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Evaluation of food safety knowledge and good personal practices among food handlers in Baghdad city

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The research shed light on a very important issue related with consumer's health and his protection from foodborne illnesses. Employees in food handling might be a source caused to foodborne illnesses if they don't have a high level of awareness in following good personal practices, like good hygiene practices, good manufacturing practices, and other practices which created to prevent contaminants to entry to food chain, or may be consider a threat to the food safety in food establishments. The research showed deficient awareness in personal hygiene in some practices among food handlers in Baghdad city, also a weak application of good manufacturing practices and other practices should be followed by food handler, which considered a threat to the food safety in their food establishments. Food handlers in Baghdad city should be more awareness in both of personal hygiene and good manufacturing practices to produce safe food, and to protect consumers from foodborne illnesses.

Keywords: food safety, good personal hygiene, food handlers.

INTRODUCTION

Foodborne illnesses are very common in developing countries, such as Iraq. This came from the weak of the food control system in mentioned countries, low level of health and nutrition awareness among consumers, no implementation of good manufacturing practices in food facilities, and the practices of hygiene and disinfection among many employees in food handling in these countries, especially in places that are not subjected to the food inspection (Alkhafaji, M. 2020). The lack in using international food standards such as Hazard Analysis Critical Control Points (HACCP) or Food Safety Management System ISO 22000 by Iraqi food establishments, and in addition to the failure to impose some of these standards in Iraqi food establishments by food control authority, leads to exposure of food safety in these food establishments to a potential risk, which exposes food safety to a great threat causing the entry of pathogens or toxins into the food distributed to the consumer causing his illness (Alkhafaji M. and Herrera R. 2021).

Food safety is one of the priorities should be taken by the competent authorities in all countries worldwide to achieve food safety goal, especially in developing countries, in order to preserve the health of everyone, especially sensitive groups of society (children, infants, pregnant women, elderly, and people with chronic diseases), which contaminated food considers a great

danger to their health. The World Health Organization indicates that a large number of children suffer from diarrheal diseases annually, reaching 220 million children, 96 thousand of them died due to this disease, in addition to malnutrition diseases among many of them, especially in third world countries. From the foregoing, it is clear to us, that unsafe food poses a serious problem faced consumers, and it is necessary to take all possible measures to reduce it (WHO, 2020).

Food contamination can occur in different ways, starting from production and ending with the consumer. Therefore, the greatest responsibility lies with food factories and other food producers by taking all measures that enable to produce safe food, meets consumer demands in one hand, and maintains his health on another hand (Alkhafaji M. 2021). There are many reasons for food contamination, and many studies confirm that food contamination occurs during the production stage, due to the failure to adopt good manufacturing practices by the food factory, as well as a lack of hygiene and disinfection practices, especially among employees in food handling, whose role is considered sometimes negative, causing food contamination, and the transmission of disease to the consumer (Alkhafaji M., 2016). It is a great responsibility for the top management of the food factory to ensure that food handlers understand their role in food production through continuous education, and include them in continuous

training courses related to food safety, and the production of healthy and safe food. (FAB, 2020)

In our research, we tried to assess the knowledge of food safety among food handlers in the city of Baghdad, by answering questionnaires addressed to them, and after analyzing their answers with their demographic data, we reached to the final assessment of their knowledge and awareness of food safety.

MATERIALS AND METHODS

Research sample

A random research sample were collected between April 2022 to August 2022 in Baghdad city Alrusafa. The research sample represented employees in food handling, 94 persons who are active worked in various food establishments were selected to participate in the survey. Participants were from employees in: cafeterias, restaurants, small food establishments and hawkers of food in selected city, and they give information about the purpose of the research before starting.

Research design

Two questionnaires are prepared for the purpose of the research, the first one related with participant's awareness of personal hygiene, and the second related with their awareness of food safety. The questionnaires are established after discussing with different persons who related with food safety whether they are worked as food inspectors in Iraqi food control authorities or academics and technics specialized in food safety.

Data analysis

We used descriptive analysis statistics to analyze data collected from research sample. Arithmetic mean and percentage are used to analyzing participant's answers.

RESULTS AND DISCUSSION

Participants in the survey

We selected 94 persons from employees in food handling to participate in the research. Participants selected from different districts of Baghdad city-Alrusafa. They asked to answer questions included in the two questionnaires submitted. They informed that their answers will be anonyms, and will not use for any report to the food control authority, it will only use for scientific research, Table 1.

Table 1: Distribution of study sample

Demographic info.	Frequency	Percentage (%)
Gender		
Male	63	67
Female	31	32.9
Age		
18–34 years	46	48.9

35–54 years	37	39.3
55–64 years	11	11.7
Nationality		
Iraq	58	61.7
Foreign employees	36	38.2
Education Level		
Without Education	5	5.3
Essential education	55	58.5
Higher education	34	36.1
Income		
300.000-600.000 ID	40	42.5
600.000-1000.000 ID	43	45.7
More than 1000.000 ID	11	11.7
Experience (year)		
Less than one year	12	12.7
One to three years	34	36.1
Four to ten years	42	44.6
More than ten years	6	6.3

Participant's awareness of personal hygiene

The importance of training on various aspects, including sanitary measures for food handlers and personal hygiene, has increased during recent decades, with the acceleration of technical development in food factories and the emergence of new production methods that require a parallel development in the practice of sanitary measures (Vitória et al. 2021). On the other hand, we find that the majority of workers who their work requires physical effort in the factory and who are required to handle food have a limited food culture and sanitary measures, which may result in them adopting unhealthy personal habits that lead to deterioration or spoilage of food, or it may reach that food will be source for transmitting disease (Alemayehu et al. 2021). This is in addition to their limited awareness of the nature of food and the nature of its contaminants such as microbes and impurities. Hence, it is necessary to adequately train them to practice of sanitary measures before, during and after working in food factories.

Personal hygiene is the first line of defense to prevent and fight the spread of infection and disease, and in this case this issue is not a personal matter, but rather mandatory for all employees in food handling (Akabanda et al. 2017).

Germs are very minute organisms that can't be seen with the eye, but rather with a microscope. They live on all surfaces (such as hands, mouth, hair, clothes, etc.), and they are harmless unless they are transferred from hands to food under suitable conditions for their growth. Their toxins are secreted into food, as these are not eliminated during cooking or freezing caused food poisoning. And hence the importance of personal hygiene and hand washing are very important to reduce the incidence of

food poisoning (Kassahun et al. 2019).

In addition to all mentioned, it is one of the legal requirements in food establishments that all those dealing with food must obtained a food hygiene course in order to help them manufacture and handle food in safe way Table 2.

Participant's awareness of food safety

Food safety is a scientific process that describes ways to handle, manufacture, and store food in ways that prevent foodborne illnesses, this includes a number of traditional methods that must be followed to avoid exposure to any potential acute health risks (Kaviani, 2022).

From here comes the importance of food safety to food handlers to be awareness to this issue, and put this in their priorities when starting to work in food handling. However, some of food handlers, because of their absence awareness of this responsibility, and for other reasons, including their failure to participate in training courses of food safety, causing food contamination and the transmission of diseases to the consumer (Mst Fatema Khatun et al. 2022). So it was necessary in this research to identify the level of awareness of food handlers for the research sample during the questionnaire given to them, Table 3.

Table 2: Participant's awareness of personal hygiene

Question	Always	Sometimes	Never
Do you taking shower before coming to work?	34 (36.1)	41 (43.6)	19 (20.2)
Do you come to work if you fell sick or having diarrhea?	14 (14.8)	22 (23.4)	58 (61.7)
Do you have work clothes used in your job?	67 (71.2)	17 (18)	10 (10.6)
Do you wear head cover during work?	49 (52.1)	25 (26.5)	20 (21.3)
Do you trim your nails regularly?	72 (76.5)	20 (21.3)	2 (2.1)
Do you wear rings or watch during job time?	8 (8.5)	31 (32.9)	55 (58.5)
Do you smoke during job time?	21 (22.3)	28 (29.7)	45 (47.8)
Do you wash your hands with water and soap when required?	59 (62.7)	29 (30.8)	6 (6.3)
Do you take vaccine requires if you asked?	69 (73.4)	18 (19.1)	7 (7.4)
Do you get medical certificate before you get to work?	51 (54.2)	20 (21.2)	23 (24.4)

Table 3: Participant's awareness of food safety

Question	Yes	No
Not following good manufacturing practices or other practices by food handlers put food safety at potential risk.	43 (45.7)	51 (54.2)
If vegetables not washed with water carefully caused probably food poisoning.	68 (72.3)	26 (27.6)
Vegetables should be keep refrigerated in isolated place than meat to avoid cross-contamination.	49 (52.1)	45 (47.8)
Food should be store in their suitable temperature until use.	38 (40.4)	56 (59.5)
Using hand gloves is essential to avoid food contamination.	59 (62.7)	35 (37.2)
Cook equipment should be washed after using and kept clean always.	55 (58.5)	39 (41.4)
Keep your environment work clean, and avoid insects to entry.	38 (40.4)	56 (59.5)
Leaving ready food at rum temperature for long time caused food poisoning.	41 (43.6)	53 (56.3)
Microorganisms covered food increased at rum temperature if not controlled	29 (30.8)	65 (69.1)
Cooking meat should be down perfectly before serving to avoid food poisoning	22 (23.4)	72 (76.5)

The research included 94 active food handlers as research sample, divided into 63 (67%) male, and 31 (32.9) female; their age was between 18-64 years old, nearly a half of the research sample 46 (48.9%) were between 18-34 years old, this reflect the young range age of food handlers in research place; 37 (39.3%) and 11 (11.7) were between 35-54 and 55-64 years old respectively.

More than half of research sample were Iraqi nationality 58 (61.7%) and 36 (38.2%) were from foreign nationalities. Also, more than half of research sample were with essential and secondary education 55 (58.5); 34 (36.1%) and 5 (5.3%) were with higher education and without education respectively. Their income deferens according to experience; about half of research sample 43 (45.7) taken 600.000-100.0000 Iraqi dinar per month, as we supposed an average salary.

Regarding food handler awareness of personal hygiene; the results showed that 34 (36.1%) of them are taking shower always before coming to work, while 41 (43.6%) doing this hygiene practice sometimes, and 19 (20.2%) never doing it. We asked participants very important question which caused foodborne illnesses by food handler, do you come to work if you fell sick or having diarrhea; 58 (61.7%) answered that they never come to work, while 22 (23.4%), and 14 (14.8%) answered sometimes and always respectively. The questionnaire also consisted some questions related to personal hygiene which we believe from our point of view reflects the culture of food handler; we asked participants, do you wash your hand with water and soap when required; their answer was 59 (62.7%) done this hygiene practice always, while 29 (30.8%) and 6 (6.3%) done sometimes and never respectively. Another important source for transfer contaminants to food related to the question to participants; do you trim your nails regularly; 72 (76.5%) answered always, 20 (21.3%) sometimes, and 2 only (2.1%) answered never.

Another important issue which threat food safety if not followed correctly, is the awareness of food handler to food safety practices such as, Good Manufacturing Practices (GMP) or Hazard Analysis and Critical Control Points (HACCP), and the level requested by them to implement these practices in way to produce safe food and protect consumer from foodborne illness. We asked food handlers about if they know that not followed these practices will expose food safety to a potential risk. Less than half of research sample answered yes 43(45.7%), and more than half 51 (54.2) answered no. Also we asked food handler specifically employees in restaurants whither they washed vegetables carefully before serving to consumer, their answer showed that 68 (72.3%) done this practice perfectly, and 26 (27.6%) didn't do it. Food temperature plays a big role in food poisoning or deterioration if it not controlled, so we asked participant some questions about their knowledge about keeping food

in the suitable temperatures; 38 (40.4%) were answered that they know and used suitable temperatures with food keeping or storing, and 56 (59.5%) of them answered that they not care of this issue. More advanced, we asked food handlers if they know that leaving ready food in rum temperature caused food poisoning, their answer was that less than half 41 (43.6%) know this, and more than half of study sample 53 (56.3%) not know. Also results showed that only third of the study sample 29 (30.8%) know that microorganisms covered food, increasing at rum temperature if not controlled, and the majority of them 65 (69.1%) not know this fact. Finally, we asked participants if they know the suitable temperature of cooking meat and whether if they checking temperature before serving food to the consumer, their response was 72 (76.5%) depend on seen or experience, while only 22 (23.4%) gave importance to use thermometer to determine food temperature of cooked meat before serving to the consumer.

At a final result, the research showed deficient in personal hygiene training courses among food handlers, which is essential to all employees in food handling and mandatory before starting their job in any food establishment with accordance to the national food regulation. This reflect weak application to the regulations and legislations related to protect consumer's health from one hand, and the absence of the effective role of food control authorities in Iraq to check these daily routines which should be followed by food handler from another hand (FAB, 2018). Also the research showed that food safety awareness among food handlers is also still weak; more than half of study research did not participate at any course about food safety, so they certainly will be a threat to the food safety in their establishments by entry a potential risk which will lead to food poisoning.

CONCLUSION

Food regulations and legislations in Iraq should be updated, specifically those which related with all food establishments classified as a high risk such as restaurants, in accordance with the classification of food establishments, to prevent a potential risk to entry to food chain. Both employees in food handling and food inspector should be taken a high level of knowledge in food safety by participating in continuous training in food safety, to be more aware about their responsibility towards consumers. All of this will prevent or reduce foodborne illness to occur among consumers.

CONFLICT OF INTEREST

The author declared that present study was performed in absence of any conflict of interest.

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AUTHOR CONTRIBUTIONS

MAJ was responsible in the design of the research, contributed to the data collection, and wrote the manuscript; also reviewed the manuscript, read and approved the final version.

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