Determination of Gap in Accreditation Standards Establishment Process Using Zachman Framework at a Health-Educational Hospital

Saeed Asefzadeh,[1] Jahanara Mamikhani,[1] and Elahe Navvabi[1,*]

[1]Department of Health Service Management, Faculty of Health, Qazvin University of Medical Sciences, Qazvin, IR Iran

[*]*Corresponding author*: Elahe Navvabi, Department of Health Service Management, Faculty of Health, Qazvin University of Medical Sciences, Qazvin, IR Iran. Tel: +98-9124121556, Fax: +98-2877555189, E-mail: elahenavvabi@gmail.com

Abstract

Background: Accreditation is usually a voluntary plan supported by a non-governmental institution and trained evaluators that examine the competency of organizations providing health service according to pre-specified performance standards.

Objectives: The current study aimed to determine the degree of establishment of accreditation standards using logical framework of Zachman.

Methods: This descriptive research was conducted during year 2015. The population of the study included people involved in the establishment of accreditation standards. Sampling was conducted in the form of complete enumeration according to 36 standards of accreditation. The instrument used for data collection was the "Logical framework of Zachman". Columns of framework consisted of people involved in conducting the work (Who), the purpose of the work (Why), strategy of the work (What), work time (When), and sub-system of doing work (Where) and way of doing work (How), and rows of framework included the view of hospital chief, director/assistants of hospital, officials and personnel. Test chi-square was used to compare between accreditation standards text and studied hospital gap. Descriptive statistical method was used for variables.

Results: People involved in doing work and sub-systems of doing work at the hospital were consistent with specified accreditation standards. In 27% of the standards, time interval of doing work in the hospital was not conducted according to accreditation standards. In terms of way of doing work, 25% of standards had not been established, and 26% of them had been established incompletely. During interviews, it was found that 59% of personnel of purpose of doing work, and 94% of them are not informed about the strategy of doing work, according to accreditation standards in the hospital.

Conclusions: Uncertainties in the accreditation standards in dimensions of purpose, people involved, strategy and time interval of doing work, respectively, led to a lack of understanding the intention of author/developers of standards by personnel. As a result, this led to lack of complete establishment of accreditation standards in the studied hospital.

Keywords: Accreditation, Establishment, Gap, Hospitals, Tehran

1. Background

The need for efficient and effective management in health service sector is inevitable, and people, patients, payers and health organizations ask for continuous improvement in quality of health service. To achieve this goal, professional organizations and service providers try to exercise control and evaluate quality in order to improve care standards (1). Sedghiani stated that the standards developed in 1997 to evaluate hospitals are no longer effective due to the dynamics in the field of health care, and also stated that their change is necessary (2). These factors provided the conditions for decision makers at all levels to search objective data in evaluating the quality of health care organizations. Licensing, certification and accreditation are methods with different goals and capabilities to meet the requirements of quality and performance information (3). Accreditation was initiated by US joint council of accreditation of healthcare organizations in the early twentieth century to evaluate hospitals, and it was known as a critical factor in evaluating the hospitals performance (4, 5). It was then continuously developed and expanded so that it was known as a valid external evaluation system in health care areas (6). Accreditation is usually a voluntary plan supported by a non-governmental institution and trained evaluators, evaluating the competency of organizations providing health service, according to pre-specified performance standards (1, 7). During this evaluation, the necessary data for making decisions on accreditation are collected and recorded through literature review, interviews with management, personnel, patients and direct observations done by evaluators (3). The pur-

pose of accreditation in health care organizations is to improve the quality of health services, improve integration in health services management, establish health care organizations database, increase safety and reduce risks to patients and personnel, provide training and consultation for healthcare organizations, and reduce costs, focusing on efficiency and effectiveness of services (8). The accreditation issue was proposed in 2012 as a requirement for Health and medical education ministry of Iran on evaluation of hospitals in Iran with the aim of improving the quality of services and increasing patient safety (9). Some other studies conducted in this regard indicated that in organizations where accreditation has been established, high quality services are provided for patients, strengthening the confidence of the society on quality and safety of cares and services (10-12). Other studies showed no significant difference between validated hospitals and non-validated hospitals in terms of patient satisfaction (13). There is little evidence on improvement of clinical results and patient care as a result of accreditation (14). Accreditation plans and evaluation of hospital performance in Iran led to increased cost, reduced personnel satisfaction, and spending much time and energy by hospital personnel, without considerable success in accreditation standards (15, 16).

Accreditation can be implemented properly through preparation, appropriate selection of accreditation method, continuous monitoring, development of appropriate information systems, and transparency of information. In addition, by changing the organization's overall attitude, it could have positive impacts on achieving hospitals' goals and enhancing the quality of services (17). Accreditation should move towards evidence-based medicine and emphasize on performance standards consistent with services outcome to complete establishment of accreditation standards (18).

In our country, there was little research conducted in this field, and this is considered a limiting factor. There is still a long way to go towards complete establishment of accreditation standards as a necessity in hospitals.

2. Objectives

Given the importance of accreditation, the need for clear and transparent standard text, the impact of proper and correct establishment of accreditation on the quality of health cares, and in line with the need of our country to improve service quality and enhance the capabilities of health systems, the present study was conducted to determine the degree of establishment of accreditation standards using logical framework of Zachman in information architecture of an educational-health hospital in Tehran.

There were a lot reasons behind choosing this hospital, some of which are stated below:

• It took much time and high costs for establishment of accreditation standards.

• This hospital was general and health-educational.

• It had the highest score in establishment of accreditation standards in the previous accreditation term.

3. Methods

This descriptive research was conducted in an educational-health hospital in Tehran, during year 2015. The population of the study included people involved in the establishment of 2014 accreditation standards, including hospital chief, director / assistants of hospital, officials and personnel of clinical, para-clinical and support departments.

Sampling was conducted in the form of complete enumeration, and interviews were done with all personnel involved in the process of establishing accreditation standards, according to the 36 accreditation standards issued by the health and medical education ministry (twelve standards of clinical departments, one standard of management and leadership departments, eight standards in para-clinic departments, and fifteen standards of support departments).

Zachman introduced a conceptual framework for information systems architecture in 1987, which led to the creation of organizational systems known as superior solution in organizational area, after complementation and expansion in 1992 (19). Currently, this framework is considered as the gold standard in information architecture and it has the widest applications in the applied and theoretical field. This is not just true about organizational architecture, but also about software architecture (20). According to official statistics, Zachman framework is used in at least 20% of organizational architecture activities throughout the world (21, 22). The Zachman framework is composed of cells created by collision of rows and columns. It is assumed that each cell containing a model represents one aspect of architecture from the perspective of a particular group of relevant people. The Zachman framework is a two-dimensional classified design displayed in a 6×6 matrix. The columns of the framework will be constant in all studies, while rows will change depending on type of study (23). The instrument used for data collection in this study was the "Logical framework of Zachman" (19). Columns of the framework consisted of six people involved in conducting the work (Who), the purpose of the work (Why), strategy of the work (What), work time (When), sub-system of doing work (Where), and way of doing work (How), and the rows of framework included the view of hospital

chief, director/assistants of hospital, officials and personnel. First, using standards and guidelines related to accreditation, "Zachman framework for accreditation standards" was complemented for clinical sectors, leadership and management department, and para-clinical and support departments. During the second stage, a set of questions was determined that should have been answered at the hospital through studies of patient records, interviews and documents observation for clinical sectors, leadership and management department, para-clinical and support departments and was called the "operational Zachman framework". In the third stage, data was collected through studies of five to ten patient records, interview and documents observation using "Zachman framework for accreditation standards" in studied hospital and detailed questions were asked from the target group to complement data, and finally, information was recorded in the "Operational Zachman framework". In the fourth stage, to determine the gap, "Operational Zachman framework" was compared with the "Zachman framework for accreditation standards". Fisher exact or chi-square test was used to compare between accreditation standards text and studied hospital gap. Data were analyzed using the Excel software. Descriptive statistical method was used for the variables.

4. Results

4.1. Frequency of Studied Standards

In the present study, 468 standards (41%) were investigated at clinical departments; 155 standards (14%) in management and leadership department, 111 standards (10%) in para-clinic department, and 395 standards (35%) in support department (Table 1).

4.2. Investigating Accreditation Standards

Investigating accreditation standards using the Zachman framework separately for each sector and department showed that in 66% of accreditation standards of people involved in doing work, 67% of accreditation standards of purpose of doing work, 49% of accreditation standards of doing work strategy, 60% of accreditation standards of time interval of doing work, 1% of accreditation standards of sub-systems of doing work, and 2% of accreditation standards of the way of doing work had not been specified in the text of accreditation standards. The results showed the highest gap in accreditation standards text related to "The purpose of doing work dimension" and the smallest gap in this regard was related to "Sub-systems of doing work dimension" (Table 2).

Table 1. Frequency and Percentage of Studied Accreditation Standards

Sector / Department		Frequency (%)	Frequency (%)
Clinical departments	Surgery	39 (3)	468 (41)
	Internal medicine	39 (3)	
	CCU	39 (3)	
	Anesthesia	39 (3)	
	ICU	39 (3)	
	NICU	39 (3)	
	Pediatrics	39 (3)	
	Obstetrics	39 (3)	
	Dialysis	39 (3)	
	Emergency	39 (3)	
	Chemotherapy	39 (3)	
	Psychiatry	39 (3)	
Management leadership	management leadership	155 (14)	155 (14)
Para-clinic department	Laboratory	23 (2)	111 (10)
	blood transfusion	(2) 23	
	medication management	20 (2)	
	Nutrition	13 (1)	
	physiotherapy	8 (1)	
	Radiology	24 (2)	
Support department	Quality improvement	13 (1)	395 (35)
	Nursing management	22 (2)	
	Infection control	10 (1)	
	Information management	27 (2)	
	Building facility	38 (3)	
	Committee	68 (6)	
	Environmental health	48 (4)	
	Waste management	22 (2)	
	Occupational health	23 (2)	
	Landry	23 (2)	
	Medical engineering	13 (1)	
	Human resource	13 (1)	
	Patient right	36 (3)	
	Procurements	39 (3)	
Total		1129 (100)	1129 (100)

Table 2. Frequency of Gap in Accreditation Standards Text Using the Zachman Framework[a]

Sector / Department	Who	Why	What	When	Where	How
Clinical departments	598 (53)	779 (69)	395 (35)	598 (53)	22 (2)	22 (2)
Physiotherapy	1129 (100)	982 (87)	846 (75)	846 (75)	0	135 (12)
Laboratory	1027 (91)	824 (73)	632 (56)	779 (69)	0	0
Radiology	790 (70)	846 (75)	654 (58)	564 (50)	0	0
Medication management	541 (48)	541 (48)	496 (44)	541 (48)	0	0
Nutrition	1038 (92)	858 (76)	688 (61)	598 (53)	0	79 (7)
Blood transfusion	1129 (100)	914 (81)	508 (45)	711 (63)	0	0
Medical engineering	1129 (100)	1129 (100)	259 (23)	858 (76)	0	0
Infection control	406 (36)	1016 (90)	609 (54)	508 (45)	101 (9)	101 (9)
Quality improvement	779 (69)	779 (69)	429 (38)	519 (46)	0	0
Nursing management	349 (31)	508 (45)	451 (40)	609 (54)	45 (4)	45 (4)
Procurements	937 (83)	745 (66)	654 (58)	938 (83)	0	0
Landry	1083 (96)	858 (76)	677 (60)	948 (84)	0	124 (11)
Occupational health	564 (50)	451 (40)	22 (2)	564 (50)	56 (5)	0
Environmental health	745 (66)	564 (50)	395 (35)	733 (65)	0	67 (6)
Waste management	587 (52)	474 (42)	0	587 (52)	0	0
Patient right	406 (36)	587 (52)	745 (66)	654 (58)	22 (2)	22 (2)
Committee	440 (39)	925 (82)	372 (33)	677 (60)	22 (2)	11 (1)
Information management	699 (62)	959 (85)	620 (55)	745 (66)	0	0
Human resource	1129 (100)	801 (71)	801 (71)	948 (84)	0	0
Building facility	440 (39)	462 (41)	248 (22)	372 (33)	0	225 (2)
Management leadership	474 (42)	835 (74)	745 (66)	609 (54)	11 (1)	11 (1)
Total	745 (66)	756 (67)	553 (49)	677 (60)	11 (1)	225 (2)

[a] Data in the table are shown as No. (%).

4.3. Degree of Establishment of Accreditation in the Studied Hospital

Investigating the degree of establishment of accreditation using the Zachman framework in the studied hospital showed that in all sectors and departments of the hospital, people were involved in doing work and sub-systems of doing work at the hospital were consistent with specified accreditation standards. In 27% of the standards, time interval of doing work in the hospital was not conducted according to accreditation standards. In terms of way of doing work, 25% of standards had not been established, and 26% had been established incompletely. During the interviews, it was found that 59% of personnel were not informed of the purpose of doing work, and 94% of them were not informed of the strategy of doing work, according to accreditation standards in the hospital.

The results showed the highest gap in accreditation standards establishment was found in hospitals related to "Strategy of doing work dimension" and the smallest gap in this regard was related to "People involved in doing work and sub-systems of doing work dimensions" (Table 3).

4.4. Comparing the Accreditation Standards Gap Rank and Accreditation Standards gap Rank in the Studied Hospital

In the 'who' dimension, the gap in accreditation standards text was 0.6 and in the studied hospital it was 0, which means it was much more than in accreditation standards text (P < 0.001).

In the 'why' dimension, the gap in accreditation standards text was 0.6 and in the studied hospital it was 0.5, which means it was more than in accreditation standards text (P < 0.001).

In the 'what' dimension, the gap in accreditation standards text was 0.5 and in the studied hospital it was 0.9, which means it was much more than the studied hospital (P < 0.001).

Table 3. Frequency of Gap Establishment of Accreditation Standards Using Zachman Framework at the Studied Hospital

Sector / Department	Who	Why	What	When	Where	How (Have Not Been Established)	How (Have Been Established Incompletely)
Clinical departments	0	790 (70)	1072 (95)	180 (16)	0	259 (23)	632 (56)
Physiotherapy	0	1016 (90)	1117 (99)	372 (33)	0	846 (75)	11 (1)
Laboratory	0	1072 (95)	1117 (99)	0	0	462 (41)	146 (13)
Radiology	0	1083 (96)	1117 (99)	(83) 937	0	745 (66)	180 (16)
Medication management	0	790 (70)	1072 (95)	0	0	146 (13)	22 (2)
Nutrition	0	564 (50)	1117 (99)	135 (12)	0	90 (8)	372 (33)
Blood transfusion	0	588 (52)	1117 (99)	180 (16)	0	282 (25)	225 (20)
Medical engineering	0	677 (60)	1117 (99)	0	0	79 (7)	169 (15)
Infection control	0	338 (30)	903 (80)	372 (33)	0	0	564 (50)
Quality improvement	0	338 (30)	564 (50)	372 (33)	0	519 (46)	79 (7)
Nursing management	0	338 (30)	903 (80)	112 (10)	0	259 (23)	338 (30)
Procurements	0	1129 (100)	1129 (100)	564 (50)	0	654 (58)	180 (16)
Landry	0	1016 (90)	1117 (99)	0	0	338 (30)	248 (22)
Occpentional health	0	564 (50)	1106 (98)	180 (16)	0	248 (22)	496 (44)
Environmental health	0	564 (50)	1106 (98)	124 (11)	0	169 (15)	259 (23)
Waste management	0	564 (50)	1106 (98)	1129 (100)	0	158 (14)	372 (33)
Patient right	0	564 (50)	1117 (99)	316 (28)	0	225 (20)	395 (35)
Committee	0	564 (50)	1117 (99)	0	0	90 (8)	282 (25)
Information management	0	564 (50)	1117 (99)	112 (10)	0	146 (13)	327 (29)
Human resource	0	677 (60)	1129 (100)	1129 (100)	0	135 (12)	688 (61)
Building facility	0	564 (50)	1129 (100)	(14) 158	0	237 (21)	349 (31)
Management leadership	0	451 (40)	1072 (95)	327 (29)	0	191 (17)	293 (26)
Total	0	666 (59)	1066 (94.5)	304 (27)	0	282 (25)	293 (26)

In the 'when' dimension, the gap in accreditation standards text was 0.6 and in the studied hospital it was 0.3, which means it was more than in accreditation standards text (P < 0.001).

In the 'where' dimension, the gap in accreditation standards text was 0.01 and in the studied hospital it was 0, which means it was much more than in accreditation standards text (P = 0.003).

In the 'how' dimension, the gap in accreditation standards text was 0.2 and in studied hospital it was 0.25, which means it was much more than in accreditation standards text (P = 0.005).

5. Discussion

Investigating the degree of establishment of accreditation standards in an educational-health hospital, using the Zachman framework showed that among 1129 examined standards, clinical sectors, para-clinic, management and leadership, and support departments, 66% of standards in standard, departments involved, or position of the work doer were not specified. Lack of transparency in position of work did not allow rows to be completed in the Zachman framework in the current study, and this caused uncertainty in some standards of management and leadership departments at the hospital. The responsibility of these uncertainties was undertaken by different departments such as quality improvement department, public relations department, etc. This issue caused two consequences for the hospital. First, lack of cooperation of the relevant people in its establishment and therefore its establishment by non-related departments. Second, lack of its full implementation due to lack of expertise, inadequate training, etc., in non-relevant departments personnel during establishment of these standards.

In 76% of the standards, the purpose was not speci-

fied, and in 56% of these standards, the strategy of doing work was not specified in the accreditation standards text. Lack of this information in the text of accreditation standard can cause undesired effects, such as that found in this study, where 59% and 94% of personnel had no information about the purpose of doing work and strategy of doing the work, respectively. Lack of transparency in the purpose of establishment in more than half of standards could have been one of the causes of creation of a perspective in the personnel of the hospital that "accreditation means documentation". Lack of awareness of the majority of personnel regarding the purpose of establishment of standards at the hospital can be due to the lack of understating of the purpose of the accreditation plan (as suggested by some authors) (17).

In more than half of the standards, the strategy of doing the work has not been specified or it has not been referred to a specified standard. Perhaps, a lack of this reference to standards was the reason for different understandings of standards by personnel and accreditation evaluators, uncertainty among personnel, especially in standards, where the way of doing work was not specified. This may have led to personalized formation of accreditation among personnel. It is believed that accreditation plan standards can be implemented through clarifying the strategy and changing the overall perspective of the organization (17).

In 60% of standards, the time of doing the work was not specified. Additionally, in some standards, the time interval was not specified in the standard, and phrases such as regular, continuous and periodic time interval were used in the standard. However, only in 27% of the standards, the time interval of doing work at the hospital was not according to the standards. Perhaps, this lack of transparency and certainty in time of doing the work in more than half of the standards caused disagreement among hospital personnel and evaluators. As a result, it resulted in different understanding of appropriate time intervals to do the work. In the lowest number of accreditation standards (1%), sub-system of doing the work was not specified in the standard. It seems that clarification and transparency in approximately 99% of standards caused the sub-system of doing the work to be done according to accreditation standards in the hospital.

Considering the standard of "participation of nursing director in annual budget in the standards of nursing management limited to developing and drafting the minutes" and "access to information is confidential for personnel", and considering the way of evaluation specified in the interview section, if personnel are asked if they access personnel case, let's see it, if unauthorized personnel brings the case, zero score is given. On the other hand, the presence of standards, such as "The standard of periodic review process in the building and facilities plan" and "next standard of checklist completed according to it", mean if the periodic review process has been developed, but has not been implemented and checklist has not been completed, 2 scores of 4 scores will belong. The presence of these standards leads to creation of documentation approaches and incomplete establishment of accreditation standards. In this regard, statistics show that while in 1% of accreditation standards, the way of doing work in the standard had not been specified, 26% of accreditation standards had been established incompletely and 25% of them had not been established at all. Studies showed that authorities and policy makers should understand the concepts and features of each of the accreditation models so that they can select appropriate models to evaluate and accredit, based on needs, requirements of facilities, conditions, and other effective factors in their organization or country. If accreditation is their selected model, identification of features and its expected results should be specified separately for each country (4).

The results of investigating the accreditation standards establishment using the Zachman framework in the studied hospital showed that uncertainties in the accreditation standards issued by health and medical education ministry in standards of purpose, people involved, strategy and time interval of doing the work, respectively, led to lack of understanding in the intention of author/developers of standards by personnel. As a result, it led to a lack of complete establishment of accreditation standards in the studied hospital.

In order to understand standards, the author / designers intention by hospital personnel, transparency of accreditation standards are suggested as follows,

- Purpose of doing the work;
- Time interval of doing the work;
- Strategy of doing the work;
- People involved of doing the work.

5.1. Limitations

This study had some limitations, with the most important limitation being the lack of similar studies to compare results, no permission to use the name of the hospital in study, lack of cooperation by IT department, angiography, and CSR in completing the operational Zachman framework. As the role of hospital chief, director, assistants, and officials were not specified in the establishment of accreditation standards, and the Zachman framework rows were not complemented.

Acknowledgments

Footnotes

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