

Food Handlers' Food Safety Knowledge, Attitudes, and Practices in Taman Negara, Kuala Tahan

Chemah Tamby Chik^{1*}, Nadiatul Shima Mohd Shahed², Sabaianah Bachok³, Aslinda Mohd Shahril⁴ & Norsila Shamsuddin⁵

^{1,3,4} Department of Foodservice Management, Faculty of Hotel & Tourism Management, Universiti Teknologi MARA Selangor, Puncak Alam Campus, 42300 Selangor

² Department of Environmental Health, Faculty of Health Sciences, University Teknologi MARA, Cawangan Pulau Pinang, Kampus Bertam, 13200, Pulau Pinang, Penang

⁵ Department of Social Sciences, Faculty of Education and Social Sciences, Universiti Selangor, 45600 Kuala Selangor, Selangor

*corresponding author: chemah@uitm.edu.my

ABSTRACT

ARTICLE HISTORY

Received:

1 January 2023

Accepted:

4 April 2023

Published:

27 April 2023

KEYWORDS

Knowledge

Attitudes

Practices

Food safety

Food handlers

Foodservice businesses play a pivotal role in the hospitality and tourism industry. Travelers will usually frequent restaurants as part of their stay in any destination. Thus, food preparation should prioritize measures to ensure food safety and preservation of the wholesomeness of food, especially when it is handled by locals. Taman Negara, which is popular among international travelers, is one of the gateways to Malaysia's many forest reserves. However, with the Covid-19 endemic, encouragement for domestic tourists to travel in Malaysia has also been made visible. Tourists from overseas and urban areas usually have higher standards for hygiene. Thus, this study aims to determine food handlers' knowledge of hygienic practices at restaurants in Taman Negara, Kuala Tahan. Data were analyzed using SPSS IBM version 22. Results show that knowledge of food hygiene among food handlers at Kuala Tahan restaurants is good with a mean score of above 4.50. The respondents strongly agree with the importance of sound knowledge of food hygiene practices. There is a good relationship between age, level of education, and training received with the food handlers' food safety knowledge. It is found that certified food handlers have a very strong significant relationship with food safety knowledge ($P < 0.10$). Through observation, the food handlers apply Good Hygiene Practices (GHP) and provide a proper hand washing area. There are no signs of pests in their facilities; however, the kitchen floor is below par for hygienic standards. There is still area for improvement in the overall cleanliness of the restaurants in Taman Negara, Kuala Tahan.

e-ISSN 2600-7274

© 2023 The Author(s). Published by Universiti Teknologi MARA Cawangan Pulau Pinang
This open access article is distributed under a Creative Commons Attribution-Non-commercial 4.0 International (CC BY-NC 4.0) license.

<https://creativecommons.org/licenses/by-nc/4.0/>



1. INTRODUCTION

The foodservice industry is one of the largest industries in Malaysia (Sia and Shantons, 2009). It covers a very broad spectrum from institutional catering on one end to business kiosks on the other. Food services include restaurants, institutional catering, central kitchens and manufactured food businesses. As the tourism industry relies heavily on food businesses and restaurants therefore, food handlers cannot neglect the cleanliness and safety of the food served to customers. They must serve food that is clean and safe to eat to prevent any problems such as poisoning and foodborne illnesses. According to Zeeshan, Shah, Durrani, Ayub, Jan, & Shah, (2017), the level of knowledge food handlers possesses depends on their specific tasks and their participation in food preparation.

In line with the above, food could be contaminated at any point in the process of slaughtering, harvesting, processing, storing, distributing, transporting, and during preparation. According to Lues and Van Tonder (2007), food safety issues due to foodborne illnesses have led to increasing global concerns. Foodborne illnesses could happen due to cross-contamination between hand hygiene and food handlers' aprons which happened in South African grocery groups (Lues & Van Tonder, 2007). Even with the growing number of food handlers who receive training on food hygiene, most foodborne illness still occurs due to improper practices of food handling (Clayton, Griffith, Price, and Peters (2002). In Malaysia, food poisoning cases is further facilitated by the hot and humid climate which is suitable for the growth of foodborne bacteria (Abdul-Mutalib et. al., 2015).

The restaurants at Taman Negara, Kuala Tahan are the only accessible restaurants before visitors enter the forest reserve. The restaurants are situated near the jetty before visitors embark on their adventure into the many activities in the national park. Once visitors enter the park, there will be no more access to food outlets. The restaurants operate under the Jerantut, Ministry of Health, and they are always being reviewed periodically. The restaurants sell local food operated by local business owners. The objectives of this study include examining the level of food handlers' knowledge and their hygiene practices. In comparison, knowledge, attitudes and practices of Sarawak food vendors showed that young food vendors have less than optimum food safety information and safe food production (Jores et. al.,2018). The restaurants in Kuala Tahan have similar business operation. Thus, it is the intent of this study to determine the knowledge, attitudes and hygiene practices of Kuala Tahan food vendors.

2. LITERATURE REVIEW

Attitude at the workplace influences everyone within the organization, from workers to customers and even business owners. Attitude helps to develop a successful work environment that determines employee productivity, morale, efficiency, and ability to construct (Boundless, 2016). Another objective of this study includes identifying the relationship between the food handlers' attitudes and their hygiene practices. According to the model of knowledge, attitude, and practices (KAP), humans change their behavior through three steps i.e. acquiring knowledge, generating belief, and developing attitude, and later transpires into action or practices (Bandura, 1976). Thus, in this study, the researcher would like to quantify the level of knowledge of the food vendors, have they formed their attitudes to hygiene, and whether that has transpired into practices when handling food. Therefore, attitudes were scrutinized using an observation method. Individuals who believe that it is important and essential that food be handled hygienically are most likely to adopt such practices in their daily routines (Aziz & Dahan, 2013). Reports have stated that although food hygiene training can improve food safety

knowledge, it is not the main element in influencing attitudes and behaviors toward food handling (Akabanda et al., 2017).

It is interesting to note that due to Covid-19 pandemic, the new normal has emphasized on social distancing, and periodicals closure of food outlets to curb the spread of the virus. However, the sales from restaurants are still possible to maintain economic sustainability. Therefore, customers are allowed to buy take away food. Additionally, according Nazila et. al. (2022), knowledge and attitude will influence the behavior. The findings from this study may contribute to the government health agencies monitoring and enforcement to control the cleanliness and hygiene factor in the restaurants especially those restaurants that the customers have no choice (due to none available). New normal from Covid-19 standard operating procedures has led to new concerns for customers' safety. The hygienic measures have to be improved to protect consumers because to-date, Covid-19 has no cure.

3. METHODOLOGY

3.1 Population and Sample Study

The sample population are the operators in the restaurants in Taman Negara, Kuala Tahan. There are only seven restaurants operating in Kuala Tahan and the restaurants sell local food and beverages. They were operated by local food business owners thus the delicacies are mainly found in Malay type restaurants. The operating hours are between 9.30 a.m to 12.00 midnight. All restaurants are floating rafts that can accommodate the kitchen area and a seating capacity for 20 to 30 people. Each restaurant has a total of three to five food handlers who prepare and serve the food. Therefore, total population purposive sampling was used due to the limited number of restaurants available in the area.

3.2 Questionnaire Method

Questionnaires were utilized to engage responses from the food handlers. The instrument was developed based on previous studies by Shuvo (2017); Tournas, Stack, Mislivec, Koch, & Ruth Bandler (2001); Newgent, 2020); and Sani & Siow (2014). The questions were in dual languages i.e. Bahasa Malaysia and English. They were prepared in English and translated into Bahasa Malaysia before being translated again to English by an English language expert to ensure accurate meaning.

The questionnaire contains four main sections namely Part A, B, C, and D which consist of food handlers' knowledge, attitudes, and practices respectively; while Part D focused on the demographic profile. There were 44 items altogether which were classified into two research sections. The Likert scale between 1 (strongly disagree) to 5 (strongly agree) was used to determine respondents' agreement to the statements in the questionnaire. The instrument checked for reliability and consistency with Cronbach's alpha value above 0.77. Observation method Observation is one of the oldest methods in qualitative study. According to McKechnie (p.573, 2008), observation involves the collection of data through looking and listening using a systematic way. The observation was done to validate the data gathered from the quantitative survey. The process was made using a checklist prepared earlier and validated by expert panels.

3.3 Statistical Analysis

Data were analyzed using SPSS (Statistical Package for the Social Sciences) version 22. Non parametric analyses were used to described the data collected. Demographic profiles were summarized in Table 1. Mean score for the knowledge, attitudes and practices on food safety

in Table 2. Kruskal Wallis test with $p < 0.10$ significant level was applied to evaluate the significance difference in attitudes of respondents with their knowledge on food safety.

4. RESULTS AND DISCUSSIONS

Thirty respondents participated in the study. All respondents, aged between 18 to 48 and above were food handlers at the restaurants. Data showing respondents' profile are in Table 1.

Table 1: Demographic Profiles of Food Handlers in the Restaurants at Taman Negara, Kuala Tahan.

No	Categories	Frequency	Percent (%)	
1	Gender	Male	9	30
		Female	21	70
2	Age	18-27 years	11	36.7
		28-37 years	5	16.7
		38-47 years	9	30.0
		48 and above	5	16.7
3	Race	Malay	30	100
		Chinese	0	0
		Indian	0	0
		Indigenous	0	0
4	Typhoid Injection	Taken	22	73.3
		Not taken	8	26.7
5	Level of Education	Primary School	7	23.3
		Secondary School	19	63.3
		Diploma	4	13.3
6	Food Handlers Certificate	Have	17	56.7
		Not in Possession	13	43.3

Female food handlers, mostly in the age group between 18 to 27 years (36.7%), make up the majority (70%) of the respondents in this study. Although it is compulsory for food handlers to take the typhoid injections, 8 persons (26.7%) were not vaccinated compared to the other 22 who were. The standard requirement set by the Ministry of Health requires all food handlers to be in possession of the Food Handlers' Certificate (*Sijil Pengendali Makanan*), however only 17 persons possess this certificate issued by the Ministry of Health. This certificate is a compulsory requirement by the Ministry of Health before food handlers can operate their business.

The mean score of this study was used to measure respondents' degree of agreement and disagreement with each question. A mean score of between 1.00 to 2.33 represents a "low" agreement level (disagree) while a mean score of between 2.34 to 3.66 indicates a "moderate" agreement level and a mean score of between 3.67 to 5.00 is categorized as a "high" agreement level.

The data in Table 2, shows the mean score for food handlers' safety knowledge and their practices at Kuala Tahan restaurants. There are 31 statements to gauge respondents' knowledge and practices at the Kuala Tahan restaurants. Most of the respondents have a mean score above 4.00, which indicates they have a high level of understanding of food safety.

Table 2: Food Handlers' Food Safety Knowledge and Practices in the Restaurants in Taman Negara, Kuala Tahan

<i>Dimensions</i>	Mean score (M)
<i>Knowledge</i>	
Washing hands regularly before and after work is one part of personal hygiene	4.77
Each time I prepare food, I measure the cooking temperature with a thermometer	3.53
Cook all raw beef and lamb at an internal Temperature of 160 °F (71.1 °C) as measured with a food thermometer	3.67
Perishable food such as meat and poultry should be securely wrapped to maintain quality	4.23
If the cans look ok, they are safe to use	4.47
It is dangerous if dented cans are used	4.33
Food inside rusty tins may be contaminated	4.53
The swollen canned food might be contaminated	4.60
The best way to prevent food poisoning from fresh fruits and vegetables is to wash them with cool running water	4.37
Inspection of raw materials involves the use of the sense of sight, smell and touch	4.60
If the raw material looks moldy (or has an abnormal color) or smells moldy, do not accept delivery of the raw materials	4.53
Marinate meat and poultry in a covered dish in the refrigerator	4.50
The premises need to have a disposal system for garbage, sewage and wastewater	4.43
The disposal of food waste through a coordinated disposal system	4.47
A clean cooking environment is a good way to control food safety	4.67
If the kitchen worker is suffering from flu, diarrhea, influenza or other illnesses, there is no problem working in the kitchen	2.43
I will take medical leave when I feel sick	4.27
The wastewater is drained via a good drainage system from food preparation premises	4.17
This premise uses grease traps to prevent the flow of residual oil into the ditch.	3.87
Cleaning the premises with a disinfectant.	4.07
<i>Practices</i>	
I use a clean and washed plate for ready-to-eat foods	4.53
I remove rings, watches and bracelets before starting work	4.40
I always ensure food purchased is clean and fresh	4.67
I wash vegetables and fresh fruits with tap water before serving	4.53
I wash my hands with soap and water after using the toilet	4.70
Poor quality of raw materials can still be used to produce edible foods	2.67
I wear an apron during food preparation	4.30
When preparing food, I use gloves	3.63
For the preparation of food, I wear a head cover or a hat	4.00
I find it hard to prepare food using an apron, gloves and hair net	2.27
I clean up the food preparation premise every time before going home	4.50

The respondents agreed that a clean cooking environment is a good way to control food safety (4.67). They know that swollen canned food might be spoiled (4.60) and the inspection of raw materials involves the use of the sense of sight, smell, and touch. They also understand that food inside rusty cans may be contaminated (4.53) and not accept raw materials if they look moldy (or has an abnormal color or smell). Respondents agreed that the premises need to have a disposal system for garbage, sewage, and wastewater (4.43). They agreed that the best way to prevent food poisoning from fresh fruits and vegetables is to wash them with cold running water (4.37). Respondents agreed that it is dangerous to use dented cans (4.33). They understand that

they have to take medical leave when they feel sick (4.27). Perishable food such as meat and poultry should be securely wrapped to maintain quality (4.23).

Respondents agreed that wastewater should be drained via a good drainage system from food preparation premises (4.17) and cleaning the premises with a disinfectant is necessary (4.07). However, respondents seem to be less in agreement (2.43) when asked whether it would bother them if they were to know of workers suffering from flu, diarrhea, influenza, or other illnesses and are still working in the kitchen. This shows that the food handlers may have assumed that these illnesses are mild and pose no threat to food preparation activities.

The mean score for food handlers' hygiene practices were also analyzed. The respondents strongly agreed (4.70) on the importance of washing their hands with soap and water after using the toilet. And food purchased must be clean and fresh (4.67). They were also in agreement with washing vegetables and fresh fruits with tap water before serving (4.53) and the use of clean and washed plates for ready-to-eat foods (4.53). The respondents also agreed that the food preparation area be cleaned each time after closing the restaurant (4.50). They understand that rings, watches, and bracelets should be removed before starting work (4.40) and aprons should be worn during food preparation (4.30). The mean score for always wearing head covers when preparing food was 4.00 while wearing gloves was 3.63. Lastly, the mean score for using poor-quality raw materials was recorded as the lowest, with a score of 2.67. This showed that food handlers may have produced food using low-quality raw materials.

4.1 Interconnection of Food Handlers' Food Safety Knowledge, Attitudes, and Practices

The food safety knowledge of food handlers depended on their age, level of education, and training that they received. Basically, the food handlers understand and are knowledgeable about food hygiene. They know the importance of washing their hands regularly before and after work and the disposal of food waste through a coordinated disposal system. They also understand the impact a clean cooking environment has on food safety and the reasons for covering marinated meat or poultry when kept in the refrigerator. These questions received a higher score, indicating that they understand and practice food hygiene and food safety when handling food. They also understand the protocols to be followed when washing their hands before and after work to avoid cross-contamination. All the trash bins in the restaurants visited were closed trashed bins with their lids properly in place and lined with disposable plastic bags. This shows the effort taken and the importance placed on protecting their restaurant from pests like flies, especially at the garbage bins. They also ensure that the workstation or dining table was cleaned and mopped regularly after use. The knowledge on food hygiene depends on the food handlers' age. The education that they received is sufficient to indicate their level of understanding of food hygiene. Training has provided a good knowledge foundation in food hygiene and handling of food safely. Certified food handlers are significant in maintaining the high level of knowledge in handling the food (0.079) at a 10% level of significance.

Table 3: Hypotheses for Food Safety Knowledge of Food Handlers in Taman Negara

Hypotheses	Sig.	Decision
There is a relationship between age and food safety knowledge	0.526	Supported
There is a relationship between level of education food safety knowledge	0.195	Supported
There is a relationship between training and food safety knowledge	0.79	Supported

* Correlation is significant at 0.10 level (n=30)

4.2 Insights on the Overall Cleanliness of the Restaurants in Taman Negara

Observations were done to validate the degree of cleanliness of the restaurants. The observations were carried out according to a checklist prepared earlier. Elements noted in the observation include practices relating to time and temperature, food preparation and services, storage, food handling practices which include good hygiene practices, utensils, and equipment. All the restaurants are floating rafts, converted from boats but with restaurant facilities. The kitchens for these boat restaurants are located at the back of the boat. The restaurants can accommodate 15 to 20 customers at any one time.

The observation was carried out using “mystery shopping” style. The restaurant owners were not aware that their premises were being observed and evaluated, however, researchers asked for permission to visit the back portion of the restaurants housing the kitchens. It was noted that all the restaurants did not place emphasis on time and temperature while preparing food because the food was made to order. There was no food left at closing time; thus food handlers need not worry about storing the food. The storage freezer was tidy with all items cleaned and kept according to the levels designated for storing raw and cooked items. Nevertheless, the ingredients were not labeled and thus could pose a risk to food preparation. All utensils and equipment were kept clean when not in use. However, the overall cleanliness of the kitchen could be improved in terms of better utensil storage and closed shelves.

It was observed that tables are clean and disinfected with sanitizing agents in between customers eating in, though this protocol was not carried out every time. The food handlers use a separate cutting board for raw ingredients and cooked items. All bins have lids on, thus fulfilling the requirements by MOH and at the same time avoiding cross-contamination caused by flies. When asked whether they have a schedule for regular disinfection of pests, the food handlers reported they only have fly traps but have not engaged the service of any pest control companies.

The food handlers use aprons when preparing food but only some of them wear gloves. However, they wash their hands between tasks and their nails are clean with no jewelry. Overall, they have good personal hygiene and they do not smoke while preparing food for customers. All restaurants have hand-washing basins for customers’ use and the sinks were kept moderately clean. On the whole, the food serving area is clean with proper sanitation although plans should be made to provide patrons with a better dining environment. Another observation was the restaurants do not have waste management systems; thus this issue needs to be addressed and the necessary precautions taken in the meantime because any waste leaking into the river, would pose another threat to the environment.

4.3 Discussion

The World Health Organization (2020) states that food hygiene is required to ensure food safety from the stage of production to consumption. At any point in the process of slaughtering, harvesting, processing, storing, distributing, transporting and preparation, food could become contaminated. According to researches, (Clayton, Griffith, Price, & Peters, 2002; Ismail, Chik, Muhammad & Mohd Yusoff, 2016), although an increasing number of food handlers receive training on food hygiene, food poisoning illnesses are still occurring due to improper hygiene practices by food handlers. Food handlers typically know the right safety measures, but there are many barriers to their implementation. These barriers include time constraints, lack of staff, and lack of facilities. Generally, food handlers have some knowledge of food safety, but they still need to go for proper food safety training. The minimum certification should include the *Sijil Pengendali Makanan* as indicated by the Ministry of Health. Failure to closely monitor

staff health and allowing any staff who may be down with a simple health issue like flu could pose a greater threat to safe food production than anyone could imagine. For example, typhoid fever which causes intestinal tract infection resulting in bleeding starts from a simple ailment, flu, and flu is very common among food handlers employed in commercial food production. Food handlers can improve their knowledge levels through participation in training programs (Young et. al. 2019). Food handlers who lack awareness or skills in food hygiene practices, maybe the cause of foodborne illnesses and even death (World Health Organization (WHO), 2020).

Consumers are also aware of the importance of consuming safe food and visiting hygiene restaurants. Customer value includes customer perception of the experience they had at the restaurants and this includes their preference (Ha and Jang, 2010). However, Woonseok, Minwoo & Ki-Joo (2020) mentioned that price could also influence customers' value of restaurants. While, some customers may choose restaurants based on their menu price, others do not care for the price but put emphasis on other factors such as cleanliness, hygiene, and aesthetic value. According to Omar, Juhdi, Ahmad & Nazri (2014) customers value food quality, however, price influences their choices of restaurants.

According to the Food Standard Agency (2020) cleaning will prevent bacteria and viruses from spreading. Furthermore, regularly disinfecting surfaces, equipment, and premises can also ensure a high level of environmental hygiene and prevent illnesses caused by food (Food Standard Agency, 2020). In addition, regular cleaning can increase the shelf life of the equipment and they will not be easily damaged. Regular cleaning can also reduce the growth of microbes, viruses, and control the presence of pests (Food Standard Agency (FDA), 2020). Nowadays pest control services are a more popular and easy way to reduce the presence of pests (Rentokil, 2020).

Amid the Covid-19 pandemic, customers prefer restaurants with open-air environments. According to Ministry of Health, exposure to someone with Covid-19 in a closed area for more than 2 hours increase the risk of contagion, if the standard operation procedure of physical distancing and wearing a mask was not followed. Food safety knowledge among customer has been known to influence their choices in restaurants (Abdul Latip, Newaz, Ramasamy, Tumin, & Noh, 2014) thus it is important for food handlers to maintain hygiene in their restaurants and their staffs because they are the ones being the front liners serving the customers.

5. CONCLUSIONS

In conclusion, food handlers' knowledge and their attitudes towards the practice of food hygiene are crucial in ensuring that every food handler follows the food safety rules and, prevent any contamination. Food handlers who are equipped with sufficient knowledge of food safety measures will observe personal hygiene, ensure clean workstations and prevent cross contamination which normally takes place in the kitchen. Knowledgeable food handlers will exercise food hygiene practices from the purchasing process right until serving meals to customers. Kwol et al. (2020) state that food handlers' knowledge of hygiene positively affected their attitudes and practices. Employees who are good in terms of knowledge and have good attitudes in observing food hygiene practices can be an example for other employees to follow.

There are many seminars, campaigns, certified food handlers, and food safety classes that can increase the level of knowledge of food handlers and indirectly improve their practices in safe food handling. The government can support in terms of providing effective food hygiene practice training programs for food handlers to improve overall hygienic practices. Training

programs need to be designed based on observations following assessment of food safety knowledge, attitudes, and practices for different age groups, religious groups, genders, educational levels, and different income levels (Hashanuzzaman, Bhowmik, Rahman, Abu Zakaria, Voumik & Al Mamun, 2020). The current training content designed by MOH is generic and used across the board for all types of food handlers. The three-hour content program is being used extensively to train food handlers regardless of their origin (locals or foreigners), education levels, or language abilities (eg. dual language speakers) (Mukhtar, Chik, Ariffin & A.Rais (2021). Thus, future studies need to address this issue and come up with a more effective program enabling better comprehension of and practices in safe food production.

ACKNOWLEDGEMENT

Researchers would like to thank grant Mitra SDG (1/2019)-60 for the financial support in the Taman Negara Scientific Expedition II (IRMI/APPLICATION/KENIAM2019) and Health Inspector in Jerantut for helping us in the completion of the data collection in this study. We would also like to thank Nur Azila binti Aliasak, Nabilah Mardhiah A Khalek, and Nur Syahirah binti Hamal for helping in the data collection process.

AUTHORS' CONTRIBUTION

CTC prepares the article and oversees the whole research process. NS vetted the methodology, while, NSMS prepare the checklist for observation. SB helps in the data collection. AMS refined the data analysis and vetted the draft article.

CONFLICT OF INTEREST

None declared.

REFERENCES

- Abdul Latif, M.A., Newaz, F.T., Ramasamy, R., Tumin, S.A., & Noh, I. (2020). How Do Food Safety Knowledge and Trust Affect Individual's Green Considerations During The COVID19 Pandemic in Malaysia?. *Malaysian Journal of Consumer and Family Economics*, Vol.24: 261-285.
- Abdul-Mutalib NA., Syafinaz, A.N., Sakai, K. & Shirai, Y. (2015). An Overview of Foodborne illness and food safety in Malaysia. *International of Food Research Journal*, Vol.22(3), 896-901.
- Akabanda et al., 2017. Food safety knowledge, attitudes and practices of institutional food-handlers in Ghana. *BMC Public Health*,17(1).
- Aziz & Dahan, 2013 Food Handlers' Attitude towards Safe Food Handling in School Canteens. *Procedia - Social and Behavioral Sciences*, 105:220–228.
- Tournas, V., Stack, M.V., Mislivec, P.B., Koch, H.A., & Bandler, R. (2001). BAM: yeast, molds and mycotoxins. *Bacteriological Analytical Manual*, 8.
- Clayton, D.A., Griffith, C.J., Price, P. & Peters, A.C. (2002). Food handlers' beliefs and self reported practices. *Int J of Environmental Health Research*, Vol.12(1), 25-39.

- Ha, J. & Jang, S. (2010). Perceived value, satisfaction and behavioural intention: The role of familiarity in Korean Restaurants. *Int J of Hospitality Management*, Vol.21 (1):2-13.
- Ismail, F.H., Chik, C.T., Muhammad, R., & Mohd Yusoff, N. (2016). Food Safety Knowledge nad personal hygiene practices amongst mobile food handlers in Shah Alam, Selangor. *Procedia-Social and Behavioral Sciences*, 222, 290-298.
- Mukhtar, M.A., Chik, C.T., Ariffin, H.A. A.Rais, A.R. (2021). Job competency of Foreign workers' in Shah Alam Restaurants: How does knowledge, attitude, practices and training effectiveness influence it?. *Journal of Foodservice Business Research*, 25(2), 127-147.
- Hashanuzzaman, M., Bhowmik, S., Rahman, M.S., M.U.M. Abu Zakaria, Voumik, L.C., & Al Mamun, A. (2020). Assessment of food safety knowledge, attitudes and practices of fish farmers and restaurants food handlers in Bangladesh. *Heliyon*, (6) e05485.
- Jeinie et al., (2016). Food Hygiene and Safety among Culinary Intern: Questionnaire for FHS Quality. *Procedia - Social and Behavioral Sciences*, 222:299-305.
- Jores et. al. (2018) Factors Associated with Food Hygiene Practices Among Street Food Vendors in Padawan, Sarawak. *Borneo Journal of Resource Science and Technology*, 8(1):56-65.
- Kubde, Pattankar, & Kokiwar, 2016. Knowledge and food hygiene practices among food handlers in food establishments. *Int J of Community Medicine and Public Health*.
- Kwol, V.S., Eluwole, K.K., Avci, T. & Lasisi, T.T. (2020). Another look into the Knowledge Attitude Practice (KAP) model for food control: An investigation of the mediating role of food handlers' attitudes. *Food Control*, Vol.110: 107025.
- Little, Rawal, Pinna, & McLauchlin, (2010). Survey of Salmonella contamination of edible nut kernels on retail sale in the UK, *Food Microbiology*, 27(1):171-4 DOI: 10.1016/j.fm.2009.08.003
- Lues & Van Tonder, (2007). The personal and general hygiene practices of food handlers in the delicatessen sections of retail outlets in South Africa. *Int J of Environmental Health*, Vol.70(4), 33-8.
- Moser C. A. and Kalton G., (1985). *Survey Methods in Social Investigation*, London School of Economics, U.K.
- Nazila N., Narges P., Nasrin H., Amir Ali E.F.A., Fateme Y., Razie T., Fakhreddin C., Somayyeh S.O., Neda K., Abdolhamid Z. & Azadeh F. (2022). Knowledge, attitude, and practice toward the COVID-19 infection among adults Iran: A cross-sectional study. *Journal of Public Health Research* 2022, Vol. 11(4), 1–7.
- Nor Ainy, Mahyudin and Z., Zainon and Ungku Zainal Abidin, Ungku Fatimah (2015). Assessment of food handler's knowledge, attitude and practices on food hygiene in Serdang, Selangor. In: *Theory and Practice in Hospitality and Tourism Research*. CRS Press, pp. 445-449. ISBN 9781138027060; EISBN: 9781315737355

- Pahang Darul Makmur. (2019). Official Portal Of Tourism Pahang - Kuala Tahan. Tourism Pahang Malaysia. Retrieved from <https://www.pahangtourism.org.my/index.php/taman-negara/kuala-tahan>
- Patricia V. Azanza, Corazon F. Gato, M. (2000). Food safety knowledge and practices of street food vendors in a Philippines university campus. *Int J of Food Sciences and Nutrition*, 51(4), 235–246.
- Sani, N.A. & Siow, O.N. (2014). Knowledge, attitude and practices of food handlers on food safety in food service operations at the Universiti Kebangsaan Malaysia. *Food Control*, 37, 210-217.
- Shuvo, S. D. (2018). Assessing food safety and associated food hygiene and sanitary practices in food industries. *Nutrition & Food Science*, 48(1), 111–124.
- Tourism Pahang. (2020). 25 Best Things to Do in Taman Negara National Park (Malaysia). The Crazy Tourist. Retrieved from <https://www.thecrazytourist.com/25-best-things-to-do-in-taman-negara-national-park-malaysia/>
- Omar, N.A., Juhdi, H., Ahmad, M. & Nazri, M.A. (2014). Factors influence customer satisfaction Indian Muslim (Mamak) Restaurants in Malaysia. *Malaysian Journal of Consumer and Family Economics*. Vol.17.:118-140.
- Woonseok, K., Minwoo, L. & Ki-Joo, B. (2020). Exploring the underlying factors of customer value in restaurants: A machine learning approach. *Int J Hospitality Management*. Vol. 91:102643
- Young, I., Greig, J., Wilhelm, B. J., & Waddell, L. A. (2019). Effectiveness of Food Handler Training and Education Interventions: A Systematic Review and Meta-Analysis. *Journal of Food Protection*, 82(10), 1714–1728.
- Zeeshan, M., Shah, H., Durrani, Y., Ayub, M., Jan, Z., & Shah, M. (2017). A Questionnaire-Based Survey on Food Safety Knowledge during Food-Handling and Food Preparation Practices among University Students. *Journal of Clinical Nutrition & Dietetics*, 03(02), 1–20.

AUTHOR BIOGRAPHIES

Dr. Chemah is a professor in Food Quality, at the Faculty of Hotel and Tourism Management, UiTM Puncak Alam. She has over 40 publications which include journals in science and social science research. She holds a Ph.D. in Food Science and has been serving the faculty for over 20 years. Her current interest includes Foodservice Quality, Halal Food and Quality System, and Sensory Marketing.

Dr. Nadiatul Syima Mohd Shahid obtained her MSc. in Food and Consumer Safety from the University of Teesside, UK and later completed her Ph.D. in Public Health (Food Safety) from Curtin University of Technology, Australia. She is now a lecturer at the Faculty of Health Sciences at Universiti Teknologi MARA. Food safety, food security, food packaging, and environmental health are the areas of her research interest.

Associate Professor Ts. Dr. Sabaianah Bachok, is a senior lecturer at the Faculty of Hotel and Tourism, the Universiti Teknologi MARA, Malaysia. She has co-authored over 60 publications including Foodservice Management, Halal Food Management, Food Product Development. Her current research interests include the Commercialization and Organoleptic Study of Limulus Caviar Products and Formulation Optimization for the Commercialization Potential of Chocolate.

Dr. Aslinda Mohd Shahril is an associate professor at the Faculty of Hotel and Tourism Management UiTM, Puncak Alam campus. She completed her PhD. from Universiti Putra Malaysia in 2014. Her research area is in hospitality service marketing, consumer behavior, sensory marketing, and self-service technology. She is an active author, authoring multiple papers in hospitality management focusing on the hospitality area and technology adoption.

Dr. Norsila Samsuddin is a Senior Lecturer at the Department of Social Science, Universiti Selangor. She has been appointed as Internal Auditor for ISO and EOMS, and published more than 10 publications in Underwater Image Processing, DASS, IoT and Psychological Well Being. Her current research interests include Burnout of Depersonalisation, Emotional Exhaustion and Reduced Personal Accomplishment, and Digital Citizenship Skills, and Workplace Bullying and Anxiety.