



An Assessment of Knowledge, Attitudes and Practices in Food Safety Among Food Handlers Engaged in Food Courts

**UMMI MOHLISI MOHD ASMAWI^{1*}, ALISSA AZUREEN NOREHAN¹,
KHASNOORSANI SALIKIN¹, NUR AIN SYAFIQAH ROSDI¹,
NUR AMIRA THAQIFAH ABDUL MUNIR¹, NURUL BALQIS MUHAMMAD BASRI¹,
MOHAMAD IKHSAN SELAMAT¹ and NORAZMIR MD NOR^{2,3}**

¹Faculty of Medicine, Universiti Teknologi MARA, Sungai Buloh, Malaysia.

²Faculty of Health Sciences, Universiti Teknologi MARA, Puncak Alam, Malaysia.

³Food Service Quality Research Group, Universiti Teknologi MARA, Puncak Alam, Malaysia.

Abstract

The aim of this paper is to evaluate the aspects of knowledge, attitude, and practices about food hygiene and safety issues among food handlers who are working in food courts. A cross-sectional study was conducted at four randomly selected food courts in Petaling Jaya, Malaysia during June and July 2017. It involves 108 respondents that match the inclusion criteria among food handlers. The guided self-administered questionnaire; were divided into three sections which are knowledge, practices, and attitudes. After the complete questionnaires were collected, data were entered and analysed using the Statistical Package for Social Science (SPSS) software version 23.0. Positive correlations were seen between mean knowledge score and mean attitudes score (p -value=0.0240, r =0.217), between attitude score and practices score (p <0.001, r =0.559) and between knowledge score and practices score (p value=0.049, r =0.190). The strongest correlation being between mean attitudes score and mean practices score. Respondents with low knowledge score also had the higher practices score. This paper serves as an eye-opener for policy makers as they can review and improve the knowledge, attitude and practices in food safety among food handlers in food courts and they can also help raise food safety awareness campaign and organize more targeted training in



Article History

Received: 08 November 2017

Accepted: 16 August 2018

Keywords

Attitude,
Food courts
Hygiene,
Knowledge,
Practices,
Safety

CONTACT Ummi Mohlisi Mohd Asmaw ✉ umieasmawi@salam.uitm.edu.my 📍 Faculty of Medicine, Universiti Teknologi MARA, Sungai Buloh, Malaysia.



© 2018 The Author(s). Published by Enviro Research Publishers.

This is an Open Access article licensed under a Creative Commons license: Attribution 4.0 International (CC-BY).

Doi: <http://dx.doi.org/10.12944/CRNFSJ.6.2.09>

Introduction

It is the responsibility of everyone involved in food serving operations to take care of the food's safety and hygiene¹. Food safety and hygiene can be defined as the various conditions and practices that preserve the food quality in the prevention of contamination and foodborne diseases². Foodborne diseases are one of the important public health concerns in Malaysia³. Annually, about 30% of the people in industrialised countries suffering from foodborne illness⁴. Malaysia itself was once shocked by the outbreak of typhoid fever in Kuala Lumpur in August 2015, which was attributed to the unhygienic state of restaurants and food stalls beside a poor standard of personal hygiene observed by the personnel⁵. Food safety is a basis for food serving because of the high numbers of foods served daily and owing to their likeliness to contamination should high standards of hygiene principles are not observed⁶. Especially in urban areas, the public finds food courts, restaurants, and food stalls are more convenient rather than cooking at home as most of them are busy working. The food handler plays a key role in ensuring strict adherence to food safety principles throughout the whole process in the food chain, particularly the food production and storage stage⁸⁻⁹. Thus, what is important for the food handlers is to wash their hands well, have good personal hygiene, clean work attire, adhere with the food-hygiene practices at work and carry out regular training to ensure that the food they handle and prepare is safe¹⁰. Ironically, a study done in Malaysia in 2016 showed that food handlers have never been trained to handle food safely, and most of them demonstrated a lack of knowledge on pathogens linked with various disease-causing agents¹¹. Therefore, our study aims to assess the knowledge, attitude and practices of food handlers in food courts, and our specific target area is in Petaling Jaya.

Materials and Methods

A cross-sectional study was conducted using cluster sampling among the food handlers working in Petaling Jaya food courts. The respondents were selected based on our inclusion criteria such as the person who handles the food based on the aspect of preparation, storage, cooking and serving of food; able to communicate/ converse in English and Malay and can read and write. All that match the inclusion criteria were taken as respondents

for each respective food courts. The food courts percentage were Jalan Othman (47%); Taman Dato Harun (14%); Seksyen 8 (14%); Seksyen 14 (25%). Hence the response rate was 100%.

The respondents were given a set of questionnaires to be filled in. A quantitative questionnaire was constructed using questions from previous studies^{6,16,17} as a platform to assess the awareness among food court handlers in Petaling Jaya towards food hygiene and safety. Some modification was done after conducting a pilot test. There were four sections for each questionnaire set: 1) demographic data 2) Knowledge section (10 questions) 3) Attitude (14 questions) 4) practice section (20 questions).

Verbal and written consents were taken from each respondent who agrees to participate in the study. Furthermore, the total of stalls of each food court was represented by percentage using the strata sampling method.

This research applied descriptive studies to analyse the raw data collected by using SPSS version 23.0 by using student T-test and one-way ANOVA. Demographics variable was determined as it one of the factors that could influence the study results. The mean score of knowledge, attitudes, and practices (KAP) of the guided self-administered questionnaire was used as the assessment of the food handlers. Categorical data were analysed using Chi-square test and presented using tables, frequencies, and histogram/pie chart/bar chart. The data from student T-test and one-way ANOVA was presented using mean and standard deviation. A simple linear correlation test was used to see the direction and strength of correlations between mean knowledge score and mean attitudes score, mean attitudes score and mean practices score and lastly between mean knowledge score and mean practices score. The calculation for the sample size required was carried out using a Raosoft sample size calculator – the confidence level is at 95% and the margin of error 5%.

Results & Discussion

This study aimed to assess the knowledge, attitudes and practices (KAP) in food hygiene and safety, among food handlers working in food courts in Petaling Jaya

Knowledge of Food Handlers on Food Hygiene and Safety

Table 1 highlights the fact that the level of food handlers' knowledge is poor with a mean percentage score of 58.3%. The food handlers score more than 50% for only four questions out of ten. This shows that their level of knowledge is poor since they cannot answer well for six questions with a score less than 50%. Participation in food safety training among food handlers is 84.3%, but on the average, they could only manage to get about half mark for the knowledge section. It shows that they do attend the training session but the lack of understanding of the knowledge that is taught. Training can improved food safety knowledge, beliefs and give positive impacts on food handling practices⁷. Hence, training is vital to ensure that food handlers have all the required amount of awareness and education to meet the food hygiene requirements, although this does not necessarily lead to a positive change in the management and handling of food^{8,17}.

Food handlers in Petaling Jaya Selatan show good knowledge in categories the way they defrost meat (87%), washing the vegetables and fruits using tap water (84.3%), the time they should clean kitchen counter (75%) and the time to wash their hand (68.5%). However, the food handlers show poor knowledge in categories of food storage temperature (17.6%), storage of food (21.3%) and preparation of food (25.9%). This study demonstrates that although food handlers are maybe aware of the need for personal hygiene, they do not comprehend crucial aspect linked to temperature values as it is needed to control the growth of microbes in food. In another hand, a study done by Firdaus *et al.*, among food handlers in Putrajaya shows a high mean percentage score of 84.1% with excellent knowledge in the categories of food storage temperature, storage of foods, self-hygiene, and high-risk foods¹².

Table 1: Food hygiene and safety knowledge

Topics	Correct (%)	Incorrect (%)	Not sure (%)
Chicken is regarded as a safe food item when cooked at an interna l temperature of 74°C.	17.6	49.1	33.3
How is the meat defrosted?	87.0	13.0	0
What is the worst method considered for thawing a frozen roast?	25.0	65.7	9.3
Which of the following must be avoided when storing raw food in the refrigerator?	21.3	69.4	9.3
When you slice raw meat, and you want to reuse your cutting utensil, what would be the next step to do?	41.7	58.3	0
Which procedure for cleaning kitchen counters can prevent food poisoning most effectively?	38.0	56.4	5.6
When is the best time to have the kitchen counters washed, rinsed and sanitised?	75.0	20.4	4.6
When you are preparing food, which one of these will require you to wash your hands after touching it?	68.5	28.7	2.8
You have used a cutting board to slice raw meat and then you need to cut tomatoes- what is your next step?	25.9	74.1	0
Do you use the tap water to wash fruits and vegetables?	84.3	15.7	0

Attitudes of Food Handlers on Food Hygiene and Safety

The overall attitudes of food handlers toward food hygiene and safety were at the high level of

satisfaction. Most respondents strongly agree with all 14 questions regarding food hygiene and safety attitudes (Table 2). Most of the food handlers strongly agreed that they should wash hands before they put

the gloves on (77.8%), but there is slight decrease the percentage that they should wash hands after using gloves (69.4%). In this study, it shows that no significant association has been established between the education level of food handlers (no formal education/primary school vs secondary

school/ tertiary education) and the attitudes of food handlers ($X^2=0.41$, $p>0.05$). This result is contradicted by the study in Putrajaya which showed food handlers with high education background have better attitudes compared with no formal educational level amongst the food handlers¹².

Table 2: Food hygiene and safety attitude

Topics	Strongly agree (%)	Agree (%)	Uncertain (%)	Disagree (%)	Strongly disagree (%)
One main responsibility of my job is to handle food safely.	81.5	14.8	2.8	0	0.9
I will handle food differently if I know it is not right.	77.8	15.7	0	5.6	0.9
I think personal cleanliness is highly important when we are at work	78.7	20.4	0	0.9	0
Food handlers suffering from foodborne diseases should not be allowed to go to work and steer clear from the premises where they work.	88.0	8.3	3.7	0	0
Food handlers who have wounded fingers and hands can handle food only if they correctly cover their cuts.	75.9	13.9	3.7	5.6	0.9
Food handlers should make sure that their nails are short and clean.	82.4	15.7	0	0	1.9
Techniques of washing hands properly are important food preparation.	82.4	15.7	0	0	1.9
It is important to wash hands right after unhygienic practices	85.2	13.9	0	0.9	0
Food handlers should wear gloves when they touch ready-to-eat foods	84.3	13.0	0.9	1.9	0
Food handlers should wash hands before putting on the gloves.	77.8	13.0	2.8	5.6	0.9
Food handlers should wash hands after putting on their gloves.	69.4	15.7	6.5	5.6	2.8
Food handlers should change gloves after they handle raw food and before they handle ready to eat foods.	75.0	19.4	4.6	0.9	0
Food handlers should wear suitable attire before they start working.	81.5	17.6	0	0.9	0
Food handlers should use a clean hand towel to wipe their hands after washing them.	84.3	13.0	1.9	0.9	0

Practices of Food Handlers on Food Hygiene and Safety

The level of food handlers' practices is good with a percentage score of 50% of the respondents always practices hygienic and safety from 14 out of 20 questions (Table 3). There are three aspects are being evaluated which are hand washing, contamination prevention, and glove use. Hand washing aspects have the highest score as they always practice right-hand washing procedure (78.7%), always wash hands after returning from the toilet (87%), always wash hand after doing unhygienic practice (84.3%), always wash hand after break session (82.4%) and always wash hand after handling waste (89.8%). Glove use aspects shows the lowest score with only 42.60% of food

handlers always putting on gloves when touching ready to eat foods, 55.6% of food handlers always washing hands before putting on gloves, 50.9% always washing hands after taking off the gloves and 52.8% of food handlers always changing their gloves when dealing with raw and ready to eat foods. In our society, usually, the consumer has a negative perception towards foreigner food handlers to have low self-hygiene compared to the local food handlers. A different result in the previous studies of food handlers in Putrajaya is nationality, and education level is two main factors that are significantly influencing food handlers' practices¹². Few studies showed that poor hygiene practices among food handlers are explained by food handlers' lack of knowledge¹³⁻¹⁵.

Table 3: Food hygiene and safety practices

Topics	Always (%)	Often (%)	Sometimes (%)	Rarely (%)	Never (%)
Do you follow the right hand-washing procedures?	78.7	18.5	1.9	0.9	0
Do you wash your hands after returning from the washroom?	87.0	12.0	0	0.9	0
Do you wash hands after rubbing your nose or scratching your body?	84.3	13.9	0.9	0.9	0
Do you wash your hand after a break from work?	82.4	13.9	0.9	2.8	0
Do you wash your hands after handling food waste or dealing with rubbish?	89.8	9.3	0	0.9	0
Do you touch food when you cut your fingers and the cut is not well covered?	6.5	2.8	7.4	11.1	72.2
Do you make sure that your hands are dry and clean every time you are handling food?	75.9	19.4	3.7	0.9	0
Do you wear any items of jewellery when you handle food?	3.7	0.9	3.7	12.0	79.6
Are you absent from work if you have any foodborne illness?	70.4	12.0	5.6	2.8	9.3
Do you smoke as you prepare for food?	0.9	0	0.9	6.5	91.7
Do you eat, drink or chew gum as you prepare for food?	6.5	2.8	0.9	10.2	79.6
Do you wear a clean and suitable uniform before working?	71.3	20.4	1.9	1.9	4.6
Do you wear proper shoes before you begin working?	71.3	19.4	6.5	0.9	1.9
Do you wear an apron before working?	86.1	10.2	0.9	0.9	1.9
Do you wear a cap before working?	79.6	14.8	2.8	1.9	0.9

Do you wear a mask before working?	39.8	7.4	13.9	15.7	23.1
Do you wear gloves when you want to touch ready to eat foods?	42.6	15.7	22.2	3.7	15.7
Do you wash your hands before you put on your gloves?	55.6	17.6	15.7	5.6	5.6
Do you wash your hands after you remove your gloves?	50.9	222.2	16.7	2.8	7.4
Do you change gloves between your handling of raw and ready to eat foods?	52.8	21.3	19.4	1.9	4.6

Correlation Between Knowledge, Attitudes and Practices

Table 4 shows an association between knowledge, attitudes and practices among food handlers engaged in food courts. There are statistically significant association between knowledge and attitudes ($X^2=5.103$, $p=0.024$), attitudes and practices ($X^2=33.751$, $p<0.001$), and also knowledge vs practices ($X^2=3.910$, $p=0.049$). There are statistically significant positive correlation between knowledge score and attitudes score (p value=0.0240, $r=0.217$), between attitudes score and practices score ($p<0.001$, $r=0.559$) and also knowledge score

and practices score (p value=0.049, $r=0.190$) (Table 5). The strongest positive correlation is between attitudes scores and practices score. Knowledge is the key element to influence the outcome of attitudes and practices among the food handlers. This association shows food handlers with good knowledge will have good attitudes and good practices. This result is similar to the previous result done in Vietnam¹⁹. However, with good attitudes can give more impact to their practices in food safety. Therefore, giving good training among the food handlers can improve their attitudes hence their practices in food safety¹⁸.

Table 4: Association between knowledge, attitudes, and practices

Variable	Chi-square	P Value	Confidence interval	Significance ($p<0.05$)
Knowledge α Attitudes	5.103	0.024	-0.385,-0.028	Yes
Attitudes α Practices	33.751	<0.001	-0.745,-0.414	Yes
Knowledge α Practices	3.910	0.049	-0.373,-0.001	Yes

Table 5: Correlation coefficient between knowledge, attitudes, and practices

	Mean Score (SD)	P Value	Correlation Coefficient (r value)
Knowledge α Attitudes	1.58 (0.495)	0.024	0.217
Attitudes α Practices	1.68 (0.470)	<0.001	0.559
Knowledge α Practices	1.58 (1.320)	0.049	0.190

Conclusion

This study revealed that food handlers with poor knowledge score able to achieve high practices score. Thus, it reflects that working experience do influence the vital practice of food hygiene and safety. We need to enhance the knowledge of food safety and hygiene to achieve an excellent practice. We would like to recommend conducting a simple test at the end of food handlers training to assess their level of understanding. It would be a great undertaking if future research is able to get various government agencies and other related

organisations to collaborate, so that more and more respondents can be surveyed (multi-centre study) and therefore increasing the possibility of rendering this food safety study more effective.

Acknowledgments

This research was funded by Universiti Teknologi MARA under FRGS grant: 600-IRMI/MyRA 5/3/GIP (015/2017).

Conflict of Interest

There is no conflict of interest

References

1. Griffith C. J, Griffith, C. J, Jackson, L. M, Jackson, L. M, Lues R, Lues R. The food safety culture in a large South African foodservice complex: Perspectives on a case study. *British Food Journal*.2017;**119**(4): 729-743,
2. Luu P. H, Davies B, Dunne M. P. The association between factors which affect the food safety practices of seafood distributors within the southern domestic distribution chains in Vietnam. *Food Control*.2017;**73**: 332-340.
3. Woh P. Y, Thong K. L, Behnke J. M, Lewis J. W, Zain S. N. M. Characterization of Nontyphoidal Salmonella Isolates from Asymptomatic Migrant Food Handlers in Peninsular Malaysia. *Journal of Food Protection*.2017;**80**(8):1378-1383.
4. World Health Organisation (WHO). WHO are first ever global estimates of foodborne diseases find children under five accounts for almost one-third of deaths. <http://www.who.int/mediacentre/news/releases/2015/foodborne-disease-estimates/en/> (2015)
5. The Straits Times. Amid KL typhoid outbreak, Malaysia's Health Ministry assures disease preventable and treatable. <http://www.straitstimes.com/asia/se-asia/amid-kl-typhoid-outbreak-malaysias-health-ministry-assures-disease-preventable-and> (2015)
6. Rebouças L. T, Santiago L. B, Martins L. S, Menezes A. C. R, Araújo M. D. P. N, de Castro Almeida R. C. Food safety knowledge and practices of food handlers, head chefs and managers in hotels' restaurants of Salvador, Brazil. *Food Control*.2017;**73**:372-381.
7. Nur Syakira A. T, Mohd Ramadan A. H, Ummi Mohlisi M. A, Norazmir M. N. Food hygiene's knowledge, attitudes, and practices between urban and suburban adolescents. *Procedia-Social and Behavioral Sciences*.2016;**234**: 36-44.
8. Jeinie M. H, Nor N. M, Sharif M. S. M, Saad M. Food hygiene and safety among culinary intern: Questionnaire for FHS quality. *Procedia-Social and Behavioral Sciences*.2016;**222**:299-305.
9. Jeewoon R., Nouvishika S., Kumar D. S., Ramchandur A. H. An investigation into how far does residents adopt measures to reduce microbial hazards during food handling. *Current Research in Nutrition and Food Science*.2017;**5**(1):06-14.
10. Jeinie M. H, Saad M, Sharif M. S. M, Nor N. M. Food safety and hygiene practice among hotel in Malaysia: a qualitative approach. *Environment-Behaviour Proceedings Journal*.2016;**1**(3):150-155.
11. Jeinie M. H, Saad M, Sharif M. S. M, Nor N. M. Hygiene practices and food safety knowledge for biological, chemical and physical hazards. *Social Sciences*.2016;**11**(19):4633-4637.
12. Mohd Firdaus S. A, Son R, Mohhiddin O, Toh P. S, Chai L. C. Food court hygiene assessment and food safety knowledge, attitudes and practices of food handlers

- in Putrajaya. *International Food Research Journal*.2015;**22**(5):1843-1854.
13. Salhadi N. A, Ab Hamid M. R, Osman N. S, Nor N. M. A qualitative study on the determination of healthy cafeteria practice in Selangor, Malaysia. *Environment-Behaviour Proceedings Journal*.2017;**2**(5):141-149.
14. Norrakiah A. S, Oi N. S. Knowledge, attitudes, and practices of food handlers on food safety in food service operations at the Universiti Kebangsaan Malaysia. *Food Control*.2014;**37**:210-217.
15. Jeinie M. H, Nor N. M, Sharif M. S. M. A conceptual model of food hygiene and safety: implication for future research. *Procedia-Social and Behavioral Sciences*.2015;**201**: 121-127.
16. Siew L. T, Fatimah A. B, Muhammad S. A. K, Hai Y. L, Nor A. M. Hand hygiene knowledge, attitudes and practices among food handlers at primary schools in Hulu Langat district, Selangor (Malaysia). *Food Control*.2013;**34**(12):428-435.
- Thomai L, Marios G, Kristina P, Aideen M, Elenilossifidou. Food safety knowledge and food-handling practices of Greek university students: A questionnaire-based survey. *Food Control*.2012;**28**(2): 400-411.
17. Thomai L, Marios G, Kristina P, Aideen M, Elenilossifidou. Food safety knowledge and food-handling practices of Greek university students: A questionnaire-based survey. *Food Control*.2012;**28**(2):400-411.
18. Gaungo Y, Jeewon R. Effectiveness of Training among Food Handlers: A review of the Mauritian Framework. *Current Research in Nutrition and Food Science*.2013;**1**(1): 01-09.
19. Thuan H. V., Ninh H. L., Anh T. N. L., Nguyen N. T. M., Pekka N. Knowledge, attitudes, practices and training needs of food-handlers in large canteens in Southern Vietnam: *Food Control*.2015;**57**:190-194.