



Measuring the compliance of nutrition management standards in selected hospitals in Tehran city

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Abstract

Background and objective: The nutrition department plays an important role in satisfying patients by providing quality services. Providing appropriate nutritional services based on standard principles can improve hospital performance. The HACCP standard is one of the criteria for assessing the quality of hospital nutrition services.

Method: This cross-sectional study was conducted among 5 selected hospitals in Tehran city in 2020-2021. Data collection was done using a questionnaire including 156 questions in five through interviews and observations. A validated questionnaire with 5 main dimensions includes 156 questions used to measure the Compliance of nutrition management standards. Also, Kruskal-Wallis and Mann-Whitney test in SPSS software version 16 was used to analyze data.

Results: The score of compliance with HACCP standards in hospitals was moderate with a score of 2.68 ± 1.75 . On average, only 67% of the standards were compliance in hospitals. The “facilities and observance of health standards” with a score of 2.7 ± 1.03 and the dimension of “employees” with a score of 2.2 ± 1.28 had the highest and lowest standards, respectively. Also, there was a significant difference in compliance with the standards between hospitals ($p < 0.05$).

Conclusion: Due to the unfavorable situation of compliance with standards in the nutrition department of hospitals, efforts to improve the structural status of nutrition units, especially monitoring staff performance can ultimately increase patient satisfaction.

Key words: Standards, HACCP, Hospital, Tehran

Background and objective

Hospitals, as one of the main pillars in the health system, play an important role in providing services to patients. Taking care of patients and providing medical services to them can improve the health of the society. Besides providing medical services, providing hotel services to patients is another important task by hospitals¹.

Although the provision of medical services in hospitals improves the health of patients, on the other hand, the provision of hoteling services, including appropriate food services, brings patients' satisfaction. In addition to improving patient satisfaction, nutrition units also play the role of providing medical services through diet therapy. Preparation and provision of appropriate food plan, as well as preparation and provision of diets that are suitable for the treatment conditions of patients, including the description of the duties of nutrition units in hospitals².

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Undoubtedly, the existence of suitable facilities, and the existence of trained human resources can play an important role in providing proper services by nutrition units in hospitals. It is necessary to monitor the performance and periodic monitoring of these units according to their facilities^{3,4}.

Considering the role and importance of food in human health and the increasing use of raw materials and ready-made food, the necessity of creating a system to maintain the health of food was felt more than ever. The basic principles of food safety system of the HACCP were developed for the first time in the 1950s in the United States and were developed by the National Aeronautics and Space Administration (NASA) with the help of Bills Bury and were used in the project to send humans into space⁵.

This system was completed over time and included 7 principles to identify and eliminate risks that threaten the health and safety of food. The seven principles of HACCP are hazard analysis, determining critical control points, establishing a system for monitoring critical points, taking corrective actions, checking the effectiveness of the system, and finally documenting and keeping records⁶.

The implementation of these principles can bring many advantages in the country's hospitals, especially in the management of nutrition units⁷. Ensuring the safety of food, improving a management system in the hospital, preventing the distribution of unhealthy food to patients, creating a culture of prevention instead of corrective action, and finally saving costs are among the advantages of implementing this standard in the hospital^{9,8}.

Unfortunately, considering the advantages mentioned, the lack of management commitment and false belief in HACCP principles and the lack of training of food hygiene managers are among the most important reasons for not implementation of

the prerequisites of the HACCP system in hospitals⁹. Therefore, the establishment of such standards in hospitals, in addition to promoting and improving the performance of hospitals, can play a role in improving the efficiency of hospitals. The current research was conducted with the aim of measuring the compliance status of HACCP standards in the nutrition department of selected hospitals in 2021.

Methods

In this descriptive-analytical research, five hospitals covered by Iran University of Medical Sciences, Tehran and Shahid Beheshti were selected randomly in 2021 and their nutrition department was investigated. Data collection was done using a questionnaire, observation, and face-to-face interview with the person in charge of the nutrition department. After coordinating and getting the necessary cooperation, the questionnaire was distributed among 83 people in the occupational health, environment, and nutrition units of the hospital, and all 83 samples participated in the study with consecutive follow-ups. Also, a number of questionnaires were completed through the in-person visit of the questioner and through observation, and finally the number of supplementary questionnaires reached 100. In general, the number of samples was selected from the number of available samples.

The content validity and reliability of the questionnaire were confirmed to be 0.85 and 0.9 in Rafati et al.'s study¹⁰. For confirmation, this questionnaire was given to 7 trained and experienced experts. In general, this questionnaire contains 156 questions in 5 dimensions: engineering and construction status (31 questions), Equipment and facilities (58 questions) facilities and compliance with health standards (25 questions), employees (19 questions) and the status of training and

supervision of food preparation and distribution (23 questions). To calculate the scores, the answer to each question was precisely defined in 5 point Likert scale (1-5); in such a way that 1 specifies the minimum compliance and 5 specifies the maximum compliance and intermediate states between these two numbers.

The conclusion made includes a range of numerical data ranging from 1 (minimum compliance) to 5 (maximum compliance)⁸. Before completing the questionnaires, the approval of the hospital management to conduct the research was obtained. In order to respect the ethical aspects of the research, the name of the researched hospitals was avoided in the text of the article and they were named alphabetically. Also, the study and data collection began after obtaining the

code of ethics from the Research Vice-Chancellor of Islamic Azad University (IR.IAU.SRB.REC.1400.149).

In order to analyze the data, SPSS version 16 statistical software and Kruskal-Wallis and Mann-Whitney statistical tests were used.

Results

In the current study, the hospitals included in the study had 100 to 210 active beds. The highest and lowest average age of the participants in the study were 38 (hospitals C) and 30 (hospitals A) years, respectively. Also, most of the participants in the study had bachelor's education. The complete results of the demographic characteristics of the study are reported in Table 1.

Table 1: Demographic characteristics of the participants in the study

Hospital	Number of active beds	Number of participants	Average age of participants (standard deviation)	education			
				Less than bachelor	bachelor	Master	More than master
A	100	12	30 (3.8)	1	9	2	0
B	150	18	35 (4.1)	2	13	3	0
C	200	24	38 (2.9)	4	15	4	1
D	210	25	35 (4.8)	5	12	6	2
E	180	21	31 (3.5)	4	14	3	0

The degree of compliance with the requirements in selected hospitals was investigated. The results showed that hospital "A" had a more favorable situation than other hospitals with an average score of 4 ± 1.47 and compliance with a high percentage of requirements (88%). on the other hand; Hospital "B" by complying with 55% of the requirements had the lowest score (2 ± 1.47) and was classified as unfavorable. In the meantime, hospitals "D" and "E" were in an unfavorable situation, having met $60 (2.42 \pm 1.21)$ and (2.38 ± 1.17) 63 percent of the requirements, respectively. Hospital "C" was in average status with an average score of 2.61 ± 1.07

and 69% compliance with standards. Table 2 shows the score related to the average score of the studied hospitals in the five dimensions of the HACCP standard.

The results of this study showed that among the studied dimensions, the dimension of education and monitoring of food preparation and distribution, and the dimension of facilities and compliance with health standards had the highest level of compliance in hospitals, so that the average score of this dimensions among hospitals were 2.7 ± 1.77 and 2.7 ± 1.03 , respectively. Also, the dimension related to employees had the lowest average score (2.2 ± 1.28).

A more detailed analysis of the dimensions in each hospital, the results showed that hospital “A” was in a better status in the dimension of engineering and construction with an average score of 4 ± 1.07 , while this hospital was in a worse status in the dimension of facilities and compliance with health standards compared to other dimensions. Hospital “B” was in a better status in the staff dimension (2.12 ± 1.72) than other, although all dimensions in this hospital were unfavorable. Also, hospital “C” was in an average status with an average score of 3.1 ± 0.92 in the dimension of facilities and compliance with health standards and in other dimensions it was in

an unfavorable situation. In the dimension of staff, hospitals “D” and “E” were in the same status as each other with an average score of 2.8 ± 1.22 , and in other dimensions they were in an unfavorable status. In both hospitals (“D” and “E”), the dimensions related to the engineering and building conditions was in the worst standard status with scores of 2.1 ± 1.44 and 2.2 ± 1.28 , respectively. According to the Kruskal-Wallis test, a significant difference was observed between the scores of the five dimensions for each hospital ($p < 0.05$), although this difference was not significant between the hospitals ($p > 0.05$).

Table 2. The average score of the five dimensions of the HACCP standard in the studied hospitals

HACCP dimensions	Hospital					Mean \pm standard deviation
	A	B	C	D	E	
Equipment	4 ± 1.07	1.9 ± 1.72	2.5 ± 1.42	2.4 ± 0.91	2.3 ± 1.62	2.62 ± 1.47
Facilities and compliance with health standards	3.89 ± 1.13	2 ± 0.92	3.1 ± 0.92	2.3 ± 1.12	2.3 ± 1.13	2.7 ± 1.03
engineering and construction	4.11 ± 1.09	1.88 ± 1.11	2.4 ± 1.01	2.1 ± 1.44	2.2 ± 1.28	2.53 ± 1.13
education and monitoring of food preparation and distribution	4.1 ± 1.72	2.1 ± 1.54	2.5 ± 1.3	2.5 ± 1.52	2.3 ± 1.41	2.7 ± 1.77
staff	3.9 ± 1.2	2.12 ± 1.72	2.6 ± 1.12	2.8 ± 1.23	2.8 ± 1.22	2.2 ± 1.28
mean	4 ± 1.47	2 ± 1.47	2.61 ± 1.07	2.42 ± 1.21	2.38 ± 1.17	2.68 ± 1.75
% Compliance	88	50	55	52	51	67

Discussion

The present study was conducted with the aim of evaluating the level of compliance with HACCP standards in selected hospitals in Tehran in the time period of 2021. The results showed that in general, except hospital "A", other hospitals did not have a favorable status in terms of compliance with standards. Hospital "A" was placed in a favorable status by complying with 88% of the requirements, while other hospitals were placed in an unfavorable status; the results showed that other hospitals compliance 50-54% of the standards. Various studies have evaluated the level of compliance with HACCP standards in the Iran's hospitals. Tofighi and et al showed that percentage of compliance with the standards in three hospitals was in the average level, which the compliance with the standards was 59, 63, and 78%, respectively⁹.

In a study conducted in Italy among 171 hospitals, only 43% of hospitals had complied with HACCP standards¹⁰. In another study that was conducted between two military and non-military hospitals, the standard compliance rate was reported as 70% and 77%, respectively¹¹. Also, in another study conducted by Farhadfar et al., the HACCP compliance rate among hospitals was found to be 54 to 67 percent¹¹. The comparison the results of the present study with other studies shows that in a few hospitals, the level of compliance with the standards is better than the hospitals investigated in the present study; In most of the investigated hospitals, the status of compliance with the standards are at an unfavorable status. The worn out of hospitals and equipment, as well as insufficient monitoring of the activities of the nutrition units, are among the reasons for the weak compliance with HACCP standards in the country's hospitals.

On the other hand, the results of the study showed that the level of standards

compliance in hospital "A" is much higher than other hospitals and this difference is significant. The difference in hospital ownership (private and government) is the main reason for such a difference. Hospital "A" is a private hospital with a much shorter lifespan than other hospitals. New equipment and the existence of a building with a shorter lifespan as well as the economic view of attracting more patients by increasing patient satisfaction are the reasons for this difference between Hospital "A" and other hospitals.

Different dimensions in the nutrition department of the studied hospitals were evaluated and in each dimensions there were problems as follows:

Except for hospital "A", the engineering and building status was the most important problem in the nutrition department of all hospitals. Non-separation of food cooking spaces from raw material preparation spaces is one of these problems. Due to the interference and intersection of food processing activities in two polluted and clean spaces, there are irreparable risks for this sensitive spaces; the separation of these two spaces was done well in hospital "A". In the study conducted by Farhadfar et al, none of the hospitals in Isfahan had observed this. Separation of entry and exit of personnel and storage of food was done only in hospitals "A" and "B", while in other hospitals this space was shared, which increases the possibility of food contamination¹². In the study of Rafati et al., this space was common in the studied hospitals¹². Regarding the full and direct supervision of the kitchen manager on the cooking and preparation process, except for hospital "A", in other hospitals there was no room for the manager inside the nutrition unit and there was not enough visibility on the cooking and food preparation process. In Shin et al.'s study, there was no direct and full supervision of the nutrition unit manager

in most hospitals¹³. Also, in the study of Rafati et al., despite the presence of the room for nutrition unit manager, there was not enough supervision¹².

The training and monitoring of food preparation as one of HACCP standard dimensions was not compliance in hospitals “C” and “B”; while this standard was observed rarely in hospital “D”, and most of the time in hospital “A”. There was a personal health education chart only in hospitals “A” and “D”, and this was not observed in the other two hospitals. In the study by Vukman et al. and other studies conducted in the hospital, written programs and advanced training courses were designed in order to improve the performance level of the personnel, and the results showed the effectiveness of the implemented courses^{5,14}.

Finally, the high sample size of selected hospitals as well as include a private hospital alongside government hospitals were the strengths of this study. But, along with the strength, hospitals face the Covid-19 pandemic, as well as the lack of definition and basic information about the HACCP standard for nutrition units are considered as the weaknesses of the present study.

Conclusion

According to the results of the present study, most of the studied hospitals were not in a favorable status in terms of compliance with the HACCP standards. Among the HACCP standards, dimension of engineering and building status, staff and training status, and supervision of food preparation and distribution in hospitals should be given more attention. Paying attention to these standards and trying to comply with them can be considered as a tool to promote and improve the performance of the hospital.

Competing Interests

The authors declare no competing interests

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Authors' contributions

The authors are the same

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