IJHSE
Iranian Journal of Health, Safety & Environment, Vol.3, No.3, pp.548-554

Assessment of Female Student's Satisfaction with the Quality of Food And Environmental Health at Food Services in Tehran University of Medical Sciences, 2013

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Received: 16 Oct. 2015, Revised: 10 Jan. 2016, Accepted: 15 Feb. 2016

ABSTRACT

Devoting Attention to the nutritional and health condition in students is of great importance. It is necessary to ensure students are satisfied with the quantity and quality of food as well as hygienic condition in the university's food services. For this reason, the present study was conducted to investigate female student's satisfaction with the quality of food and environmental health at food services in Tehran University of Medical Sciences.

A number of one hundred of female students, studying at Tehran University of Medical Sciences, were randomly selected. All the selected students were proved to be customers of food services located in one the Medicine, Public Health, Pharmacy, paramedical Sciences, Dentistry, Rehabilitation and Nursing schools. A questioner was prepared as a tool for data collection and its validity and reliability was determined. Afterwards, data analysis was performed using SPSS software (version 23).

Results showed that 22% of female students expressed their satisfaction with the quantity of food as "excellent" and 47% as "moderate". 28% of students rated the food diversity as "moderate" ok". Seven percent of students reported at least on a case of food poisoning caused by the consumption of food at the university. On average, the overwhelming majority of students expressed their satisfaction as "good" or "medium" with environmental health in at food services in the university, respectively. All the students were aware of the importance of the presence of insects and animals outside the food services and 95%of students reported the presence of insects like beetle, housefly and mosquito and animals like cats, outside the food services. It was concluded that the majority of female students were satisfied with the quantity of food and ranked the quality of food as "medium".

However, they reported some problems regarding hygienic condition inside and outside the dining services and personal health of staff and stated that more attention should be paid by responsible authorities of the university. The student views can be used by these authorities to improve the quality and quantity of food and hygienic condition at food services in Universities.

Keywords: Environmental Health, Restaurant, Food Service, Students, Food Quality, Food Safety

INTRODUCTION

The importance of human health and nutrition is highlighted in Holy Quran, surah Abas (Ayah 24)" Then let man look at his food, [and how we provide it]"[1]. Foodstuff can transmit different kinds of diseases which are proved to be threatening to human health. In this regard, a considerable number of food-borne diseases has been reported throughout the world, form the most developed countries to less developed ones [2]; over the past two decades, food-borne diseases has been proposed as one of the growing economic issues because of their adverse effects on public health [3]. The results emerged from researches carried out in the Netherlands, UK and USA have shown that 70% of food-borne diseases are due to the poor food handling practices, carried out by food caterers and workers working at food services [4].

Considering that health care agencies are responsible for providing health services to society, they ought to monitor food caterers and food services in order to reduce the risk of communicable food-borne diseases to the lowest possible levels. Therefore, different aspects of personal health and food safety need to be trained to all food caterers and food handlers [5]. Extra attention needs to be given to providing healthy foods for students as one of the most important social groups. As a result, supplying healthy foods with acceptable quality and providing hygienic conditions in catering services are crucial

for students to improve their academic performance and encourage their creativity. Students need to receive all the essential nutrients. While healthy and nutritious foods have positive effects on physical and mental health, unhealthy and contaminated foods may cause toxic effects on consumers and affect their physical and mental performance negatively.

Food quality is the quality characteristics of food that are acceptable to consumers. This includes external factors as appearance, texture, and flavor [6]. Food quality is an important food producing requirement, because food consumers are susceptible to any form of contamination that may occur during the manufacturing process. Besides ingredient quality, there are also sanitation requirements. It is important to ensure that the food producing and preparation environment is as clean as possible in order to produce the safest possible food for the consumer. Female students should be satisfied with food quality and safety that consume at food service of the university. Satisfaction is the consumer level of approval when comparing a product's perceived performance with his or her expectations [7]. In recent years, some measures have been taken by universities to improve the safety and quality of foods which are provided for students. In most universities, nutritional needs of students are generally determined based on student's age and activities through expert investigations. However, there is still increasing demand for giving more attention to food preservation, preparation and distribution in order to ensure the implementation of food safety principles and regulations along the whole process. Taking these measures can be effective in reducing chemical, physical and biological food contaminants to the levels which are not harmful to human health. If the hygienic conditions of carting services including dining services in universities are not in compliance with food safety and environmental health principles, it can lead to an increase in the number of food-borne diseases among students [8].

In this regard, a considerable number of studies have been conducted around the world, but further research needs to be carried out in Iran. It is necessary to ensure that students are satisfied with the quality and quantity of foods as well as hygienic condition in food services.

To this end, the present study aimed to determine the levels of satisfaction with food services among female students studying at Tehran university of Medical Sciences.

MATERIALS AND METHODS

The current work is an applied and a descriptive-analytical study with cross-sectional design, which was conducted on a number of 100 female students randomly selected from Tehran University of Medical Sciences in September 2013. Veiros *et al.* studied food health and safety system in the University of Portugal [9]. They showed that more than 50% of performance of the system was acceptable. Accordingly, if the following formula is used, the total sample size is 100. The formula for sample size is $N= Z2pq/d2$. $z=1.96$, $p=0.5$ (50%), $q=0.5$, $d=0.1$, $N= 100$.

The levels of satisfaction with the quality and quantity of food and also hygienic condition of dining services were investigated. A questionnaire was designed for collecting data and students were asked to answer questions for the lunch meal. The study population was chosen from students of miscellaneous disciplines with different levels of education, taking in to account the number of students in each discipline. Out of all 100 participants, the numbers of 33, 23, 17, 11, 9, 4, and 3 were selected from Medical, Public Health, Pharmacy, Paramedical, Dental, Rehabilitation and Nursing schools respectively. Regarding the point that lunch meal for medical students is served by food services in hospitals after the fourth year of their study, questionnaires were distributed among the first- to forth-year medical students. A wide range of questions about age, major, level of education, observation of the presence of physical objects in food, poisoning background with foods served by dining services in the university, staff's state of personal health, hygienic condition in food services, equipment, and facilities (including toilets and lighting), observation of mischievous animals and insects in vicinity of the dining hall, diversity, quality and quantity of food (including taste, appearance, temperature). To determine the content validity of the questionnaire was trained and experienced experts and was approved.

The questionnaire used Cronbach alpha reliability based on a survey (α=0.93) and determined. Data analysis was performed using SPSS software (version 23) to analyze the results of descriptive statistics (frequency and percentage) and Spearman was used for analysis. P-value less than 0.05 was considered as statistically significant results.

RESULTS

Demographic information for all the participants is summarized in Table 1. As shown, 59% of the respondents were PhD students, 13% master students, and 28% bachelor students. The average age of the participants was 22, with being 56% of students aged between 19 and 22.The majority of the

participants were either freshmen or sophomores, and according to collect information, 91% of the students were living in a dormitory.

Table 1. The satisfaction levels with the quality and safety of the foods served at food services in the university

Parameter	Satisfaction level	N	%
Appearance	Excellent	1	1
	Good	32	32
	Medium	48	48
	Weak	17	17
	Invalid responses (No responses)	2	2
Taste	Excellent	1	1
	Good	15	15
	Medium	39	39
	Weak	41	41
	Invalid responses (No responses)	4	4
Temperature	Very hot	3	3
	Hot	44	44
	Relatively cold	42	42
	Cold	11	11
	Invalid responses (no responses)	0	0
Food Quantity (adequacy)	Excellent	21	21
	Good	47	47
	Medium	22	22
	Weak	10	10
	Invalid responses (no responses)	0	0
Food Diversity	Excellent	1	1
	Good	28	28
	Medium	50	50
	Weak	21	21
	Invalid responses (no responses)	0	0
Observation of physical object	Hair	4	4
	Stones	4	4
	Animal droppings	2	2
	Insect residues	3	3
	None	87	87
Food poisoning background	Yes	7	7
	No	93	93

The information on the levels of satisfaction with healthy foods and also hygienic condition in dining services is given in the Table 2. As shown, with regard to appearance and taste of the foods, only 1% of participants rated as "very satisfied", 3% as "completely warm", and 44% as "warm"; moreover, 22% of participants showed to be “very satisfied” with the quantity of food and 47% were “satisfied”. In the case of food diversity, only 1% of the participants were "very satisfied" with the types of foods served in food services. The results also showed that 7% of the participants had been poisoned at least once due to the consumption of the foods served in university. The presence of physical objects (hair, animal’s droppings, and insect residues) in food, at least once, was reported by 13% of respondents. Relationship between satisfaction levels with the quality and safety of the foods served at food services in the university was significant ($p \leq 0.05$).

Table 2. Demographic and social information for the female students participated in this study

Parameter		N	%
Age	19-22	56	56
	23-26	41	41
	27-30	3	3
Major	Health	24	24
	Nursing	3	3
	Medicine	33	33
	Para medicine	11	11
	Rehabilitation	3	3
	Pharmacy	17	17
	Dentistry	9	9
Level of education	PhD	59	59
	MSc	13	13
	BSc	28	28
Educational years	0-2	53	53
	3-4	28	28
	5-7	19	19
Residence	Dormitory	91	91
	Outside of dormitory	19	19

The results obtained from the sanitary condition audition of food services in the university and personal health assessment of the staff assessment, carried out by participants, are shown in the Table 3. As shown, cleanness of dishes, cleanness of tables, and lighting, sanitary condition of toilets were reported as “very good” by 6, 9, 6, and 5% of the participants respectively. The Frequency of observing mischievous animals, insects and cat was 13, 12, and 7% respectively. Moreover, lacking the use of mask, scratching head, sneezing and coughing, and using a cell phone at work by the food service’s staff was reported by 32%, 6%, 2%, and 16%, respectively. 32% of the participants stated that staff working at dining hall did not use mask. Also, 6% of students reported scratching head, 2% coughing and sneezing, and 16% using cell phone. Relationship between satisfaction levels with the environmental health audition for food services and personal health assessment of the staff, carried out by participants in this study was significant ($p \leq 0.05$). Table 4 shows the correlation between food poisoning and food health and environmental factors. The high correlation coefficient between the field of food poisoning with Staff’s personal health ($r=0.345$), Cleanness of dishes($r=0.940$), Cleanness of tables($r=0.893$) and physical hazards can be seen. Physical threats seriously raise food poisoning ($r=0.735$).

Table3. Results obtained from the environmental health audition at food services and personal health assessment of the staff, carried out by participants in this study

Results of assessment and audition		N	%
Cleanness of dishes	Excellent	6	6
	Good	38	38
	Moderate	42	42
	Weak	14	14
Cleanness of tables	Excellent	9	9
	Good	31	31
	Moderate	50	50
	Weak	10	10
Lighting	Excellent	6	6
	Good	31	31
	Moderate	40	40
	Weak	23	23
Hygiene condition of toilets	Excellent	5	5
	Good	13	13
	Moderate	41	41
	Weak	41	41
The presence of insects and mischievous animals in dining services	Cat	70	70
	Cockroach	12	12
	Flies and mosquitoes	13	13
	None	5	5
Staff's personal health	Lack of mask, head cover, gloves and gowns	32	32
	Scratching head	6	6
	Sneezing and coughing	2	2
	Using cell phone	16	16
	None	44	44

DISCUSSION

Students have a pivotal role in the development of societies, therefore, Particular attention needs to be devoted to the quality and quantity of their foods a. The present study was conducted on a number of 100 female students in order to evaluate their satisfaction with the quality and quantity of food, staff's personal health and the hygienic condition of dining services. Taking into account that food services and restaurants in Iranian universities play a key part in providing food for students, the implementation of food safety and hygienic principles along the whole food supply chain, from the preparation point to the consumption point, must be guaranteed. In this respect, it is necessary to monitor the hygienic condition of food services and the implementation of food safety rules. The Executive Regulation, Article 13 on the health regulations for foodstuffs and beverages published by the Ministry of Health has particularly emphasized on the implementation of environmental health principles in restaurants. According to this regulation, food must be served in clean and hygienic dishes or containers without any crack, fracture or broken part. Sufficient numbers of dishes, tables and chairs must be available and the reuse of dishes also is prohibited. Also, the suitability and adequacy of lighting in dining hall need to be provided, and hygienic condition of toilets must be in compliance with environmental health regulations [10]. The results showed that 78% of the participants were satisfied with dishes and table's hygiene, lighting, and the hygienic condition of toilets, while 22% were dissatisfied. Legani *et al.* reported that the surface of 10% of the equipment and dishes used in food services were contaminated to an unacceptable level and 10.8% of uncooked and cooked red meat was contaminated with Escherichia coli [11]. Rokni and Esfandiari evaluated the quality of red meat in four restaurants in the University of Tehran and reported that the number of E. coli, coliforms, and golden staphylococcus were above the standard limit in 20%, 99%, and 22% of meat samples respectively. They also reported the highest rate of contamination in deboned meat samples, and the second highest in raw ground meat samples. They suggested that the higher rate of contamination with indicator microorganisms such as coliforms and staphylococcus was due to possible cross-contamination along meat preparation process and lack of proper implementation of health regulation [12]. It is obvious that coliforms have fecal origin, and contamination with Staphylococcus can be found in skin, wounds, and under nail. Staphylococcus aureus was also detected inside the nose of 40% of individuals [13]. Poor personal health of the staff working at food services may result in an outbreak of infectious diseases. The most hazardous situation may be occurred when staffs do not wear gloves while preparing food, which this is demonstrated to be common in the majority of food services. This issue can lead to transmission of bacterial diseases. The bacteria can spread over the meat surface rapidly and produce enterotoxins, which are often resistant to high temperatures so that they can be remained biologically active during cooking process [14-18].

Our findings showed that 32% of the respondents reported that the staff working at food services did not use gloves and believed that their unhealthy habits may spread food-borne diseases. Aycicek *et al.* conducted a survey on the contamination rate of workers' hands working at catering services and isolated 16 different types of bacteria; with Staphylococcus being the most common species (70%). Out of all sample contaminated with Staphylococcus, Staphylococcus auras coagulase was not detected in 56.7%. Results also showed the presence of diphtheria bacillus bacteria in 21.7%, bacillus serous in 10.5%, and Escherichia coli in

7.8% of the total samples [19]. Poor personal health, dirty hands, and lack of using gloves can cause various types of diseases and to prevent this issue, the staffs working at food services need to be trained for personal health and food safety principles. The results showed that 56% of the participants were not satisfied with staff's personal health and they reported the lack of using mask, gown, glove, or head cover by 32%. 6% of head and body scratching, 2% of coughing and sneezing, and 16% of using a mobile phone were observed by the respondents as signs of poor personal health.

Table 4. The correlation between food poisoning and food health and environmental factors

	8	7	6	5	4	3	2	1
1.Food poisoning background	r=0.364	r=735	r=176	r=460	r=0.471	r=0.447	r=0.345	r=1
2. Staff's personal health	r=0.877	r=0.485	r=0.666	r=0.900	r=0.88	r=0.877	r=1	
3.Cleanness of dishes	r=0.940	r=0.513	r=0.713	r=0.821	r=0.924	r=1		
4.Cleanness of tables	r=0.893	r=0.580	r=0.645	r=0.801	r=1			
5.Hygiene condition of Toilets	r=0.820	r=0.608	r=0.709	r=1				
6. The presence of insects and etc.	r=0.710	r=0.248	r=1					
7.Observation of physical objects	r=0.450	r=1						
8. Food temperature	r=1							

Veiros *et al.* carried out a study on the status of food safety and health system at the canteen in the University of Portugal. Their results showed that more than 50% of the food safety system applied at the university was acceptable. Also, 16% of participants were dissatisfied with the availability of facilities; and 24.1% shoed their dissatisfaction with staff's personal health. Furthermore, the satisfaction rate for the sanitary condition of equipment and the places specified to food preparation and food distribution was 61.1% and 73.8%, respectively [9]. On average, 22% of the participants stated that sanitary condition of the dining facilities was "poor", 5.5% "very good", 62.5% "good", and 43.25% "moderate". All the participants put particular emphasis on the presence of mischievous animals and insects in the vicinity of the dining halls from aspects of public and environmental, and 95% complained about the presence of animals (cat, cockroach, fly, and mosquito) and insects around the dining facilities.

The presence of physical objects is another important issue that can treat food safety and hygiene. In this study, the presence of hair by 4%, animal droppings by 2%, and stones by 4% and insect residues by 3% of the participants was observed. In contrast, 87% of students declared the absent of aforementioned physical hazards in their food. The consumption of unhealthy foods can cause food poisoning in students. In the present study, 7% of students reported at least one case of food poisoning caused by the consumption food served in the university. Diarrhea, vomiting, and gastroenteritis were common symptoms of food poisoning. There is a significant correlation with food poisoning and the presence of insects with 90% confidence (r=0.176) in restaurant. Presence of insects seriously raises food poisoning.

To prevent the incidence of food-borne illnesses, appropriate measures such as hygienic designing of food services, enforcing the implementation of the personal health principles by staff working at dining services, disinfecting vegetables and fruit, using clean drinking water for food preparation, managing pests, using proper temperature for cooking, enforcing the use of head cover and mask, prohibiting workers with intestinal parasitic, bacterial or viral diseases, jaundice, cut, eye or respiratory infections from working at food services until full recovery, keeping perishable foods cold and separating cooked food from raw materials are needed to be taken [5, 8]. Malhotra *et al.* investigated the personal health status of the staff working at the food services in Molana Azad Medical University in India [20]. Their results showed the report of at least on a case of diarrhea by 7.94% and parasitic infection by 41.1% of the staff as a result of consumption of food served in the university. Scars and wound on the hands also were observed in 39.7% of the staff and by and large, medical and clinical examinations for this group were not satisfactory.

Raman and Chinniah studied student satisfaction with the quality of foodstuff, food diversity, environmental health condition and staff's personal health at the cafeteria of AIMST University, Kedah Darul Aman. They reported that 55.4% of the students prefer to have their lunch outside the university and expressed their dissatisfaction with foods served at the cafeteria. They also found a weak positive correlation between student's satisfaction and the quality of foodstuff. The students stated well-cooking, freshness, taste and flavor as the most important factors that determined their satisfaction levels with the quality of foodstuff [21]. In another study, Sahin *et al.* investigated the satisfaction rate

of patients with foods served at food services in hospitals and reported that 51.3% of the participants stated the quality of the foods as "good", and 34.4% as "dissatisfactory". They argued that there was a significant correlation between the taste and appearance of the foods with satisfaction level. The levels of satisfaction regarding taste, appearance, diversity, Cooking temperature , quantity, clean dishes (spoon and fork) were 50.5%, 60.2%, 66.6%, 41.7%, 61.8%, and 77.5% respectively [22]. The student's views can be used by responsible authorities at Iranian universities to form a firm foundation for food quality and safety improvement programs. Nutrition and Health Administration of the university have been making great attempts towards providing and distributing healthy foods with acceptable quality in order to promote food safety and students' health. Although university aims to provide students 'satisfaction by taking such measures, there is still need for more monitoring and controlling programs to improve hygienic condition and environmental and public health at foodservices. In this regard, routine auditory programs can be effective.

In this study, the quality and quantity of food compared to standard portion size or standard quality index of food just ask from participants and it can be mentioned the limitation of the study.

CONCLUSION

Considering the results of this study regarding student's views on different quality and safety parameters of foodstuff, implementation of health rules and hygienic condition of dining services, there is a need for giving further attention to the quality of food and implementing public and environmental health principles by the responsible authorities of the university. The staff working at the dining services needs to be trained for and informed about personal health principles and must be subjected to regular medical and clinical examinations. these training courses are essential to increase awareness of the staff about the ways of food-borne illnesses prevention, sanitization and hygienic reformation of food services, implementation of personal health principles, pest management and establishment of strict rules for preventing the workers with intestinal parasitic, viral or bacterial diseases from working at dining services until full recovery in order to enhance the safety and quality of foods at food services.

ETHICAL ISSUES

Ethical issues such a plagiarism have been observed by the authors.

COMPETING OF INTEREST

The authors have declared that no competing interest exists.

AUTHORS' CONTRIBUTION

All authors equally help to write this manuscript.

FUNDING/SUPPORTING

All the funding was paid by the authors.

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