KNOWLEDGE, ATTITUDE, AND PRACTICE AMONG FOODWORKERS IN RESTAURANTS OF SHAHREKORD, IRAN

Hemati, Sara[1], **Fadaei,** Abdolmajid[2]*

[1]Students' Research Committe, Research Center, Shahrekord University of Medical Sciences, Shahrekord, Iran
*[2]Department of Environmental Health Engineering, School of Health, Shahrekord University of Medical Sciences, Shahrekord, Iran
*E-mail: ali2fadae@yahoo.com

Abstract
Food-borne diseases are major health problems, which can threaten public health in developing and developed countries.This study aimed to examine the food workers' attitude, knowledge, and practice regarding food hygiene in restaurants of Shahrekord, Iran. For this purpose, information was obtained from 141 food workers,selected from 47 restaurants, during 2018, completed the questionnaire, which comprised of 4 distinct parts: demographic data, food safety knowledge, attitude, and practice. According to the findings, the knowledge and attitude of food workers was relatively acceptable, while they showed poor food hygiene practices (20±3.1, 25±2.7, and 14.7±4.2, respectively). The level of education and attitude had no significant association, similar to knowledge and attitude ($p>0.05$). As the results indicated, improvements in food safety knowledge and attitude did not necessarily produce positive changes in food workers' practice. The majority of workers (92.9%) stated that they wished to check the safety of prepared food. Almost all workers recognized the importance of workplace sanitary practices, including hand washing (correct answers, 85.1%), use of gloves (correct answers, 78.01%), and proper cleansing of tools (correct answers, 83.68%). The essential practices for improving food safety among food workers include washing hands, separation of raw and cooked food, and use of caps, masks, and aprons.

Key words: Attitudes, Food hygienic, Knowledge, Practices, Restaurant

Received: 18.10.2019 Reviewed: 27.02.2020 Accepted: 02.03.2020

INTRODUCTION

Food-borne diseases are major health problems, which can threaten public health in developing and developed countries. These diseases can influence people's health and impose harmful effects on foreign trade, national development, and economy (Medeiros et al., 2011). In low-income developed countries, many cases of poisoning are reported due to the following factors: use of foods which are produced under unsanitary conditions; droughts; poor health education; water pollution; cleaning deficiencies; poor conditions of food storage; heavy metal pollution; and pesticide residues.

Nevertheless, food poisoning does not only occur in less developed countries. In developed countries, poisoning may be caused by unhygienic storage conditions, failure to provide care for food preparation, and growing demands for low-cost foods (Afifi Abushelaibi., 2012; Ansari-Lari et al., 2010). In some countries, food poisoning outbreaks are significantly associated with the use of polluted food. The key contributing factors for the outbreak of food-borne diseases are contaminated equipments, unsuitable storage and preparation temperatures, poor personnel hygiene, insufficient cooking, and insecure sources.

A major cause of food-borne diseases is oral ingestion of viable microorganisms or toxins, which are produced sufficiently for pathological changes (Al-Sakkaf, 2012). Yarrow reported three factors, including knowledge, attitude, and practice (KAP), which can affect food poisoning, particularly in food workers (Martins et al., 2012; Chapman et al., 2010). In different countries, several studies have been conducted on food workers' practice and knowledge (Malhotra et al., 2009; Afifi & Abushelaibi., 2012; Seaman& Eves, 2010). However, the current status is not well established in Iran owing to inadequate

information about food-borne diseases and food workers' hygienic practices and scarce data on their attitude and knowledge of food hygiene.

Educational programs regarding food security can help provide safer foods. The questionnaire of food safety attitude, knowledge, and practice (KAP) is a potent tool for the development and assessment of educational programs in food workers. However, no research has yet evaluated KAP among food workers of restaurants in Iran. Accordingly, the present study aimed to examine the food workers' KAP regarding food hygiene in 47 restaurants of Shahrekord, Iran.

MATERIALS AND METHODS

This cross-sectional study was performed in Charharmahal and Bakhtiari (Shahrekord) during 2018. Province is a small province in southwest of Iran, with a population of 947,763 people (2017) and an area of 16,403 km^2.The province is mainly active in the agriculture sector. Most of the industrial sector is clustered around the center of the province.Overall, 141 workers, selected from 47 restaurants, to collect the data, a self-made questionnaire was used which was designed through literature review and similar studies(Pichler et al., 2014; Mcintyre et al., 2013). Questionnaire's validity was confirmed by 10 experts of food science and technology as well as educational authorities. The reliability of the questionnaire was calculated through test-retest method by 30 workers (α = 0.80) which comprised of 4 distinct parts: demographic data, food safety knowledge, attitude, and practice. The first section included demographic questions regarding the respondent's age, sex, employment duration, educational level, and training participation. The knowledge section consisted of 15 close-ended questions about specific food-borne disorders and staff hygiene. Three possible answers were defined for each question, i.e., "wrong", "right", and "no knowledge". The knowledge scores were determined based on the participant's response to every question.

The next section of the questionnaire was concerned with the participant's attitude towards food safety measures. This section included 9 questions, and a 3-point scale ("yes", "no", and "uncertain") was applied to evaluate the participant's agreement with the questions. The final section of the questionnaire evaluated the workers' practice, based on their self-report hygienic behaviors. It included 10 questions, rated on a 3-point scale ("never", "often", and "always").In this cross-sectional study has no ethical consideration.

SPSS version 13 was used for statistical analysis. The mean and percentage of responses were determined for every category and presented in tables. For analysis of data, descriptive tests (mean, standard deviation, percentage, and frequency) were applied. Also, Chi square test was used to evaluate the association between variables. The level of significance was set at 0.05.

RESULTS AND DISCUSSION

In this study, among 141 food workers, 71% were male. According to the findings, the mean age of food workers was 25 years (SD, 6.4; range, 20-55), and the mean employment duration was 3.5 years (SD, 5.0). Nearly 61%, 35%, and 4% of the subjects had less than high school, high-school, and higher education, respectively. Overall, 64% of the subjects had participated in food safety programs by the Environmental Health Department of Shahrekord University of Medical Sciences. As the findings indicated, no significant relationship was found between knowledge and sociodemographic characteristics. Table 1 presents the most significant responses.

Nearly 50% of responses regarding *Vibrio cholerae*, diarrhea, brucellosis, and typhoid were correct. Almost all workers were familiar with the importance of workplace sanitary practices, including use of gloves (correct responses, 78.01%), hand washing (correct responses, 85.1%), and proper instrument cleansing (correct responses, 83.68%). Additionally, 56.02% of subjects did not answer the question about the proper

refrigerator temperature or failed to correctly answer the question.

Moreover, in 49.64% and 46.8% of subjects, the proper storage temperature was not correctly identified for hot and cold convenience food, respectively. Approximately 51.77% of responses about the proper refrigerator temperature were inaccurate. As to the question regarding the transmission of food contamination via insects, the food workers obtained scores of 87.94%, which indicates their adequate knowledge about this type of food contamination. Table 2 presents the most significant responses.

Most of the participants (92.9%) stated that they wished to confirm the safety of food for consumers, while 7.09% denied to do so or did not answer the question. As the findings revealed, food contamination was prevented by the application of masks in 63.12% of the participants. Almost 63% of the respondents believed that gloves could prevent food contamination. As stated by nearly 85% of the subjects, defrosted food does not need to be refrozen; Table 3 presents the subjects' responses.

About 47.51% of the evaluated food workers stated that they never used masks, whereas 27.65% claimed that they usually applied masks during work. According to the reports, 46.09% and 52.48% of the subjects always washed their hands before or after contact with raw and cooked food, respectively. Moreover, with respect to smoking in the workplace, 61.7% of the subjects claimed that they never smoked, while 18% stated that they always smoked in the workplace. According to Table 4, the mean attitude, knowledge, and practice scores were respectively 20±3.1, 14.7±4.2, and 25±2.7.

Table 1. The food workers' level of knowledge

Questions	Responses, n (%)		
	Right	Wrong	No knowledge
Vibrio cholerae is transmitted through food.	71(50.35)	58 (41.13)	12(8.51)
Typhoid is transmitted through food.	82(58.15)	44(31.20)	15(10.63)
Brucellosis is transmitted through food.	75(53.19)	50(35.45)	16(11.34)
Bloody diarrhea is transmitted through food.	78(55.31)	47(33.33)	16(11.34)
There should be no contact between raw chicken, fish, and meat.	107(75.88)	25(17.73)	9(6.38)
The correct refrigerator temperature is 4 to 7^0C.	62(42.39)	73(51.77)	6(4.25)
Food contamination is reduced by washing hands before work.	120(85.10)	17(12.05)	4(2.83)
Food contamination is reduced by the use of gloves during work.	110(78.01)	22(15.6)	9(6.38)
Food contamination is reduced by appropriate handling and cleaning of instruments.	118(83.68)	15(10.63)	8(5.67)
Food contamination is increased by eating and drinking in the workplace.	100(70.92)	23(16.31)	18((12.76)
Food contamination can be transmitted through insects.	124(87.94)	11(7.8)	6(4.25)
Food contamination can arise from reheating food.	98(69.5)	15(10.63)	28(19.85)
Hot convenience foods must be stored at 61-70^0C.	67(47.51)	70(49.64)	4(2.83)
Cold convenience foods should be stored at maximum temperature of 4^0C (tolerable, 6^0C).	68(48.22)	66(46.8)	7(4.96)
Food should be kept in the refrigerator based on its expiration date (first in-first out).	110(78.01)	20(14.18)	11(7.8)

Table 2- The food workers' attitudes

Questions	Responses, n (%)		
	Yes	No	Uncertain
Staff with hand erosions or cuts should not be in contact with unwrapped food.	90(63.82)	30(21.27)	21(14.89)
It is not suitable to refreeze defrosted food.	120(85.1)	19(13.47)	2(1.41)
Food contamination can be reduced by using gloves.	90(63.82)	14(9.92)	37(26.24)
Raw and cooked food should be separately stored.	100(70.92)	17(12.05)	24(17.02)
Food contamination can be reduced by using aprons.	97(68.79)	15(10.63)	29(20.56)
Food contamination can be reduced by using masks.	89(63.12)	16(11.34)	36(25.53)
Food contamination can be reduced by using caps.	112(79.43)	20(14.18)	9(6.38)
Safe handling of food is an important work responsibility.	105(74.46)	16(11.34)	20(14.18)
It is important to present safe food to customers.	131(92.9)	9(6.38)	1(0.7)

Table 3. The food workers' practices

Questions	Responses, n (%)		
	Always	Often	Never
Do you have a habit of washing your hands before touching raw food?	65(46.09)	50(35.46)	26(18.43)
Do you have a habit of washing your hands after touching raw food?	74(52.48)	47(33.33)	20(14.18)
Do you smoke at work?	20(14.18)	34(24.11)	87(61.7)
Do you use an apron during work?	80(56.73)	40(8.04)	21(14.89)
Do you wear a cap during work?	97(68.79)	35(24.82)	9(6.38)
Do you wear a mask during work?	35(24.82)	39(27.65)	67(47.51)
Do you defrost frozen food at room temperature?	49(34.75)	50(35.46)	42(29.78)
Do you use different kitchen equipment to make cooked and raw food?	69(48.93)	53(37.58)	19(13.47)
Do you check the unity of food packages?	67(47.51)	32(22.69)	42(29.78)
Do you store food in the refrigerator based on the expiration date?	55(39)	67(47.51)	19(13.47)

Table 4. The mean and SD of correct answers to questions regarding KAP of food workers

Type of question	Mean	SD
Knowledge (15 questions)	20	2.7
Attitude (9 questions)	25	3.1
Practice (10 questions)	14.7	4.2

4.Discussion

This study, which was conducted during 2018 at Shahrekord restaurants, presented critical findings about food workers' KAP regarding food safety. As reported by almost all participants, they washed their hands in case of contact with food to decrease the contamination risk (Pichler et al., 2014; Mcintyre et al., 2013).

To prevent food-borne diseases originating from restaurants, the gaps in food safety knowledge should be narrowed to present effective behavioral and educational interventions. Inadequate knowledge about food-borne diseases was also reported in studies by Gomes-Neves et al. (2011) and Osaili et al. (2013) from Portugal and Jordan, respectively. The present results showed adequate knowledge about the transmission of food contamination through insects (87.94%), which is in consistence with a study from the UAE conducted by Afifi and Abushelaibi (2012).

According to the current results, there is inadequate knowledge about the proper temperature for storing hot and cold convenience foods. Similarly, in a previous study from Italy, food handlers at hospitals were uninformed about the proper temperature for storing these foods (Buccheri et al., 2010); therefore, design of targeted courses is necessary for the food staff.

Regarding self-reported hygienic practices, 46.09% and 52.68% of food workers, respectively washed their hands before and after handling food. In addition, only 24.82% of workers used a mask while working. As the findings indicated, 61.7% of workers never smoked at work. Training and education may lead to improved knowledge, while changes in the behaviors and practice of food staff are not guaranteed. Therefore, adequate knowledge of food safety is not essentially associated with proper handling practices (Afifi & Abushelaibi (2012).

On the other hand, the mentioned result is contradictory with the findings reported by Abdul-Mutalib et al. (2012), which indicated that proper attitude and adequate knowledge are associated with good practice. In addition, Ansari-Lari et al. (2010) showed that attitude and knowledge were positively correlated, while practice and knowledge showed a negative correlation. In addition, Scott and Vanick (2007) reported that knowledge was significantly associated with practice.

CONCLUSION

Despite the relatively acceptable attitude and knowledge of food workers, their food hygiene practices were unacceptable. The essential practices for improving food safety among food workers include washing hands, separation of raw and cooked food, and use of caps, masks, and aprons. In addition, continuous training and education should be integrated. In fact, knowledge and training for safe food handling practices in restaurants may help prepare safer foods and reduce the possibility of food-borne diseases.

Acknowledgments

Shahrekord University of Medical Sciences supported this study.

REFERENCES

[1] Abdul-Mutalib, N.A., Abdul-Rashid, M.F., Mustafa,S ., Amin-Nordin,A., Hamat, R. A.,& Osman,M.(2012). Knowledge, attitude and practices regarding food hygiene and sanitation of food handlers in Kuala Pilah, Malaysia.Food Control, 27, 289-293.

[2] Afifi,H.S.,& Abushelaibi,A.A. (2012). Assessment of personal hygiene knowledge, and practices in Al Ain, United Arab Emirates. Food Control. 25(1) 249-253.

[3] Ansari-Lari,M., Soodbakhsh,S, & Lakzadeh, L.(2010). Knowledge, attitudes and practices of workers on food hygienic practices in meat processing plants in Fars, Iran. Food Control, 21, 260–263.

[4] Al-Sakkaf, A (2012). Evaluation of food handling practice among New Zealanders and other developed countries as a main risk factor for campylobacteriosis rate. Food Control, 27, 330-337.

[5]Buccheri C., Mammina C., Giammanco S, Giammanco M., LaGuardia M., & Casuccio A. (2010). Knowledge, attitudes and self-reported practices of food service staff in nursing homes and long-term care facilities. Food Control, 21, 1367–1373.

[6] Chapman B., Eversley T., Fillion K., MacLaurin T., & Powell D. (2010). Assessment of food safety practices of food service food handlers (risk assessment data): testing a communication intervention (evaluation of tools). J .Food Protect, 73, 1101-1107.

[7] Martins R. B., Hogg T., & Otero J. G. (2012). Food handlers' knowledge on food hygiene: the case of a catering company in Portugal. Food Control, 23, 184-190.

[8] Malhotra R., Lal P., Krishna Prakash S., Daga M. K., & Kishore J. (2008). Evaluation of a health education intervention on knowledge and attitudes of food handlers working in a medical college in Delhi, India. Asia-Pac J Public He, 20(4), 277-286.

[9] Medeiros C.O., Cavalli S.B.,. Salay E ., & Proença R.P.C. (2011). Assessment of the methodological strategies adopted by food safety training programmes for food service workers: A systematic review.Food Control, *22*, 1136-1144.

[10] McIntyre L., Vallaster L., Wilcott L., Henderson S. B., & Kosatsky T. (2013). Evaluation of food safety knowledge, attitudes and self-reported hand washing practices in food safe trained and untrained food handlers in British Columbia, Canada .Food Control, 30, 150-156.

[11] Neves E.G., Cardoso C.S., Araújo A.C.,& Correia da Costa, M. (2011). Meat handlers training in Portugal: A survey on knowledge and practice.Food Control, 22, 501-507.

[12] Osaili T.M., Abu Jamous D. O., Obeidat B. A., Bawadi H. A., Tayyem R. F., & Subih, H. S.(2013).Food safety knowledge among food workers in restaurants in Jordan. Food Control, 31, 145-150.

[13] Pichler J., Ziegler J., Aldrian U., & Allerberger F. (2014). Evaluating levels of knowledge on food safety among food handlersfrom restaurants and various catering businesses in Vienna, Austria 2011/2012. Food Control, 35, 33-40.

[14] Scott E., & Vanick K. (2007). A survey of hand hygiene practices on a residential college campus. Am J Infect Control, 35(10), 694-696.

[15] Seaman P., & Eves A. (2010). Perceptions of hygiene training amongst food handlers, managers and training providers e a qualitative study. Food Control, 21, 1037-1041.

[16] Soares L.S., Almeida R.C.C., Cerqueira E.S., Carvalho J. S., & Nunes I. L. (2012). Knowledge, attitudes and practices in food safety and the presence of coagulase positive staphylococci on hands of food handlers in the schools of Camaçari, Brazil. Food Control, 27, 206-213.