

The Relationship among Quality Transformation, Quality Requirements and Quality Dimensions of services in Hospitals under Supervision of Medical Sciences Universities and Presenting Model

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Abstract

Background: According to quality transformation of services during the time, the quality requirements and standards also change and recognition of these requirements and transformation process can assist in recognizing the quality dimensions of services. The aim of this research was to explain the transformation process, requirements and quality dimensions of services in hospitals.

Methods: The present study is a descriptive research of correlational type that used measuring method. In the study, the hospitals affiliated to Medical Sciences Universities were chosen from 4 provinces of Tehran, Fars, Lorestan, and Yazd. 432 staff members answered the quality requirements and transformation process questionnaires; 500 customers answered quality dimensions questionnaires. Data analysis was done using Pearson correlation coefficient, exploratory factor analysis, confirmatory factor analysis, and structural equation.

Results: The results showed that quality transformation in the studied hospitals with an average of 3.34 was more than the satisfaction and the quality requirements with an average of 3.75 was in a good level; also, the quality dimensions with the average of 3.61 was also in a good level. Moreover, there was an inverse relationship between quality transformation and quality requirements and a direct relation between quality requirements and quality dimensions. There was no statistical meaningful and direct relationship between quality transformation and quality dimensions.

Conclusion: Based on the results of the study, among 4 steps of quality transformation, our country Iran is in the quality control step. Moreover, based on opinions of hospital staff, professional requirement is the most important one among quality requirements components. Also, according to the customers' viewpoint, if the service is provided with high security, then it is a high quality service. Therefore, quality control together with professional requirement can make a high secure service that contains all quality dimensions.

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Introduction

Nowadays, in the globalization process and spontaneous joining to competitive continuum, countries face numerous problems.¹ Quality is one of the challenges that organizations' management is dealing with. Quality of services is a substantial factor for organizations development, achievement and persistence.² That is why most of the organizations and institutes providing services are looking for the ways to improve quality level of their services in order to not only possess the market, but also improve the quality of their services.³ Also, after 1990 when global dimensions of quality concept was taken into account by organizations, services providers and their customers⁴ as well as most of the experts believe that the best and most secure way to gain achievement is to stay alive in customers' mind. The goal is attainable through providing high quality products and services so that having enough knowledge about the concept of quality and trying to improve it leads to provision of higher quality services,^{5,6} as investigating different industries have proven that high quality services is a basic contributor in customers' satisfaction and loyalty.⁷⁻¹¹ This is especially important in healthcare because the patients' satisfaction was recognized as a key factor related to efficiency of organization.^{12,13} Patients' satisfaction has a high effect on their contribution in care and treatment processes.¹⁴

In fact, transformation process of quality services include 4 phases; the first phase is involvement in quality control that is doing essential controls for comparing and adjusting the product to its determined demands as well as its desirable standards.¹⁵ The second phase that is called "quality guaranty phase", involves more coordination and harmony than merely discovering and solving problems and bugs, and the focus is on the whole production continuum with the cooperation of all professional and expert groups.¹⁶ In the third phase, called quality system phase, the concept of quality is expanded to broader meanings so that it is not comprised of only functional features of product, but also service features such as delivery and support are contained.¹⁵ In the new phase, integrated systems of work and organization are planned with the purpose of obtaining customers' satisfaction.¹⁷ In other words, organizations' success depends highly on their ability to identify the customers' needs as well as their quick and low price services for customers that meet their demands.¹⁸ This is considered as success in providing services for customers that require perfect commitment to customers and understanding quality requirement¹⁹ and its 4 components (competitive requirement, accountability requirement, professional requirement and ethics requirement) as incentives to compete those organizations that actively consider their quality standards. Focusing on customers' needs, as the core concept of quality, is one of the

most effective tools of competition and permanence that refers to competitive requirement.²⁰ Moreover, accountability requirement describes an employee's level of responsibility toward services he/she provides.¹⁵ Professional requirement includes essential commitment to meet the customers' needs through application of the most appropriate operation. Ethics requirement means that customers are worthy to receive services with the highest quality.²⁰

Also, providing high quality services for customers and gaining their satisfaction require recognition of service quality dimensions and understanding the importance of each dimension for customers as well as analyzing their expectations related to each of these dimensions.²¹ Service quality is considered as a basic factor of organizational development and achievement and it is a strategic, effective and pervasive issue in the organization's agenda.²²

Service quality dimensions in the present study include:

- Security: high safety of services and products.
- Politeness: employees' politeness and manner when dealing with customers.²³
- Reliability: service providers' bailment, faith and honesty at work.¹⁵
- Accountability: employees' tendency to help customers and delivering services to customers as fast as possible.²¹
- Speed: being fast and careful in delivering services and to make sure of service delivery accuracy.¹⁵
- Competency: level of skills, expertise and professionalism when delivering services.²⁴
- Availability: quick and easy access to services.²³
- Flexibility: organization's ability to adapt to changes and demands.
- Tangibles: physical equipment, materials, facilities, regular well-ordered documents and employees.²⁵
- Sympathy: organization empathy and attention toward customers.²¹
- Professionalism: having high skills and capability when doing tasks in the best possible way.²³

The abstract and vague structure of service quality from one side and much importance of improving service quality from the other side^{26,27} caused evaluating services quality to be considered as a key step in codifying improvement plans of service quality.²⁸ Because of difficulties and problems arising in defining and measuring the plans, there is not an integrated thorough consensus about them.²⁹ One of

the key principals of quality debate is definition of quality requirements and quality dimensions such that their measurement and definition is essential.³⁰ Managing hospital affairs and coordinating different parts of hospital regarding narrow resources as well as increasing demands relating to services quality and finally public health are critical issues.³¹ therefore, one of the main problems of public hospitals (government hospitals) is their services quality.³²

Providing satisfactory and affordable services in the best possible way and in the shortest time are the most important objectives of healthcare institutes, besides regarding “quality” as a core concept of healthcare systems; delivering poor quality services leads to more diseases, handicaps, higher costs and lower trust to healthcare systems.³³ Although many studies have been done on the ground of quality requirements and quality dimensions, no research has been done on quality transformation. So, the absence of an integrated study about what situation our country has in different steps of quality transformation was deeply felt. Also, the relationship of this variable to quality requirements and quality dimensions of services was not studied before. Therefore, the main objectives of the present study were to recognize and describe the quality transformation, quality requirements and quality dimensions variables and to study the relationship between these 3 variables in the hospitals affiliated to Medical Sciences Universities of our country.

Methods

This study started in the first half of 2014 and finished

in first half of 2015; it was carried out in the hospitals affiliated to Medical Sciences Universities from 4 provinces.

The present study used Cobb’s (1999) model for designing quality transformation variable as a predictor variable and also Edward’s (1990) model for designing quality requirements variable as a moderator variable plus a combination of 3 models of Gronroos (1988), Johnston (1995) and Parasuraman (1988) for designing quality dimensions of services variable as a criterion variable (Table 1).

According to normal distribution of data and their quantitative nature, Pearson correlational coefficient was used to investigate the relationship between variables.

This study is descriptive from correlational type that was carried out using measuring method. The results were obtained from estimating samples of 4 provinces of Tehran, Fars, Lorestan and Yazd. The sampling was done using multistep cluster method in a way that cluster sampling method was applied for selecting the first sample group while simple random sampling method was applied for selecting the second sample group. The size of the first group was determined 432 staff of hospitals using Cochran formula and that of the second group was considered as infinite number of customers of hospitals but in order to set a congruence between the numbers of the two groups, the number of second group was determined as 500 people from the customers (Table 2).

Two different groups answered 3 questionnaires (quality transformation, quality requirements and

Table 1: The number of indexes of each variable and number of questions in the questionnaires

Variable	Component	Number of index
Quality transformation	Quality control	Reviewing (13 questions)- using statistical techniques (5 questions)
	Quality guaranty	After sale service (5 questions)- internal audit(11 questions)
	Quality systems	Adjustment to quality requirements (5 questions)- quality documentation (7 questions)
	Integrated systems of work and organization	Paying attention to customer demands (9 questions)- employees’ participation (4 questions)
Quality requirements	Competitive requirement	6 questions
	Accountability requirement	5 questions
	Professional requirement	5 questions
	Ethics requirement	4 questions
Quality dimensions	Tangibles	4 questions
	Reliability	5 questions
	Accountability	4 questions
	Security	4 questions
	Sympathy	4 questions
	Flexibility	6 questions
	Accessibility	3 questions
	Competency	6 questions
	Speed	4 questions
	Politeness	5 questions
Professionalism	7 questions	

Table 2: Statistical population and sample size in hospitals affiliated to Medical Sciences Universities

No	Name of province	Number of hospitals	Number of staffs	Samples
1	Tehran	95	9344	271
2	Fars	41	3452	101
3	Lorestan	14	1160	34
4	Yazd	12	811	26
Total	4	162	14767	432

quality dimensions) such that 432 hospital staff, as the first sample group, answered quality transformation questionnaire and quality requirements questionnaire, while 500 customers, as the second sample group, answered the quality dimensions questionnaire.

To investigate the relationship between variables, encoding method was applied when distributing questionnaires such that each customer recognized who he/she was connected to. Thus, the researcher was unable to pair the information of each customer to its related staff and then the data were used in testing the hypothesis.

Quality transformation questionnaire is composed of 59 questions, each with 5 answer choices beginning with completely agree to completely disagree at the end.

Moreover, quality requirements questionnaire contains 20 multiple choices questions, 4 choices for each, beginning with completely agree to completely disagree at the end. Quality dimensions questionnaire is also composed of 52 multiple choices questions, 4 answer choices for each, beginning with completely agree to completely disagree.

Notably, the questionnaires were distributed among the staff usually in night shifts and even if they didn't have enough time to fill out the questionnaires, they were asked to do it in their free time or after some determined time (often 3 days). The customers' questionnaires were answered normally by patients or their attendants and in case they did not cooperate, they were encouraged to answer questionnaire through the researcher's explaining the importance of study and its results in improving quality of services as well as keeping the privacy of their information.

The study used content validity method for determining the validity of research that showed to be 0.88 for quality dimensions questionnaire, 0.84 for quality transformation questionnaire, and 0.91 for quality requirements questionnaire. Cronbach's alpha was used for estimating the final factor; also, the reliability of the questionnaires was 85.1 for quality dimensions, 77.5 for quality requirements, and 83.7 for quality transformation.

Data analysis was carried out in the form of two statistical parts as:

- Descriptive statistics: research data were described using mean, median, mode, frequency,

percent of frequency and box plot.

- Inferential statistics: the study used Pearson correlation coefficient to determine the relationship between quality transformation, quality requirements and quality dimensions components and total analysis was done in three levels of exploratory factor analysis, confirmatory factor analysis and Structural equation.

Also, data analysis was conducted using SPSS, MINITAB version 17 and LISREL version 8.8. The significance level was considered 0.05.

Results

Based on the results obtained from hospitals of the 4 mentioned provinces, quality transformation variable was in a level upper than satisfactory with the mean of 3.34; quality requirements variable was in a good level with a mean of 3.75, and quality dimensions variable was in a good level with the mean of 3.61.

According to the relationship between variables of quality transformation and quality dimensions, as the amount of $-P$ (0.166) obtained from the test was more than the significance level of 0.05, then it cannot be claimed that there is a significant relationship between the two variables. It shows that although transformations happened in quality, quality dimensions weren't observed. Besides, in investigating the relationship between quality transformation and quality requirements, as the amount of $-P$ (0.030) obtained from the test was lower than the significance level of 0.05, then it can be said that there was an inverse relationship between the two variables. This result indicates that although quality transformation is achieved, the process of quality requirements was inverse.

Also, as the amount of $-P$ (0.003) obtained from the test, in reviewing the relationship between quality requirements and quality dimensions, was lower than the significance level of 0.05, the null hypothesis is rejected and therefore it can be claimed that there was a direct relationship between the two variables. In other words, quality dimensions can be achieved based on quality requirements.

The relationship between components of quality requirements and quality dimensions variable was estimated and the results showed that there was a direct relationship between competitive requirement

(with correlation coefficient of 0.107) and professional requirement (with correlation coefficient of 0.131) as well as between ethics requirement (with correlation coefficient of 0.110) and quality dimensions. Furthermore, there was no significant relationship between accountability requirement and quality dimensions (with correlation coefficient of 0.008). This shows that given fair competition between the staff and their commitment to work and organization code of ethics, they can deliver high quality services.

Based on the results obtained from evaluating the relationship between components of quality transformation and quality dimensions variable, there was a reverse relationship between quality control and quality dimensions (with correlation coefficient of -0.102); also, there was no significant relationship between quality guaranty component (with correlation coefficient of -0.086) and quality systems component (with correlation coefficient of 0.084) as well as between integrated systems of work and organization component (with correlation coefficient of 0.001) and quality dimension variable.

The study of the relationship between quality requirements components and 3 components of quality control, quality guaranty and quality systems showed that ethics requirement had the strongest relationship with these 3 components (Tables 3 ,4, 5).

Also between integrated systems of work and organization and quality requirements components, the component of professional requirement had the strongest relationship with integrated systems of work and organization (Table 6).

To estimate the goodness of fit of all models, the scales of GFI, NNFI, NFI, RMSEA and GFI were applied. The researchers considered RMSEA (Root Mean Square Error of Approximation) value for lower than 0.08 as a suitable goodness of fit of model. RMSEA value of model in the present study was 0.058. On the other side, the researchers considered the value of χ^2/df for lower than 3, as acceptable,³⁴ and in the present study this value was 2.706. The value of AGFI, GFI, CFI, IFI, TLI, NFI and RMSEA was a variable number from 0 to 1; the values closer to 1 show more

Table 3: The relationship between quality control and components of quality requirements

Variable	Quality control	Competitive requirement	Accountability requirement	Professionalism requirement	Ethics requirement
Quality control	1				
Competitive requirement	**0.184	1			
Accountability requirement	**_0.173	**0.224	1		
Professional requirement	**_0.356	*0.116	**0.355	1	
Ethics requirement	**_0.362	0.076	**0.288	**0.470	1

*Meaningful in 0.05 level, **Meaningful in 0.01 level

Table 4: The relationship between quality guaranty and components of quality requirement

Variable	Quality guaranty	Competitive requirement	Accountability requirement	Professional requirement	Ethics requirement
Quality guaranty	1				
Competitive requirement	**0.157	1			
Accountability requirement	-0.053	**0.224	1		
Professional requirement	**_0.232	*0.116	**0.355	1	
Ethics requirement	**_0.251	0.076	**0.288	**0.470	1

*Meaningful in 0.05 level, **Meaningful in 0.01 level

Table 5: The relationship between quality systems and components of quality requirements

Variable	Quality systems	Competitive requirement	Accountability requirement	Professional requirement	Ethics requirement
Quality systems	1				
Competitive requirement	**0.124	1			
Accountability requirement	**0.329	**0.224	1		
Professional requirement	**0.328	*0.116	**0.355	1	
Ethics requirement	**0.387	*0.076	**0.288	**0.470	1

*Meaningful in 0.05 level, **Meaningful in 0.01 level

Table 6: The relationship between organization and work integrated systems and components of quality requirements

Variable	Organization and work integrated systems	Competitive requirement	Accountability requirement	Professional requirement	Ethics requirement
Organization and work integrated systems	1				
Competitive requirement	0.002	1			
Accountability requirement	**-.0196	**0.224	1		
Professional requirement	**-.0277	*0.116	**0.355	1	
Ethics requirement	**-.0161	0.076	**0.288	**0.470	1

*Meaningful in 0.05 level, **Meaningful in 0.01 level

appropriate goodness of fit of model. Meanwhile, the values more than 90% also show the goodness of fit of model.³⁵ In the present study, GFI (Goodness of Fit Index) value was estimated for 0.96, AGFI (Adjusted Goodness of Fit Index) for 0.93, CFI (Comparative Fit Index) for 0.97, NFI (Normed Fit Index) for 0.93, NNFI (Non-NORMED Fit Index) or TLI (Tucker-Lewis Index) for 0.95 and IFI (Incremental Fit Index) for 0.97. Totally, according to the aforementioned indexes it seems that the model used in the present study was of a good fit index.

To make sure of the validity of data as well as authenticity of sampling, the Kaiser-Meyer-Olkin index (KMO) was applied (exploratory factor analysis). Based on the results, regarding the quality of sampling, the KMO value of quality requirement variable was for 0.841, KMO value of quality transformation variable was for 0.891 and KMO value of quality dimensions was for 0.78; all of these 3 values are acceptable. According to the significance level of Bartlett test ($P < 0.05$), the appropriate condition for conducting factor analysis was provided. To conduct the confirmatory factor analysis, Chi-square, RMSEA and GFI tests were used. The acceptance level of Chi-square test was lower than 5 so 2.46 was calculated for quality requirements variable, 2.51 for quality control, 3.19 for quality guaranty, 2.12 for quality systems, and 2.66 for integrated systems of organization and work. The acceptance level in RMSEA test was less than or equal to 0.08 ($0.08 \leq$). In calculations, this score was 0.058 for quality requirements, 0.059 for quality control, 0.066 for quality guaranty, 0.051 for quality systems, 0.052 for integrated systems of work and organization, and 0.057 for quality dimensions. The acceptance level for GFI test was more than or equal to 0.90 ($0.90 \geq$); in calculations this score was obtained 0.95 for quality requirements, 0.91 for quality control, 0.95 for quality guaranty, 0.93 for quality systems, 0.92 for integrated systems of work and organization, and 0.98 for quality dimensions. Meanwhile, based on goodness of fit indexes, the model was of a good fit.

In this model (Figure 1), rectangles show variables and ellipses show latent variables (structure). Coefficients in the diagram are the route coefficients.

Coefficients between variables and independent latent variables (between each factor and its dimension) show standardized factor load while coefficients between latent variables show the regression coefficients. Factor load is a value that refers to level of relationship between latent and non-latent variables. Quality control component related to quality transformation variable (with factor load of 0.90) and professional requirement component related to quality requirement variable (with factor load of 0.75) as well as security component related to quality dimensions variable (with factor load of 0.65) had the highest effect on determining its related variable. In other words, these components have a more important role in explaining the related variable than other components (Figure 1).

Route coefficients indicated the relationship and type of that relationship between main variables such that coefficient of route between quality transformation variable and quality requirements variable showed an inverse relationship (-0.55). Coefficient of route between quality transformation and quality dimensions showed an inverse relationship between the two variable (-0.13) and coefficient between quality requirements and quality dimensions revealed a direct relationship between the two variables (0.51).

Discussion

The results of the study showed that there was no significant (meaningful) relationship between the main variables of quality transformation, quality requirements and quality dimensions that means although a transformation happened in quality, we couldn't recognize the dimensions of services quality. Moreover, according to the inverse relationship between quality transformation and quality requirements, it can be concluded that transformation process of services quality has an inverse role in determining the quality requirements. However, the direct relationship between quality requirements and quality dimensions in the present study shows that through paying more attention to quality requirements and following them, it is possible to recognize the dimensions of services quality; also, based on the results, regarding the relationship

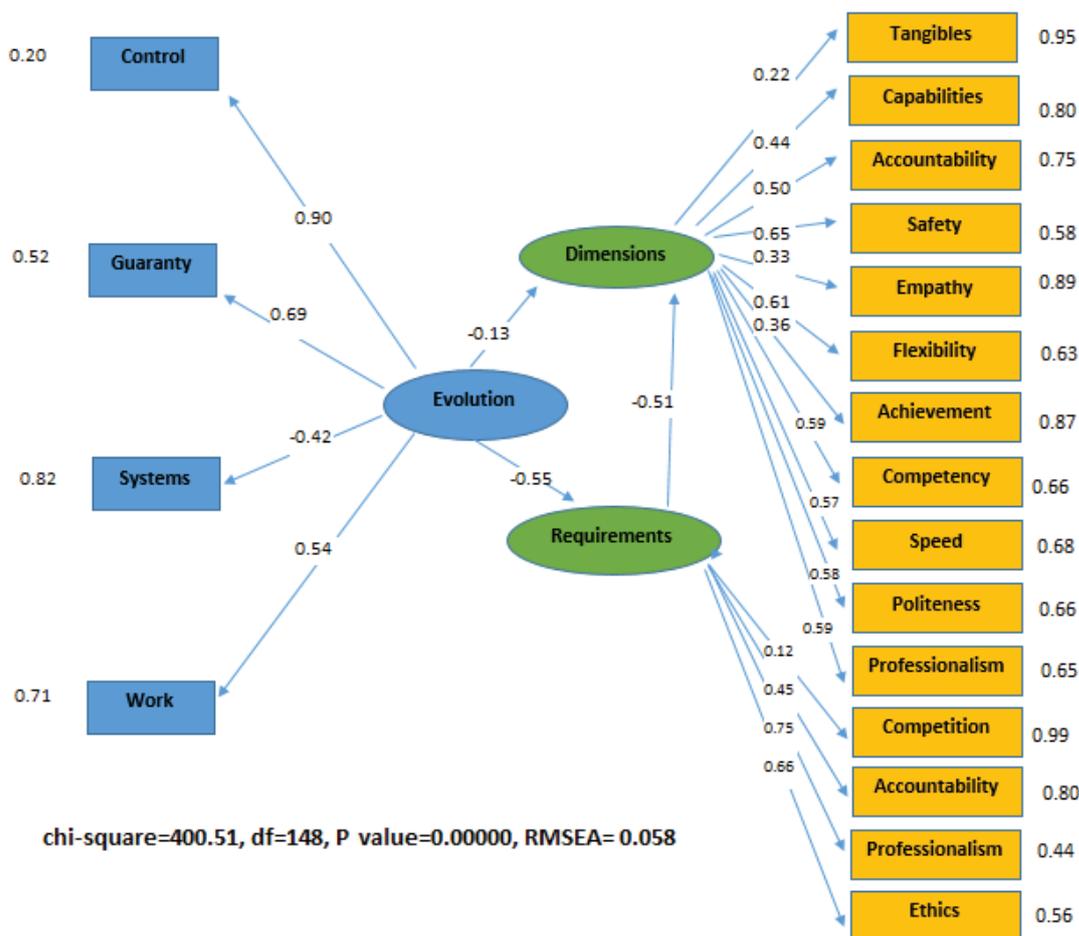


Figure 1: The final model of the study.

between quality requirements and quality dimensions of services, competitive, ethical and professional requirements have the strongest relationship with quality dimensions implying that nowadays the society is much more sensitive and responsible toward activities of organizations than before, specially toward immoral activities of organizations.

Recently, working ethics attracted much attention such that understanding morality concept, both generally and specifically in business environment, is considered as an essential substructure for creating and preserving ethical system in the society and consequently in organizations.³⁶ It is possible to say that professional requirement is one of human features that can be referred to as satisfaction from the heart or commitment to perform duties and responsibilities in the best possible way in a situation that there is no supervision system.³⁷ Therefore, determining the level of motivation in service employees who perfectly do their tasks and making sure of high quality of services delivered to customers enable the organization to preserve the current customers in addition to attract new customers. Thus, through focusing on quality requirements practically, it is not difficult to achieve quality dimensions.³⁸ Obviously, physicians and nurses need to increase their knowledge and information

in order to recognize the patients' expectations and pay more attention to ethics as well as increase their commitment to work that consequently leads to having more empathy, harmony, contribution and speed in delivering services.

Various studies conducted in this field also indicate that ethics can be considered as a source of employees' quality of work. Many researchers and theorists consider a working environment with high working quality as an ethical workplace because such an environment would be expanded just if managers would trust their employees and staffs.³⁹

Regarding the relationship between quality transformation and quality requirements variables, there was a direct relationship between components of competitive requirement, quality control and quality guaranty. Besides, all of 4 components of competitive requirement, professional requirement, accountability requirement and ethics had a direct relationship to quality systems and inverse relationship to integrated systems of work and organizations. Thus, increasing the feeling of competition in the workplace as well as developing a motivating climate and fair competition between employees can help to achieve quality control and quality guaranty at work. Through creating

commitment to work in employees and encourage them to observe the organization's code of ethics plus having accountability toward the customers' demands, it is possible to develop and apply quality systems in the organization.

To pay enough attention to ethics and observing them in the organization is a key issue in the current global economy; and organizational ethics and behaviors are basic contributors of creating and preserving long term relationship between organization and customers.⁴⁰ Among service quality dimensions, safety was of highest coefficient and tangibles (appearance) was of lowest coefficient and this result corresponds to those of Sabahidgoli's⁴¹ research. It shows that physicians and nurses' behavior toward patients as well as employees' sufficient knowledge when answering the patients and their relatives' questions and is of much more importance and creates trust in patients about receiving a safe service, rather than merely focusing on appearance of the hospital and employees or modern facilities and equipment.

The results of the present study also indicated that there was a direct relationship between integrated systems of work and organizations and professional requirement and it refers to the physicians and nurses' commitment toward satisfying the patients and their attendants' demands. This shows their professional performance and consequently increases their contribution in caring and paying more attention to patients.

Among service quality dimensions, safety at first and then flexibility and professionalism were respectively at the second and third level of importance for patients while tangibles dimension was of the lowest importance. This shows that the patients and their attendants' first demand is receiving safe services. It means that physicians and nurses must have sufficient knowledge to be able to answer the patients' questions be able to work with equipment and facilities. Flexibility dimension, at the second level of importance for patients, shows that physicians and nurses can manage the patients' needs and do their tasks at the same time. Also, doing tasks accurately and carefully with of the fewest possible mistakes plus high ability of dealing with tasks that refers to professionalism dimension are of much importance for patients.

Through evaluation of quality transformation, it was recognized that in the current situation, our country is at the first step of four steps of quality transformation that refers to the necessity of the managers' more attention to the customers' needs and also the necessity of the employees' more contribution in providing high quality services for customers as well as sharing their knowledge and experiences in the

workplace to their colleagues. Observing all of these factors leads to the employees' professionalism and then achieving professional requirements that together with ethics can deliver a type of services that makes the customers sure about receiving a secure service.

In general, medical and healthcare organizations need a modern management system based on codified methods that is authorized with enough access to resources in order to enjoy better accountability of management. We suggest that the determined standards should cover various aspects of services to improve their quality. Also, the staff should be able to deliver a high quality service to customers through observing fair competition issues and promoting themselves in organization. To do so, the staff firstly require to learn necessary skills and abilities. Then they would be capable to work in providing services in line with the organization's policies with more knowledge about their job. Managers of organizations should develop motivating and rewarding systems to improve the employees' responsibility more towards organization's interest rather than their personal benefits.

Conclusion

According to the final model of the study, it was found that there was an inverse relationship between quality transformation variable and quality requirements variable while there was no relationship between quality transformation and quality dimensions variable. Besides, there was a direct relationship between quality requirements and quality dimensions. Moreover, among 4 steps of quality transformation variable, the quality control, among 4 components of quality requirement variable, the professional requirement component and among the components of quality dimensions variable the security component can best explain the related variable regarding higher standard factor load. Based on these conclusions, quality control together with professional requirement can be useful for providing a safe service with high quality because quality control is a way for physicians' and nurses' individual and professional learning. They can acquire professional requirements standards through respecting their profession, paying more enough attention to patients, increasing their scientific knowledge related to their profession and educating essential and sufficient trainings for dealing with the patients' needs.

So, it is proposed that managers in hospitals and medical health care systems to should emphasize more the dimensions of quality of services as public hospitals and medical centers deal with a huge number of customers and patients that need much more attention. Moreover, managers should meet the patients' needs in the shortest time possible through cooperation and sympathy with colleagues and

learning necessary skills and expertise.

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