and feeling responsibility regarding to them

In the third step in order to measure the validity of model, the data were collected from patients by use of a questionnaire. Patients were asked to declare their perception about the service quality on the basis of seven lacerate scales. In this process, 142 questionnaires were collected and on the basis of the results shown in table 1, the research model was provided and examined.

In order to measure the validity of model, structural equation approach has been used. This approach is a statistical technique for testing and estimating causal relationships using a combination of statistical data and qualitative causal assumptions [14].

3. Results:

One of the most important aspects in evaluating a theory in every managerial concept is developing good criteria in order to achieve reliable and valid estimate from the mentioned structure. One of the essential conditions for evaluating validity and reliability is reviewing the unidimensionality of the measure which can be controlled by calculating comparative fitness index.

Comparative fitness index in this study is exactly 1 which shows the unidimensionality strength of the model.

Although unidimensionality is an essential prerequisite but, it does not show the beneficiary of the model by itself. Therefore, after checking the unidimensionality of the model, the reliability has been evaluated and internal consistency measured by Cronbach Alpha [11]. The Cronbach Alpha was calculated for every seven criteria in the study (table 3).

Table 3. The Cronbach Alpha of seven quality criteria in the study

critierion	Cronbach Alpha
reliability	0.839
Responsiveness	0.793
warranty services	0.757
sincerely	0.731
Physical environment	0.728
outcome	0.688
Social responsibility	0.808

In this study content validity and convergent validity were used to test the veracity and accuracy of the measure. Content validity ensures that all the aspects and factors reflecting our mentioned concept are covered in the measure [15].

The available approach is developed on the basis of analyzing conceptual and experimental literatures in the field of service quality measurement. Convergent validity can be calculated by the use of Bentler Bonett coefficient [14]. Table 4 shows the fitness measures of the research model.

Table 4. The fitness measures of the research model

Fitness measure	Desired limit	Estimated value
χ^2	*	140.98
RMSEA	<0.05	0.007
CFI	>0.9	1
ECVI	**	0.0268
RMR	<0.05	0.02208
GFI	>0.9	0.9091
NFI	Near to 1	0.9455
NNFI	Near to 1	1

4. Conclusion:

Health care managers' knowledge about service quality factors is a very important element in continuous quality improvement. Additionally, because of the increase in customers' knowledge and technology improvement, the quality aspects and factors have changed over the time. For the reason that the final objective for service quality measurement is quality improvement and increasing customers' satisfaction, therefore managers should determine the strength and weaknesses of their organization's services and plan for their improvement and modification effectively and efficiency.

This study provides a systematic approach for managers by comprehensively reviewing literatures, identifying the aspects and factors of service quality, measuring validity of the model and measuring the importance of these aspects.

For the reason that the mentioned methods and measures have somehow general aspect, the managers of other industries can also use this model successfully with a little revision. Innovations and specific characteristics of this research are as following:

- Providing a new model for service quality measurement in health care sector.
- Identification of aspects and criteria for service quality measurement in health care sector.

Comparing to other models, this method has several advantages as seeking consistency in judgments, being user friendly, etc. It also allows users to structure complex problems in the form of a hierarchy or a set of integrated levels. It can also be combined with well known operations research techniques to handle more difficult problems. This model can handle both qualitative and quantitative data effectively.

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