Osong Public Health Res Perspect 2016 7(4), 239–247
http://dx.doi.org/10.1016/j.phrp.2016.05.001
pISSN 2210-9099 eISSN 2233-6052

Centers for Disease Control & Prevention
Republic of Korea

ORIGINAL ARTICLE

Assessment of Service Quality in Teaching Hospitals of Yazd University of Medical Sciences: Using Multi-criteria Decision Making Techniques

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Received: March 29, 2016
Revised: April 25, 2016
Accepted: May 9, 2016

KEYWORDS:
FAHP,
hospital,
service quality,
SERVQUAL,
TOPSIS

Abstract
Objectives: Hospitals as integrated parts of the wide-ranging health care systems have dominant focus on health care provision to meet, maintain and promote people's health needs of a community. This study aimed to assess the service quality of teaching hospitals of Yazd University of Medical Sciences using Fuzzy Analytical Hierarchy Process (FAHP) and Technique for Order Preference by Similarity to Ideal Solution (TOPSIS).
Methods: A literature review and a qualitative method were used to obtain experts' viewpoints about the quality dimensions of hospital services to design a questionnaire. Then, using a self-made questionnaire, perceptions of 300 patients about the quality of delivered services were gathered. Finally, FAHP was applied to weigh each quality dimension and TOPSIS method to rank hospital wards.
Results: Six dimensions including responsiveness, assurance, security, tangibles, health communication and Patient orientation were identified as affecting aspects of hospital services quality among which, security and tangibles got the highest and lowest importance respectively (0.25406, 0.06883). Findings also revealed that in hospital A, orthopedics and ophthalmology wards obtained the highest score in terms of quality while cardiology department got the lowest ranking (0.954, 0.323). In hospital B, the highest and the lowest ranking was belonged to cardiology and surgical wards (0.895, 0.00) while in hospital C, surgical units were rated higher than internal wards (0.959, 0.851).

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Conclusion: Findings emphasized that the security dimension got the lowest ranking among SERVQUAL facets in studied hospitals. This requires hospital executives to pay special attention to the issue of patients' security and plan effectively for its promotion.

1. Introduction

As health care organizations are directly responsible for people's lifesaving, delivery of high quality services has got a particular importance to avoid them from preventable deaths and harmful injuries. Quality is a multidimensional concept with patient satisfaction as one of the important facets. Analyzing the quality of health care services from patients' viewpoint has beneficial implications for a hospital such as being helpful for strategy making in quality improvement [1,2]. Provision of health services in compliance with patients' needs and expectations increases the organizations' chances to survive in today's competitive environment [3]. To date, several definitions were used in regard to healthcare quality. British National Health System (NHS) defines healthcare quality as to provide the right services to the right people at the right time, with the right approach and in line with population affordability [4]. Gronroos introduced a two dimensional quality model comprised of technical and functional aspects [5]. Patients have difficulty in evaluating technical quality while functional sides can be easily evaluated by them [6]. Thus, patients evaluate the quality of health care services based on interpersonal and environmental factors, which offers to satisfy the requirements of patients in addition to their acceptance [7].

Several methods have been used to measure the quality of health services which are often faced with uncertainty [8,9]. To overcome such a problem and resolve ambiguities related to human judgements, the Multi-criteria Decision Making Models (MCDM) and fuzzy theories have been introduced in performance evaluation [10,11]. AHP is a structured technique for analyzing complex situations based on mathematics and psychology developed by Thoms L. Saaty in the 1970s. Those who apply AHP method, first break their decision problem down into a hierarchy of more realized subproblems, each of which can be analyzed individually. When the hierarchy is made, the decision makers thoroughly evaluate various factors by comparing them to each other in regard to their impact on an element above them [12]. TOPSIS model which has been proposed by Hwang and Yoon in 1981 [13] is a multi-criteria decision making model used to compare a set of choices by determining weights for each measure [14–16]. In this study, we tried to use MCDM to assess the service quality of teaching hospitals of Yazd University of Medical Sciences using Fuzzy Analytical Hierarchy Process (FAHP) and Technique for Order Preference by Similarity to Ideal Solution (TOPSIS).

2. Materials and methods

This was a descriptive, cross sectional study conducted in 2013 in hospitals affiliated by Yazd University of Medical Sciences. First, a literature review was done to extract quality dimensions in a SERVQUAL model (Figure 1). Then, the initial draft was revised based on 42 experts' viewpoints (including hospital managers, hospital technical employees and faculty members of healthcare management departments) and finalized through a qualitative method analyzing the data obtained from an expert panel. Finally, 29 sub-dimensions were selected which were categorized in six aspects. Then, a fuzzy AHP (analytic hierarchy process) was structured to evaluate the hospitals service quality and weigh identified dimensions.

As mentioned above, despite the widespread application of AHP in many decision-making problems, there is a criticism about the technique which focuses on its failure in managing uncertainties. To overcome such a dilemma, FAHP has been developed [17,18]. The method allows decision makers to include the uncertain situations in their judgments [19] (Figure 2).

In second phase of the study, a questionnaire was developed based on the literature review and expert viewpoints to analyze patients' perceptions about health services quality of Yazd hospitals. The Questionnaire was comprised of two sections, section A contained socio-economic characteristics of patients and section B encompassed 29 questions with 5-point Likert scaling system related to research objectives of the study. Content validity of the questionnaire was confirmed by experts and its reliability was tested through Cronbach's alpha which calculated as 0.92. The research population was inpatients of three training hospitals affiliated by Yazd University of Medical Sciences. Patients in ICU and pediatric wards were excluded due to inability to contribute in research. A total of 300 patients (considering d = 0.22, α = 0.05, SD = 1.9 and $n=\frac{(z_{1-\alpha/2})^2\times(SD)^2}{d^2}$) with at least 2 days length of stay contributed in the study. To collect the data, simple random sampling was used, that the admitted patients to each hospital, as an allocation proportional the number of patients and wards, samples are extracted for each hospitals and questionnaires and wards were distributed. Data gathered from completed questionnaires were analyzed using TOPSIS method and Excel software. Excel software is one of the most functional Microsoft Office