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# Identifying factors affecting hoteling quality in Iranian public hospitals using DEMATEL approach

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## Abstract:

**INTRODUCTION:** The most important goal of a proper health-care system is to provide good health. Today, patients do not consider hospitals as simply a place of rehabilitation; rather, they compare the hospital with a hotel in terms of environment, facilities, services, and quality of accommodation. This study aims to use DEMATEL approach to extract factors affecting the hoteling quality.

**METHODS:** This was a descriptive, cross-sectional study conducted in 2018. The study was carried out in two steps. In the first step, the factors affecting the hoteling quality were extracted, and in the second step, the DEMATEL technique was used to analyze and rank the cause and effect. The study population consists of all experts in the fields of medicine and health care (hospital managers, deputies, and faculty members familiar with accreditation and hoteling), among which twenty experts were selected using purposeful sampling and a questionnaire designed by the researcher consisting of 11 dimensions was distributed among them. The reliability of the questionnaire was calculated using Cronbach's alpha coefficient which was equal to 0.85 while its validity was confirmed using Delphi technique. DEMATEL approach was used for data analysis.

**RESULTS:** The results show that among factors, human factors and economical-financial factors and, among subfactors, maintaining human dignity and quick action in providing emergency services are among the most important factors affecting the hoteling quality. Maintaining human dignity and speed of action in providing emergency services to patients was identified as the most important factor in improving hoteling quality.

**CONCLUSION:** The results of this study can be used to evaluate the quality of accommodations and health facilities, medical equipment, and building quality of hospitals, which can lead to effective actions and improvement of patient satisfaction and the eventual success of health transformation plan.

## Keywords:

Assessment, DEMATEL, quality health care

## Introduction

Today, modern hospitals are designed inspired by hotels and by considering factors such as enhanced satisfaction of the patient and his/her family.<sup>[1]</sup> Quality is a familiar term, which is used in many organizations, whose most common and general definition is the alignment between what has been offered and what is required by the patient.<sup>[2]</sup> The quality of services is an

important factor for the growth, success, and continuity of an organization, and is one of the main factors for predicting the prospect of organizations.<sup>[3]</sup> Accordingly, today, it has been known as a strategic problem to improve the quality of services for organizations that function in the service sector (e.g. hospitals),<sup>[4]</sup> concepts such as service quality have replaced cost-effectiveness and production control.<sup>[5]</sup> Quality aims to fulfilling the needs of customers and plays an important role in improving customer satisfaction.<sup>[6]</sup>

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Today, the main mission of hospitals is the provision of high-quality care for patients and meeting their needs. Fulfilling this important mission necessitates internalization of quality in hospitals.<sup>[7]</sup> By providing high-quality services to customers and patients, in addition to gaining the satisfaction and loyalty of clients, hospitals can achieve profitability in addition to keeping their survival and develop better competitive conditions in the market for their health-care service.<sup>[8]</sup> Hospital hoteling is one of the important quality factors in hospitals. Based on that, hospitals can achieve a higher level of competitive advantage by enhancing patient satisfaction.<sup>[9]</sup>

Hospital hoteling is the most important criterion for customer satisfaction and can recover quickly and effectively the consent of patients and their relatives; hoteling involves factors related to inpatient convenience and security including inpatient room and bed, suitable space, and facilities (TV, sleepwear wall paint, and room space).<sup>[10]</sup> Due to their role in improving patient satisfaction, hoteling services are considered to be an important competitive factor of every hospital.<sup>[9]</sup> Hospital managers must be familiar with the concepts and importance of hoteling and hospitality and have enough information in order to create strategies to improve their health-care service, patient satisfaction, and general facilities.<sup>[11]</sup> It is a valuable asset which cannot be ignored by any hospital manager. Indeed, hoteling services are an important variable for guaranteeing quality in hospitals.<sup>[12-14]</sup> The concept of hoteling in hospitals is about hospitality and nonmedical services experienced by patients and their families from the moment of entering the hospital to the eventual discharge that can lead to satisfaction or dissatisfaction. Hoteling provides a warm and pleasant environment for customers (patients).<sup>[1,15]</sup> Emotional experiences are more important to patients than the classic model of service quality and can be affected by the patients' entire experience. A good experience grants a connection and means that patients and their families will return to the hospital when they need further services and might even recommend the hospital to others. The challenges of health care and medicine are larger than those of simple daily care; it can be an emotional connection which creates an emotional relation and dependence between patients and staff members.<sup>[16]</sup> The hospitality in health care is a complex process, which depends on precise planning and keeping various factors such as system commitments, hardship pay, and financial limitations. If these factors are investigated properly, an important opportunity will be developed for offering a warm hospitality in this sector and hoteling services will be performed well. In addition, in addition to developing quality in the provision of services, the hospital has succeeded in patient absorption and improving marketing.<sup>[17]</sup>

To this end, health-care organizations use various systems to attract patients and their families and improve the quality of hospitals.<sup>[18]</sup> In the area of medicine – health care, a combination of futuristic payment systems and patient-oriented strategy has motivated hospitals to attract patients (and thus income) through increasing the quality of services.<sup>[19]</sup> Shieh *et al.* in their study stated that professional and qualified medical staff is the most important criterion, after which good relations with patients and providing timely and immediate help are the most important factors affecting service quality in hospitals. In general, training, communication skills, and problem-solving abilities are among the factors positively affecting and improving patient satisfaction.<sup>[20]</sup> Another study also reported similar results in their study identifying key factors of patient satisfaction based on SERVQUAL and DEMATEL.<sup>[21]</sup>

The suggested factors affecting hoteling quality based on previous studies and the opinions of experts include performance factors, physical factors, human factors, safety factors, economic–financial factors, cultural (ethical) factors, general welfare factors, patient guidance, personnel selection, care services, and clinical welfare services.<sup>[10,16,17]</sup>

Therefore, due to the limited resources and facilities in organizations, especially health-care organizations, identification and prioritizing the factors affecting hoteling services quality is necessary.

This study was carried out by the DEMATEL approach to identify the factors affecting the improvement of the quality of hoteling services in Iranian public hospitals and identifying which factors were the most important and influential?

## Methods

### Research framework

This was a descriptive, cross-sectional study conducted in 2017. This research is a large study carried out in two phases.

#### *First phase*

In this phase, factors affecting the quality of hoteling services in hospitals were extracted through the literature review and an in-depth interview with 11 experts (11 factors and 96 sub-factors were identified and finalized).

This phase of the research is published in an article entitled "Factors affecting the quality of hospital hotel services from the patients and their companions' point of view: A national study in Iran."<sup>[1]</sup>

#### *Second phase*

After gathering factors and components affecting hoteling quality in Iranian public hospitals, in the second phase, a

pairwise comparison questionnaire was distributed among twenty experts including specialists and staff members working in hospitals in order to determine the effect of each factor on the hoteling quality of public hospitals.

Then, important and influential factors and the amount of interaction between factors affecting hoteling quality were extracted using the DEMATEL technique.

### DEMATEL methodology

DEMATEL technique was used for data analysis. This technique was first used in Battelle Memorial project in Battelle Memorial Institute of Geneva. The DEMATEL technique is generally used for complex international problems and in order to use the judgment of experts in science, politics, economy, and sociology.<sup>[20,22]</sup> This technique has various characteristics which include a capable process for identifying hierarchy and interfactor relations.<sup>[23]</sup> One of the advantages of DEMATEL technique compared to decision-making techniques based on pair comparison is that it accepts feedback from relations. In other words, factors in the system do not have to be independent from one another. The importance and weight of each factor is determined by all the factors in the system and the model as a whole.<sup>[20]</sup>

In this technique and based on the influencing and being influenced relations, factors influencing quality improvement were determined. The results revealed factors with greater interaction with the system (larger  $r_i + d_j$  which are factors that are influencing or being influenced by other factors to a greater degree and also factors with more positive  $r_i - d_j$  are more important). Regarding influenced factors, those with more influence on the system (larger  $r_i + d_j$ ) and are less influenced (smaller  $r_i - d_j$ ) are more important.

### Instrument

For data collection, paired comparison questionnaire was used. In this questionnaire, the effect of each criterion in relation to each other is determined. The method of responding to the questions and the scoring pattern is in the form of 0 = without effect up to 4 = very significant effect. The notable point is that the effect of one criterion on another should not be necessarily reverse.

### Sampling

Experts participating in this study included national experts in the fields of medical health care with sufficient experience in hospital hoteling who were selected using purposeful sampling.

## Results

The final results of the factors affecting the quality of hoteling services determined using Delphi method with

the final score of each factor according to the experts are shown in Table 1. After collecting and analyzing the opinions of experts, using paired comparisons, out of the 11 factors identified, 6 factors, and out of 96 subfactors, 16 subfactors had cause-and-effect relationships.

Then, a matrix was created using approaches and factors determined in the previous stage, with approaches and factors for improving the quality of hoteling services being its rows and columns, respectively. This matrix was distributed between experts who were asked to score each cell by comparing the pair on its respective row and column and give it a score between 0 and 4. The important part was that in direct relations between rows and columns, reverse relations were eliminated and indirect relations between rows and columns were not considered.

Based on the gathered questionnaires and matrixes and maximum rule, the relations between approaches, factors, and subfactors were identified, and then the median of the scores given by experts was calculated. Finally, based on the relations determined using pair-wise comparisons and the median score, a diagram of the relations between approaches, factors, and subfactors was created using 0–4 weight scores [Figure 1].

The direct relation matrices are prepared based on the relations and median of scores obtained from the previous stage [Table 2]. Then, according to relation 1 and relation 2, the normalized direct relations matrix was calculated across the criteria. Given the limitation of paper pages and impossibility of demonstrating the relevant calculations, Table 3 related to the level of criteria is presented.

$$S = mA$$

$$m = \min \left[ \frac{1}{\max_i \sum_{j=1}^n |a_{ij}|}, \frac{1}{\max_j \sum_{i=1}^n |a_{ij}|} \right] \quad \text{Eq. 1}$$

**Table 1: Factors affecting the quality of hoteling services in public hospitals**

Factors affecting hoteling quality	Final score
Physical	89.9
Performance	95.3
Financial-economic	86.3
General welfare services	86.3
Safety	92.2
Cultural	86.2
Humanitarian	92.3
Patient guidance	86.5
Personnel identification	78
Care services	88.1
Clinical welfare services	86.9

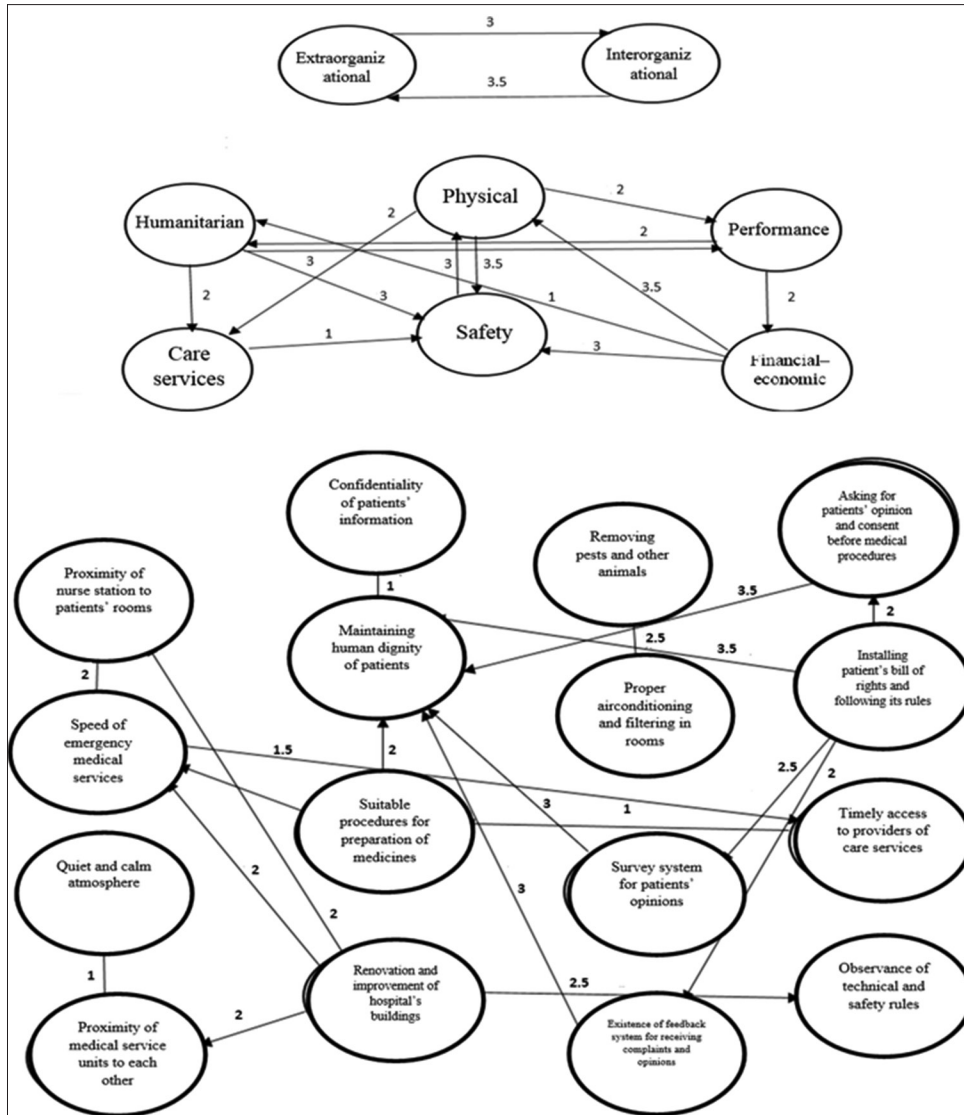


Figure 1: The relation between approaches, factors, and subfactors and the strength and weakness of these relations

$$T = S(1 - S)^{-1} \quad \text{Eq. 2}$$

Then, the total relation matrix of T that shows all direct and indirect relations between approaches, factors, and subfactors was calculated using equation 3 [Table 4].

$$r = [r_i]_{n \times 1} = \left[ \sum_{j=1}^n t_{ij} \right]_{n \times 1}$$

$$d = [d_j]_{1 \times n} = \left[ \sum_{i=1}^n t_{ij} \right]_{1 \times n} \quad \text{Eq. 3}$$

Data analysis in causal graph showed that based on  $r_i + d_j$  scores, human factors and economic-financial factors have higher impact on other factors affecting the quality of hoteling services. Based on the positive score of  $r_i - d_j$  performance, it was found that human and economic-

financial factors are in the cluster of influencing factors, whereas physical, safety, and care factors are in the cluster of influenced factors based on the negative score of  $r_i - d_j$ . It is also obvious that human and economic-financial factors are in both clusters [Figure 2].

### Discussion

The quality of services provided in some hospitals of the country, especially at the level of public hospitals, did not meet the wishes and expectations of patients and their companions.

Moreover, despite the burdensome diagnostic and medical costs and advanced technologies used in hospitals, patients' dissatisfaction with existing services is undeniable. This indicates the need to pay more attention to providing quality hotel services.

**Table 2: Matrix of direct internal relations of factors**

	Physical	Performance	Financial-economic	Safety	Humanitarian	Care services
Physical	0	0.02	0	0.02	0	0
Performance	0	0	0	0	0.01	0
Financial-economic	0.03	0	0	0.02	0	0
Safety	0	0	0	0	0	0
Humanitarian	0	0.2	0	0.02	0	0
Care services	0	0	0	0.01	0	0.01

**Table 3: Normalized direct relation matrix**

	Physical	Performance	Financial-economic	Safety	Humanitarian	Care services
Physical	0.000	1.42	0.000	2.5	0.000	1.42
Performance	0.000	0.000	1.42	0.000	1.42	0.000
Financial-economic	2.5	0.000	0.000	2.14	1.42	0.000
Safety	2.14	0.000	0.000	0.000	0.000	0.000
Humanitarian	0.000	2.14	0.000	2.14	0.000	1.42
Care services	0.000	0.000	0.000	0.71	0.000	0.000

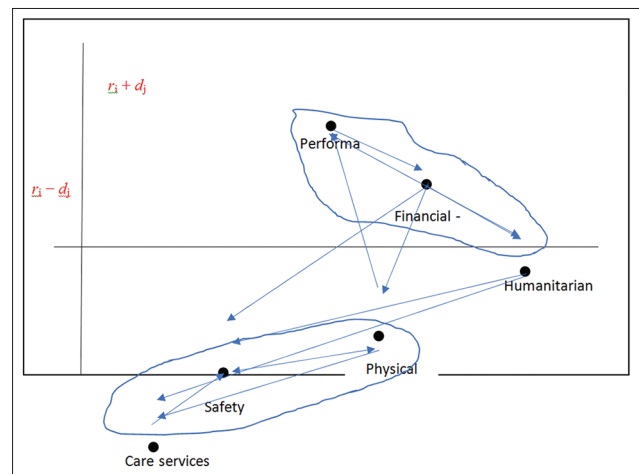
**Table 4: Total relationship matrix using  $r_i \pm d_j$  values**

Factors	$d_i - r_i$	$d_i + r_i$
Physical	-0.47	6.34
Performance	1.49	6.84
Financial-economic	0.85	7.61
Safety	-0.65	3.23
Humanitarian	0.25	8.45
Care services	-1.87	1.51

Given the above-mentioned facts, the results of DEMATEL method for identifying the factors affecting hoteling service quality of public hospitals are as follows:

- Approach level: Based on the results of DEMATEL technique on approaches, interorganizational approach can have the largest effect on other factors of this study. In total, 73% of the interactions in approach levels and 65% of all positive  $r_i + d_j$  scores belong to this approach. This shows that extraorganizational approach is effected by interorganizational approach and although this effect is mutual, the effect of extraorganizational approach on interorganizational approach was significantly lower
- Factor level: The factors at this level can be divided into three main categories. The most important factors in this level are human and economic-financial factors which are in the first category. Regarding the effects of human resources in hospitals and quality of services, other studies mention staff skill and health improvement<sup>[24]</sup> and skills, proficiency, accuracy, and professionalism of employees.<sup>[25]</sup>

In a systematic review study, the quality of services provided by well-trained and trained clinical staff is one of the organizational factors affecting the average patient stay in hospital. On the other hand, human factor has been mentioned as one of the four effective organizational factors in managing the length of hospital stay.<sup>[26]</sup> In addition to workforce, economics and costs



**Figure 2: A causal graph**

also play an important role and are the most important criteria; one way to increase people’s acceptance of hospitals is to provide hospital services in the shortest possible time at a reasonable cost; therefore, contracting with all insurers and accepting all types of insurance in public hospitals lead to reduced patient payout, which is one of the factors contributing to improved patient quality and satisfaction.<sup>[27]</sup>

The total score of influencing and being influenced (total of all interactions) in this category is 57% (32% and 25%, respectively). It is also worth mentioning that 72% of all negative  $r_i + d_j$  scores belong to this category. This means that this category is greatly influenced by other categories. The second category includes performance factors, which is the most influenced category. In total, 36% of all positive  $r_i + d_j$  scores belong to this category, which shows its influence on other categories. The third category includes physical, safety, and care factors, which do not belong to any of the previous categories and are less important in cause-effect relationships.

c. Subfactor level: The subfactors can also be divided into three main categories. The most important category includes maintaining human dignity and quick action in providing emergency services as its most important members. Maintaining human dignity and privacy of patients is also mentioned in other studies.<sup>[28,29]</sup>

Research has shown that speed and accuracy in delivering administrative and client workflows increases patient loyalty.<sup>[30]</sup>

Other subfactors of this category including environment quality, process quality, and the quality of interactions between patients and medical staff are also considered to be among the quality indicators of hospitals.<sup>[13]</sup> These results show that privacy is among the basic human rights and maintaining it during medical procedures is necessary, which leads to maintaining the human dignity of patients.

The way the hospital staff treats and respects the patient's rights and cares about their needs, in addition to improving the hoteling quality, is also effective in selecting hospital by the patients.<sup>[30]</sup>

The total scores of influencing and being influenced (total of all interactions) in this category is 46% (26% and 20%, respectively). The second category includes displaying the patients' rights charter and improvement of physical spaces and suitable procedures for providing medication in hospital which have the highest amount of influence. These subfactors include 16% of all negative  $r_i + d_i$  scores, which shows that this category greatly influences others. The third category includes confidentiality of patients' information; consensus and consent of patients at the start of medical procedures; lack of bugs and pests in the hospital; proximity of nurse stations to hospital rooms; calm and quite atmosphere; close proximity of care units to each other in order to prevent extra travel time; gathering the opinions of patients on food, care services, and timely diagnosis; having a system for managing suggestions and complaints in the hospital; availability of care providers when needed; asking for patients' consent and permission before a medical procedure; and proper airconditioning and filtration in the wards. These subfactors belong to neither of the previous categories and therefore have less important cause-effect relations.

Improving the quality of hospital hoteling services is one of the goals of health transformation plan, which plays an important role in improving patients' satisfaction. Based on international trends, health-care sector in Iran faces great challenges which increase the need to improve the quality of hospital services in both clinical and hoteling aspects.

## Conclusion

Therefore, in approach level, interorganizational approach has the greatest influence on hoteling quality. In the factor level, human factors and economic-financial factors are the most influential factors. Finally, in subfactor level, maintaining human dignity and quick action in providing emergency services is the most influential subfactor in improving the quality of hoteling services.

This can indicate the particular importance of speed of action in providing service and respect and attention to the patient due to the vitality of the hospital services and the specific mental status of the patients, which can underpin many organizational planning and staff training.

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## Conflicts of interest

There are no conflicts of interest.

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