

**ASSESSMENT OF FOOD HANDLER'S KNOWLEDGE, ATTITUDE AND
PRACTICES ON FOOD SAFETY AND HYGIENE IN KOTA BHARU**

FYP FPV

NURSHAMIMI SYUHADA YUSAIRI

(D15A0026)

A RESEARCH PAPER SUBMITTED TO THE FACULTY OF VETERINARY
MEDICINE, UNIVERSITI MALAYSIA KELANTAN
IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR
THE DEGREE OF
DOCTOR OF VETERINARY MEDICINE

JUNE 2022

UNIVERSITI MALAYSIA KELANTAN

KELANTAN

CERTIFICATION

This is to certify that we have read this research paper entitled ‘**Assessment of Food Handler’s Knowledge, Attitude and Practices on Food Safety and Hygiene in Kota Bharu, Kelantan**’ by Nurshamimi Syuhada Yusairi, and in our opinion it is satisfactory in terms of scope, quality and presentation as partial fulfillment of the requirement for the course DVT 5436 – Research Project.



Dr Mohamed Dauda Goni
DVM (UMK), PhD in Infection and Global Health (Liverpool)
Fellow,
Faculty of Veterinary Medicine
Universiti Malaysia Kelantan
(Supervisor)



Dr Intan Noor Aina Kamaruzaman
DVM (UMK), PhD in Infection and Global Health (Liverpool)
Senior Lecturer,
Faculty of Veterinary Medicine
Universiti Malaysia Kelantan
(Co-supervisor)

ACKNOWLEDGEMENT

**Special thanks for those who have given their support, guidance, advice, and aid
for the completion of this project paper:**

Dr Mohamed Dauda Goni

Dr Intan Noor Aina Binti Kamaruzaman

Dr Maizan Mohamed

Prof Madya Dr Ibrahim Abdul-Azeez Okene

Family

Friends

DVM 5 class of 2017/2022

Thank You

UNIVERSITI
MALAYSIA
KELANTAN

DEDICATIONS

In the name of Allah, the most gracious and the most merciful. I am grateful to Allah for giving me the chance to complete this study despite multiple health challenges faced throughout the journey. First and foremost, I would like to thank my honourable supervisor, Dr Mohamed Dauda Goni for his guidance and also consideration for me in completing the study and also to my co-supervisor, Dr Intan Noor Aina Binti Kamaruzaman for comprehending me with the formats and teaching me in writing the thesis especially on citing the articles. I would like to dedicate my dissertation work to my family and awesome friends. A special feeling of gratitude to my loving mom, Norzihan Mohd Nor, whose words of encouragement and push for tenacity rings in my ears. Next, not to forget to thank Malani Simukoko, Imran Ssemuaddu and Donald Torsabo for their endless support to me in completing this study by aiding me with my English and giving moral encouragement. Lastly but not least, thank you to Dr Goh Soon Heng for his comments on correcting my thesis.

UNIVERSITI
MALAYSIA
KELANTAN

Table of Contents

1.0	Introduction	1
2.0	Research problem	2
3.0	Research questions	2
4.0	Research hypothesis	3
5.0	Objectives	3
6.0	Literature review	4
6.1	Food hygiene and safety	4
6.2	Association food handlers with food-borne disease outbreaks	4
6.3	Knowledge of food hygiene	5
6.4	Education level	5
6.5	Working experience	6
6.6	Food handlers training	6
6.7	Attitude towards of food hygiene	6
6.8	Medical check- up certifications	7
6.9	Food safety and hygiene practices	7
6.10	Food preparation	8
6.11	Cross contamination	8
7.0	Materials and methods	8
7.1	Study area and population	8
7.2	Questionnaire design	9
7.2	Data Analysis	10
8.0	Results	12
9.0	Discussion	18
10.0	Conclusion	21
11.0	Recommendations and future work	21
	Appendix A	22
	Appendix B	27
	References	28

List of tables

Table 7.3a: KAP statements scoring	10
Table 7.3b: KAP grading system	11
Table 8.1: Sociodemographic data of respondents (n=100)	12
Table 8.2: Knowledge on food safety and hygiene of respondents (n=100)	14
Table 8.3: Respondents attitudes towards food safety and hygiene	15
Table 8.4: Practices of food handlers towards food safety and hygiene	16
Table 8.5: Overall KAP Score (n=100)	17

List of appendices

Appendix A.1: A consent statement to respondents in the study	22
Appendix A.2: A sample of questionnaire given to respondents used in the study	23
Appendix B.1: Questionnaire reliability test by Cronbach's Alpha coefficient test	27

ABSTRACT

An abstract of the research paper presented to the Faculty of Veterinary Medicine, Universiti Malaysia Kelantan, in partial requirement on the course DVT 5436 – Research Project.

Food poisoning is one of the major public health problems in Malaysia with a lot of cases reported in Kelantan in the past few years which correlates to food handling safety and hygiene. In Kota Bharu, the issue of food safety and hygiene among food handlers has not been extensively studied. Thus, there is a strong need to expand on the literature of the current study. A cross-sectional study was conducted among food handlers in Kota Bharu to determine their level of knowledge, attitudes and practices of food safety and hygiene. 100 respondents were collected from various food premises in Kota Bharu. 62% are male respondent which mostly obtained from restaurants and averagely aged around 33 years old. Majority of them are vaccinated against typhoid and more than half had attended training on food safety. This study reveals a moderate level of knowledge (78%) with a high level of attitude (90%) and practices (81%) towards food safety. Thus, it is recommended to improve the knowledge on the safe handling in context of temperature and preparing the meats.

Keywords: *Food Safety, Hygiene, Food Handlers, KAP study*

ABSTRAK

Abstrak daripada kertas penyelidikan dikemukakan kepada Fakulti Perubatan Veterinar, Universiti Malaysia Kelantan untuk memenuhi sebahagian daripada keperluan kursus DVT 5436 – Projek Penyelidikan.

Keracunan makanan adalah salah satu masalah kesihatan awam utama di Malaysia dengan banyak kes dilaporkan di Kelantan dalam beberapa tahun kebelakangan ini yang berkaitan dengan keselamatan dan kebersihan pengendalian makanan. Di Kota Bharu, isu keselamatan dan kebersihan makanan dalam kalangan pengendali makanan masih belum dikaji secara meluas. Oleh itu, terdapat keperluan yang kuat untuk mengembangkan literatur kajian semasa. Kajian keratan rentas telah dijalankan dalam kalangan pengendali makanan di Kota Bharu untuk menentukan tahap pengetahuan, sikap dan amalan keselamatan dan kebersihan makanan mereka. 100 responden telah dikumpul dari pelbagai premis makanan di Kota Bharu. 62% adalah responden lelaki yang kebanyakannya diperoleh dari restoran dan purata umur yang terlibat adalah sekitar 32 tahun. Majoriti daripada mereka telah diberi vaksin kepialu dan lebih separuh daripada mereka telah menghadiri latihan keselamatan makanan. Kajian ini mendedahkan tahap pengetahuan sederhana (78%) dengan tahap sikap tinggi (90%) dan amalan (81%) terhadap keselamatan makanan. Oleh itu, adalah disyorkan untuk meningkatkan pengetahuan tentang pengendalian selamat dalam konteks suhu dan penyediaan daging sebelum memasak.

Kata kunci: *Penjagaan makanan, Kebersihan, Pengendali makanan, KAP*

1.0 Introduction

Food is a basic substance that provides essential nutrients such as carbohydrates, proteins, and fat for the body to function properly. It is used in the body of living organisms to sustain their growth, its vital processes and to provide energy. Digestion of food will facilitate the absorption of nutrients into the body (The Scientific World, 2018).

Food safety and hygiene is of paramount importance in every society of the world. Food handlers are people who work in the food industry sector that mainly does food handling activities such as, preparing, cooking, packaging, food storing, displaying and working with surfaces in contact with food (Queensland Government, 2021). They play a vital role in ensuring food safety and hygiene as well as controlling the transmission of food pathogens to consumers. Food handlers should take precautionary measures during preparation, cooking of food, storage of raw materials and serving food to customers (MOH, 2011).

Despite various reports on food safety and hygiene among restaurant workers across the world, including in Malaysia, most food handlers in restaurants are not applying the Standard Operating Procedures (SOPs) in food preparation that covers food safety and hygiene. Therefore, there is the need to assess the knowledge, attitude and practice levels of food handlers towards food safety and hygiene in restaurants within Kota Bharu, Kelantan, Malaysia.

2.0 Research problem

Handling errors by the food handlers have contributed to most outbreaks of food poisoning, despite having good practices and knowledge on food safety and hygiene (Todd *et al.*, 2007). In August 2015 at Kuala Lumpur, Malaysia, there was an outbreak of typhoid fever as a result of poor hygiene (The Straits Times, 2015). There are several similar studies that have been conducted in a few states in Malaysia. However, there are none such studies conducted in Kelantan to evaluate the knowledge, attitudes and practices of food safety and hygiene among food handlers in restaurants in the Kota Bharu city. Since food borne illness is an important part of public health in Malaysia, it is important to conduct this study to give an overview of understanding levels on food safety among food handlers and at the same time create awareness to the handlers.

3.0 Research questions

- 3.1 What is the food handler's knowledge level on food safety and hygiene at restaurants in Kota Bharu?
- 3.2 What is the attitude of food handlers in relation to food safety and hygiene at restaurants in Kota Bharu?
- 3.3 What are the common practices of food safety and hygiene among food handlers at restaurants in Kota Bharu?

4.0 Research hypothesis

- 4.1 Most food handlers in Kota Bharu, Kelantan, have good knowledge on food safety and hygiene.
- 4.2 Most food handlers in Kota Bharu have good attitudes on food safety and hygiene.
- 4.3 Most food handlers in Kota Bharu have satisfactory levels of practices on food safety and hygiene.

5.0 Objectives

- 5.1 To determine the level of knowledge on food safety and hygiene among the food handlers at restaurants in Kota Bharu, Kelantan.
- 5.2 To determine the attitude towards food safety and hygiene among the food handlers at restaurants in Kota Bharu, Kelantan.
- 5.3 To identify the level of practices of food safety and hygiene among the food handlers at restaurants in Kota Bharu, Kelantan.

6.0 Literature review

6.1 Food hygiene

Food can be susceptible to contamination from water, air, fomites, vectors and handlers (Onee & Sani, 2011). The flare up of water and food borne diseases causing diarrhea has killed almost 2.2 million people per year worldwide (Kopper *et al.*, 2014). Contaminants in food can occur at any stage of preparation. Thus, it is important to bear in mind that food hygiene measures in preventing food borne diseases (Ismail *et al.*, 2016).

6.2 Association of food handlers with food-borne disease outbreaks

Ethiopia, a study conducted by Yimam *et al.* (2020) has identified the common intestinal parasite that infected the public and food handlers. Majority of predominant intestinal parasites are *Ascaris lumbricoides* and *Entamoeba histolytica/ dispar*. After toilet use, food handler can be protected from intestinal parasitism by washing their hands (Yimam *et al.*, 2020) while a study conducted by Aklilu *et al.* (2015) commonly found *Giardia lamblia*, *hookworm* and *Trichuris trichiura* which are the dominant parasite. Most mixed infection of *E. histolytica* and *G. lamblia* coupled with dominant parasites shown by food handlers. There was low isolation of *Salmonella* spp. from participants that have no regular medical examination and no isolation of *Shigella* spp. from stool cultures collected (Yesigat *et al.*, 2020).

6.3 Knowledge of food hygiene

Cuprasitrut *et al.* (2010) distinctly stated that awareness on sources of pathogens and its preventive measure to food handlers would greatly enhance their practice. Sharif *et al.* (2013) discovered that most respondents have low knowledge on how to thaw frozen meats. A research conducted by Anuradha and Dandekar (2014) discovered numerous food handlers had poor knowledge in terms of causes, mode of transmission and prevention of food borne illness.

6.4 Education level

Lack of education makes food handlers that are unable to read or write to neglect the food safety and hygiene principle (Prabhu and Shah, 2012). A research done by Onee and Sani (2011) has rooted out that food handlers who accomplished above secondary levels of education had sufficient understanding of food safety and hygiene while handling food. However, there was no significant association between education and level of practice discovered by Abdullahi *et al* (2016). Nevertheless, no association does not translate into the fact that education was not a crucial element. There are several other factors that may lead to failure to practice food hygiene (Abdullahi *et al*, 2016) such as lack of training and not following routine medical check-up at hospital (Azanaw, 2019).

6.5 Working experience

Food handlers with good experiences are pointless except if they had wise understanding on food handling (Prabhu and Shah 2012). However, a study

conducted by Onee & Sani (2011) discovered that food handlers with traineeship have poor understanding in handling food as compared to those who have experience for more than 6 years which is contradicted by Prabu and Shah (2012).

6.6 Food handler's training

Food handlers training is the supreme scheme to minimize food poisoning around the neighborhood. Multidisciplinary training which includes visual recognition of awareness and provision of the necessary resources to the handlers, managers, and fellow workers that will strengthen their behavior and credence (Soares *et al.*, 2012). There is a need to implement yearly courses and targeted training (Soon *et al.*, 2011).

6.7 Attitude towards food hygiene

Besides knowledge and enforcement, attitude plays an important role which ensures decreasing of foodborne illnesses (Bas *et al.*, 2006). Attitude regarding safe handling of food is great among food handlers in relation to social, organisational and environmental factors that bring about food poisoning (Sharif *et al.*, 2013). Results also indicated that 98.5% of the respondents from the study are keen on practicing disinfection procedures on kitchenware used, surfaces, the premises and general cleanliness. This is vital in preventing food cross contamination (WHO, 2020).

6.8 Medical check-up and certifications

In Malaysia, all food handlers must be healthy to handle food and are required to have a valid health card certificate and undergo an annual medical checkup at any clinics. This requirement is regulated in license terms under Food and Eating Premises by Laws, 1966. Food operators who failed to have valid health certificates can be charged up to RM500 for each offense under Clause 4 of the By-Laws (Daily Express, 2019). All food handlers in Malaysia must be injected against *Salmonella typhi* to avoid infection and spreading of typhoid fever to healthy consumers (Zai, 2021).

6.9 Food safety and hygiene practices

Food safety and hygiene are important features for food handlers to take action along the food production chain. Food borne microorganisms may replicate at sufficient levels causing illness to humans associated with poor handling or unhygienic practices by the handlers (Prabhu and Shah, 2012). The pivotal measures in avoiding food contaminants is by maintaining personal hygiene (Medeiros *et al.*, 2001). In another study by Cuprasitrut *et al.* (2010) revealed that bacterial contamination is related to poor food hygiene and is caused by food storage on the floor.

6.10 Food preparation

Annually, there are more than three million cases of food-borne illness due to improper preparation of foods (Masami *et al.*, 2006). Proper cooking food is by heating for an ample amount of time and at a high temperature about 70°C

and 90°C that is adequate to kill pathogens that cause food poisoning (Medeiros *et al.*, 2001).

6.11 Cross contamination

Cross contamination is the transmission of harmful pathogens from food to food, to hands, or from kitchen utensils to meals and is the most common cause of food borne illnesses (Zain & Naing, 2002). It can also occur when uncovered raw foods stored in a fridge or on other holding are placed directly adjacent to or above ready-to-eat foods (Zain & Naing, 2002).

7.0 Materials and methods

7.1 Study area and population

The study was conducted in Kota Bharu, Kelantan. Waiters, chefs, cooks, dishwashers and employers were among food handlers that were targeted in the study. Data collection started from 13th March 2022 until 22nd May 2022. Questionnaires were targeted to 100 respondents who were willing to participate in the study. Questionnaires were distributed to potential participants conveniently at food premises such as restaurants, food courts, hospital kitchens and hotels at different areas of Kota Bharu through face-to-face self-administered questionnaires in Bahasa Melayu within 10 minutes time allocated to answer the survey. Assisted explanations were provided to respondents who were illiterate and unable to comprehend the questions.

7.2 Questionnaire design

The questionnaires were constructed by modifying the extracted questions from pre-existing literature and in accordance with the food safety guidelines by MOH and WHO. Each questionnaire consisted of four sections which are the socio-demographic data in PART I, the knowledge in PART II, attitude in PART III, and practices in PART IV that were made to assess the data of food handlers on food safety and hygiene. Nine socio-demographic questions were set to obtain a general profile of the handlers. In PART II, fourteen statements were constructed which required the respondents to answer true, unsure, or false based on their knowledge of food safety and hygiene. The knowledge statement comprises the personal hygiene and habits of handlers in the kitchen and the right steps in preparing and storing the food. Eighteen statements were constructed in PART III pertaining to the attitude of food handlers according to the food safety and hygiene practices in terms of food preparation, serving, and storage, personal hygiene, and perception of safe food handling. PART IV also consists of eighteen 3 Likert-scale statements which revealed the daily practice of the handlers in the kitchen. A pilot study was initiated which involved ten respondents and the data collected were used in performing a reliability test by using Cronbach's alpha coefficient test in SPSS version 26. A value of 0.837 was achieved. Thus, the questionnaire made was reliable to be used in the study.

7.3 Data analysis

Data generated were entered into Microsoft Excel and analysed using the latest SPSS version 26. Descriptive statistics was applied to analyse the raw data collected. The demographic variables were summarised as frequency and percentage for categorical data, while mean, standard deviation (SD) for numerical data. Arbitrary scale from Pacholewicz et al., (2016) was used to interpret the overall score of KAP variables as demonstrated in Table 7.3a. Meanwhile Table 7.3b shows the grading system that was used to grade the handlers knowledge, attitude and practices (KAP) score.

Response	Score given	
	Positive Statement	Negative statement
Knowledge		
True	2	0
Unsure	1	1
False	0	2
Total knowledge score	28	
Attitude		
Agree	2	0
Neutral	1	1
Disagree	0	2
Total attitude score	44	
Practices		
Always	2	0
Sometimes	1	1
Never	0	2
Total practice score	24	

Table 7.3b KAP grading system			
Grading	Score ($\Sigma=96$)		
	Knowledge	Attitude	Practice
Good (>80%)	>23	>28	>28
Moderate (60%-79%)	17-23	21-28	21-28
Poor (<60%)	<17	<21	<21

UNIVERSITI
 MALAYSIA
 KELANTAN

8.0 Results

Characteristics	Numbers (%)	Characteristics	Numbers (%)
Premise		Experience	
Hotel	5	<1 year	22
Restaurants	44	1-2 years	22
Franchise	12	3-5 years	14
Food stalls	20	>5 years	42
Food courts	14	Salary	
Hospital kitchen	5	<RM1,000	15
Sex		RM1,000-RM1,500	35
Male	62	RM1,501-RM2,000	32
Female	38	>RM2,000	18
Ethnic		Attended the course	
Malay	89	Yes	57
Chinese	7	No	43
Indian	3	Vaccinated	
Others	1	Yes	77
Level of education		No	23
Secondary School	40		
Primary School	1		
University/College	59		

The data samples are taken from food handlers that collected at various food premises in Kota Bharu. The handlers are from different backgrounds. Both hotels and hospital kitchens accounted for 5% of food handlers each participated in the study. Most of the respondents (44%) were food handlers that participated from restaurants which included the local franchisee. 12% of respondents were collected from several international franchise outlets available in Aeon Mall, Tesco Kota Bharu and KB Mall. Variety of street food stalls personnel (20%) by the roadside also took part in the study. Majority (62%) of respondents are male while 28% are females. Their age ranges from 55-18 years old with a mean age of 32.96 ± 10.26 years old. Malay were the majority (89%) ethnic among respondents. Only 7% of the data collected were Chinese

food handlers from the Chinatown of Kota Bharu. 3% of them were Indians and 1% of food handlers were Indonesian. 59% of respondents made it through tertiary education, 40% working with backgrounds of secondary school and only 1% of them only studied until primary school. About 42% of the handlers have worked for more than 5 years in the industry. Meanwhile, 14% have already been working for 3-5 years. Next, 22% of the respondents are still rookie at the workplace and also 22% already passed 1 year of working. 15% percent of the respondents received their salary less than RM1,000 per month while 35% got about RM1000 – RM1,500 followed by 32% of the respondents having a salary between RM1,500 to RM2,000 ringgit. More than RM2,000 monthly salary was given to 18% of the respondents. The data also demonstrate that only 57% have attended food safety and hygiene training prior to working. Lastly, it was found that 77% were already vaccinated against typhoid while only 23% of them are not yet vaccinated while working in the food industry.

Table 8.2 Knowledge on food safety and hygiene of respondents (n=100)

	True (%)	Unsure (%)	False (%)
Preparation of food in advance is more likely to contribute to food poisoning.	51	39	10
Pets are allowed into the kitchen area	1	10	89
Frozen meats should be defrosted in a container running tap water	55	32	13
Raw meats should be washed before preparation	72	22	6
Raw food should be kept or stored separately from cooked food.	91	8	1
Need to use separate equipment such as chopping boards and utensils for raw meats, vegetables and cooked food	75	13	12
Raw meat need be stored at freezer part of the refrigerator at temperature – 18 °C	75	23	2
Food preparation utensils can be washed with tap water only	37	18	45
Fruits and vegetables can be washed by running tap water	81	19	-
Food can only be reheated once.	53	32	15
An incorrect application of cleaning and sanitization procedures for equipment (refrigerator, slicing machine, mincer) increase the risk of foodborne disease to consumers.	76	20	4
The use of cap, masks, protective gloves, and adequate clothing can reduce the risk of food contamination	92	7	1
Ready-to-eat foods that kept in room temperature for prolonged of time will cause growth of bacteria related to foodborne diseases	81	17	2
A food handler suffering from diseases such as diarrhea, sore throat and flu poses a risk of food contamination	91	9	-

Table 8.3 Respondents attitudes towards food safety and hygiene

	Agree (%)	Uncertain (%)	Disagree (%)
It is my responsibility to practice safe food handling.	93	7	-
I believe good personal hygiene can prevent foodborne illness (keep short nails, wash hands regularly, cover hair, etc).	89	11	-
Working with dirty hands should be avoided.	98	2	-
We must cover our mouth and nose when coughing or sneezing	98	2	-
Apron can be used as a towel to clean hand	58	21	21
We should not smoke while working.	86	12	2
We should not rub our hands on face, hair, etc. while working	82	17	1
Jewelry (including wedding rings) and a watch can be worn while handling food.	4	16	80
The same towel can be used to clean many places.	10	17	73
Separate kitchen utensils must be used to prepare raw and cooked food	67	24	9
Food should not be touched with wounded hands.	86	15	-
We cannot use damaged or cracked eggs	89	10	1
We should always make sure raw foods are in good condition before cooking.	85	14	1
We should follow all food handling practices guidelines if provided.	90	9	1
It is necessary to regularly check temperature settings of chillers and freezers	74	18	8
I am willing to change my food handling practices when I know they are wrong	89	9	2
I think the employer should educate its employees on personal hygiene continuously	90	9	1
Knowledge about food safety is important to me	91	8	1

Table 8.4 Practices of food handlers towards food safety and hygiene

	Always (%)	Sometime (%)	Never (%)
1. I use gloves during the distribution of unpackaged foods	70	20	10
2. I wear an apron while working	66	31	3
3. I properly clean the food storage area before storing new products	81	18	1
4. I wash my hands before start working	98	1	1
5. I use my apron as a towel to clean my hand	24	39	37
6. I rub my hands on my face and hair while working	7	48	45
7. I wear cap or hair net while preparing food	56	17	27
8. I clean the work area before I start work.	86	14	-
9. I chew gum while working.	2	21	77
10. I smoke while working.	3	15	82
11. I use jewelry and a watch while working	8	19	73
12. I use the same towel to clean many places.	5	30	65
13. I separate raw food with cooked food in refrigerator	85	11	4
14. I use separate kitchen utensils to prepare raw and cooked food	69	19	12
15. I touch unwrapped food with my wounded hand.	8	6	86
16. My hand nails are kept clean and short	88	11	1
17. I washed and cleaned my apron after the day	55	35	10
18. I discard the foods that is not sold after the day end	41	34	7

Aspects	Knowledge (%)	Attitude (%)	Practices (%)
Good	48	85	61
Moderate	45	11	30
Poor	7	4	9
Mean score	78.25(11.15)	90.44(12.27)	81.81(14.25)

Food handlers in Kota Bharu have good attitudes and practices towards food safety and hygiene. However, the knowledge on food safety was still on a moderate level.

9.0 Discussion

Food handlers' response on knowledge of food safety and hygiene is presented in Table 8.2. About more than 90% of the food handlers are aware of contamination risks to the food by personnel attire in the kitchen, their health status and also by the temperature while storing foods, especially the ready to eat food which will promote bacterial growth if left at room temperature for prolonged time. Other than that, only half of the handlers acknowledge that food can only be reheated once. Less than half of them are aware that utensils should not only be clean by using tap water but also need to be accompanied by soap or dishwasher. Surprisingly, 72% of them were not aware of the fact that raw meats should not be washed before preparation. 75% understand that there is a need to use separate equipment for different types of food. Again, the same percentage of the handlers are aware that raw meat needs to be stored in a freezer with a temperature less than 18 degrees Celsius. Lastly, 89% of the respondents understand that pets are strictly prohibited to be in the kitchen. However, 10% of them are unsure about this matter. This study shows that the food handlers in Kota Bharu have moderate knowledge on food safety and handling. Furthermore, they lack knowledge of food safety in terms of raw meat preparation and handling that will increase the risk of cross contamination.

Table 8.3 shows that more than 90% of the food handlers have positive attitudes towards food safety and hygiene in which they show good perception on every statement listed. 93% of the food handlers agreed that it is their responsibility to practice safe handling of food and also acknowledged (89%) that good personal hygiene could prevent food borne disease and working with dirty hands should be

avoided which is similar data reported by Abdul-Mutalib *et al.* (2012). However, about more than half (58%) of the handlers had negative attitudes on hand hygiene whereby they agreed on usage of an apron to clean hands. Majority (80%) agreed that jewellery and accessories cannot be worn while handling food which contradicted to the findings in Kuala Pilah by Abdul-Mutalib *et al.* (2012) and most also agreed on the wrongdoings while in the kitchen such as smoking and rubbing hands on face which will increase risk of foodborne. They moderately (67%) agreed on the need to use separate utensils and 73% of the food handlers also agreed on usage of different towels for different surfaces.

Table 8.4 represents practice responses by the handlers. It shows that most of them are practicing good food safety and hygiene at their work in which 98% will always wash their hands before start working, 81% will always properly clean the food storage area and also 86% will clean the work area before start to work. 88% of them always keep their nails clean and short. However, they have poor practice in washing and cleaning their apron and also discarding the unsold food after the day ends. Other than that, 66% always put on an apron while working in the kitchen and 39% sometimes tend to use their apron as a towel to wipe off their hands. Upon the observation at the premises, despite the results revealing a good food safety practice by the handlers, they practiced opposite from what they responded to in reality that also been reported in a study by Nik Husain *et al.* (2016). Most of them were observed not wearing gloves while preparing food such as ready-to-eat meals which was also observed by Lee *et al.* (2017) during his research at canteens on a university campus which might increase the risk of food contamination. Thus, to establish their awareness of their malpractices,

it is vital for employers to constantly educate their employees on food safety to subsequently change their behaviour positively and perform the right practices (Seaman and Eves, 2010). Apart from that, the employer should supervise and address their wrongdoings while visiting the premises (Nur Izyan *et al.*, 2019) as mentioned by Clayton *et al.*, (2002), the practices become harder without the supervision and enough exposure on knowledge of food safety at their working premises even though they are aware of the need to implement certain practices.

From overall KAP scores, it was found that attitudes in food safety are higher than knowledge and also practices. Same result was also obtained by Firdaus Siau *et al.* (2015) in which his study shows 84.4% attitudes and presence of inconsistency between knowledge (73%) and practices (58%) whereby knowledge alone does not govern positive attitudes and safe handling of foods. Apart from that, Ansari-Lari *et al.* (2010) stated that behaviour and attitudes does not always be influenced by attending training and their education level.

10.0 Conclusion

The main aim for this study is to assess the level of knowledge, attitude and practices among food handlers in Kota Bharu. Most food handlers in Kota Bharu, Kelantan, have good knowledge, positive attitudes and satisfactory practices in food safety and hygiene at their working premise. Several points in food safety and knowledge need to be reemphasised to allow better comprehension among food handlers such as the preparation of raw meats including the temperature control in storage. Employers need to be responsible and strict in observing and training their crews on food safety and hygiene. Hence, their premise will improve the quality and safety of the food produced and waited to be served to the customers which subsequently reduces the occurrence of food poisoning in this main city of Kelantan.

11.0 Recommendations and future work

There are several limitations in this study, data on temperature of storage and during cooking is another critical point in food safety and delivering safe food to consumers. This study also does not perform further statistical analysis such as correlations between genders, education, training and other possible variables with KAP. However, the data obtained might have a high possibility of being biased in such that the respondents may choose the correct statements instead of what they truly practiced or perceived. From this study, further study is also recommended to investigate the limitation factors of food safety knowledge to be instilled in food handler's practices.

Appendix A

A.1 *An example of consent statement to the respondents in the study*

ASSESSMENT OF KNOWLEDGE, ATTITUDE AND PRACTICES AMONG FOOD HANDLERS IN KOTA BHARU

Dear Respondent,

I am Nurshamimi Syuhada Yusairi, a final year veterinary student from the Faculty of Veterinary Medicine, Universiti Malaysia Kelantan. I am conducting research for the course, DVT5436 Final Year Research Project. The aim of this study is to assess the knowledge, attitude and practices of food safety and hygiene among food handlers within Kota Bharu, Kelantan, Malaysia.

The survey enclosed herein contains four sections where most of the questions are in Likert-Scale format. It will take about 5-10 minutes to complete the survey. Your response is highly valued. It will be kept private and confidential as the report will only be used for academic and research purposes.

You may withdraw your participation whenever you feel uncomfortable answering the questions. Participation is strictly voluntary.

I appreciate your honest feedback, as your input is beneficial for communication. If you have any inquiries, please contact the researchers below:

Researchers:

Nurshamimi Syuhada Yusairi (D15A0026)

0145345711

syuhada.d15a0026@siswa.umk.edu.my

Supervisor:

Dr Mohammed Dauda Goni

dauda.g@umk.edu.my

I have read and understood the instructions, risks and benefits involved in the study

A.2 *A sample of questionnaire given to respondents used in the study*

**PENILAIAN PENGETAHUAN SIKAP DAN AMALAN TENTANG
KEBERSIHAN DAN KESELAMATAN MAKANAN DIKALANGAN
PENGENDALI MAKANAN DI KOTA BHARU**

PART I - Maklumat Demografik

1. Jantina:

<input type="checkbox"/>	Lelaki
<input type="checkbox"/>	Perempuan

2. Umur: ____ tahun

3. Etnik:

<input type="checkbox"/>	Melayu
<input type="checkbox"/>	Cina
<input type="checkbox"/>	India
<input type="checkbox"/>	Lain-lain

4. Tahap pengajian tertinggi:

<input type="checkbox"/>	Sekolah Rendah
<input type="checkbox"/>	Sekolah menengah
<input type="checkbox"/>	Kolej / Matrikulasi / Universiti

5. Pengalaman bekerja sebagai pengendali makanan:

<input type="checkbox"/>	Kurang dari 1 tahun
<input type="checkbox"/>	1-2 tahun
<input type="checkbox"/>	3-5 tahun
<input type="checkbox"/>	Melebihi 5 tahun

6. Berapakah gaji bulanan anda?

<input type="checkbox"/>	<RM1,000
<input type="checkbox"/>	RM1,000 – RM1,500
<input type="checkbox"/>	RM1,501 – RM2,000
<input type="checkbox"/>	> RM2,000

7. Pernahkah anda mengikuti mana-mana kursus pengendalian makanan?

<input type="checkbox"/>	Pernah	<input type="checkbox"/>	Tidak pernah
--------------------------	--------	--------------------------	--------------

8. Pernahkah anda menerima suntikan imunisasi tifoid?

<input type="checkbox"/>	Ya	<input type="checkbox"/>	Tidak
--------------------------	----	--------------------------	-------

PART II - Pengetahuan Dalam Mengendali Makanan

	Betul	Tidak pasti	Salah
1. Penyediaan makanan terlebih awal boleh mengundang kepada keracunan makanan.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Haiwan peliharaan dibenarkan berada di dapur.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Daging beku perlu 'defrost' didalam bekas menggunakan air paip yang mengalir.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Daging mentah perlu dibasuh sebelum penyediaan.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Makanan mentah perlu disimpan di tempat berasingan dengan makanan yg telah dimasak.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Perlu menggunakan perkakas dapur seperti papan pemotong yg berasingan untuk kegunaan makanan basah(daging, ayam, ikan), sayur dan makanan yg telah dimasak.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Daging mentah perlu di simpan dalam 'freezer' pada suhu -18° C.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Perkakas makanan boleh dibasuh dengan menggunakan air paip sahaja.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Sayur dan buah-buahan boleh dibasuh menggunakan air paip yg mengalir.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Makanan hanya boleh dipanaskan sekali sahaja.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Langkah yg salah ketika proses pembersihan dan sanitasi peralatan elektronik seperti peti sejuk, mesin pengisar dan lain-lain akan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

meningkatkan risiko keracunan makanan terhadap pelanggan di premis.

- 12. Penggunaan penutup kepala, pelitup muka, sarung tangan serta pemakaian bersesuaian dapat mengurangi risiko kontaminasi dalam makanan.
- 13. Makanan 'ready-to-eat' yg ditinggalkan terlalu lama di suhu bilik boleh mengundang pertumbuhan bakteria yg boleh menyebabkan keracunan makanan.
- 14. Pengendali makanan yg mengalami gejala seperti cirit-birit, sakit tekak dan selsema mengundang risiko kontaminasi makanan.

PART III - Sikap Ketika Mengendali Makanan

		Setuju	Neutral	Tidak setuju
1.	Ia adalah menjadi tanggungjawab saya untuk mengamalkan pengendalian makanan yg selamat.			
2.	Saya percaya bahawa penjagaan kebersihan diri boleh menghindari penyakit bawaan makanan.			
3.	Bekerja dengan tangan kotor mesti dielakkan.			
4.	Kita mesti menutup mulut dan hidung ketika batuk dan bersin.			
5.	Kita tidak boleh menggunakan apron sebagai tuala untuk mengelap tangan			
6.	Kita perlu mengelak daripada merokok di tempat kerja ketika mengendali makanan.			
7.	Kita harus mengelak daripada menyentuh muka, rambut dan lain-lain sewaktu bekerja.			
8.	Barang kemas termasuk cincin kahwin dan jam tangan boleh dipakai ketika mengendali makanan			
9.	Tuala yang sama boleh digunakan untuk mengelap semua tempat.			
10.	Perlu menggunakan perkakas dapur yg berasingan untuk penyediaan bahan mentah dan memasak makanan.			
11.	Makanan tidak boleh disentuh dengan tangan yg luka.			
12.	Kita tidak boleh menggunakan telur yg pecah atau rosak.			
13.	Kita perlu selalu memastikan bahan mentah berada dalam keadaan yg baik sebelum memasak.			
14.	Kita perlu mengikuti segala langkah pengendalian makanan yg telah ditetapkan.			

15.	Suhu pada kompartemen 'chiller' dan 'freezer' didalam peti sejuk wajib di semak selalu.			
16.	Saya akan memperbaiki kelakuan saya semasa mengendali makanan setelah saya mendapati ia salah.			
17.	Saya berasa majikan perlu sentiasa melatih dan mengajar pekerja tentang kebersihan diri.			
18.	Pengetahuan tentang keselamatan makanan adalah sangat penting bagi saya.			

PART IV - Amalan Saya Sebagai Pengendali Makanan

		Sentiasa	Jarang	Tidak pernah
1.	Saya memakai sarung tangan ketika menyediakan makanan yg sedia dimakan ('ready-to-eat').			
2.	Saya memakai apron sewaktu bekerja di dapur.			
3.	Saya akan memastikan tempat storan makanan bersih sebelum menyimpan produk makanan yg baru.			
4.	Saya membasuh tangan sebelum memulakan kerja.			
5.	Saya menggunakan apron sebagai tuala untuk mengelap tangan.			
6.	Saya menggaruk muka dan rambut ketika bekerja.			
7.	Saya memakai sarung rambut atau topi ketika menyediakan makanan.			
8.	Saya membersihkan tempat untuk digunakan sebelum mula bekerja.			
9.	Saya mengunyah gula-gula getah semasa bekerja.			
10.	Saya merokok ketika bekerja.			
11.	Saya memakai barang kemas dan jam tangan sewaktu bekerja.			
12.	Saya menggunakan tuala yg sama untuk mengelap banyak tempat.			
13.	Saya mengasingkan makanan mentah dan makanan yg dimasak di dalam peti sejuk.			
14.	Saya menggunakan alat dapur yg berasingan untuk menyediakan bahan mentah dan makanan yg dimasak.			
15.	Saya menyentuh makanan yg tidak dibungkus dengan menggunakan tangan yg luka..			
16.	Kuku jari saya pendek dan bersih.			
17.	Saya akan bersihkan apron saya setelah tamat seharian bekerja.			

18. Saya membuang lebih makanan yg tidak terjual pada hari tersebut			
---	--	--	--

Appendix B

Appendix B.1: A result of questionnaire's reliability test by Cronbach's Alpha coefficient test

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.837	.845	51

UNIVERSITI
MALAYSIA
KELANTAN

References

- Abd Lataf Dora-Liyana, N. A., Mahyudin, M. R., & Ismail-Fitry, A. A. Z., & Rasiyuddin, H. (2018). Food safety and hygiene knowledge, attitude and practices among food handlers at boarding schools in the northern region of Malaysia. *Social Sciences*, 8(17), 238-266. <https://doi.org/10.6007/IJARBSS/v8-i17/5228>
- Abdullah Sani, N., & Siow, O. N. (2014). Knowledge, attitudes and practices of food handlers on food safety in food service operations at the Universiti Kebangsaan Malaysia. *Food Control*, 37(1), 210–217. <https://doi.org/10.1016/j.foodcont.2013.09.036>
- Abdullah, N. B. A. (2021). Food Poisoning Outbreaks among Schoolchildren in Terengganu and their Associated Factors. *Sains Malaysiana*, 50(4), 1027–1036.
- Abdullahi, A., Hassan, A., Kadarman, N., Saleh, A., Baraya, Y. S., & Lua, P. L. (2016). Food safety knowledge, attitude, and practice toward compliance with abattoir laws among the abattoir workers in Malaysia. *International Journal of General Medicine*, 9, 79–87. <https://doi.org/10.2147/IJGM.S98436>
- Abdul-Mutalib, N. A., Abdul-Rashid, M. F., Mustafa, S., Amin-Nordin, S., 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(2), 289–293. <https://doi.org/10.1016/j.foodcont.2012.04.001>

- Akabanda, F., Hlortsi, E. H., & Owusu-Kwarteng, J. (2017). Food safety knowledge, attitudes and practices of institutional food-handlers in Ghana. *BMC Public Health*, *17*(1), 1–9. <https://doi.org/10.1186/s12889-016-3986-9>
- Ali, A. N., Jie, J. S., Prajapati, S. K., Ahmed, N. Z., Iqbal, M. Z., & Alshammari, T. M. (2018). A KAP study on food safety and hygiene among private university students in Kedah state, Malaysia. *Journal of Natural Remedies*, *18*(3), 113–121. <https://doi.org/10.18311/jnr/2018/22289>
- Angelillo, I. F., Viggiani, N. M. A., Rizzo, L., & Bianco, A. (2000). Food handlers and foodborne diseases: Knowledge, attitudes, and reported behavior in Italy. *Journal of Food Protection*, *63*(3), 381–385. <https://doi.org/10.4315/0362-028X-63.3.381>
- Asmawi, U. M. M., Norehan, A. A., Salikin, K., Rosdi, N. A. S., Munir, N. A. T. A., Basri, N. B. M., Selamat, M. I., & Nor, N. M. (2018). An assessment of knowledge, attitudes and practices in food safety among food handlers engaged in food courts. *Current Research in Nutrition and Food Science*, *6*(2), 346–353. <https://doi.org/10.12944/CRNFSJ.6.2.09>
- Halim, M. H. A. A., Nagaretnam, L., & Azman, S. A. N. (2014). Association between knowledge, attitude and practice (KAP) and hygiene status of food handlers and premises in cafeterias of a public university in Malaysia. *International Journal of Public Health and Clinical Sciences*, *1*(1), 180–188.

- Jevšnik, M., Hlebec, V., & Raspor, P. (2008). Food safety knowledge and practices among food handlers in Slovenia. *Food Control*, 19(12), 1107–1118. <https://doi.org/10.1016/j.foodcont.2007.11.010>
- Lee, H. K., Halim, H. A., Thong, K. L., & Chai, L. C. (2017). Assessment of Food Safety Knowledge, Attitude, Self-Reported Practices, and Microbiological Hand Hygiene of Food Handlers. *Int J Environ Res Public Health*, 14(1): 55. <https://doi.org/10.3390/ijerph14010055>
- MOH. (2011). Food safety and quality. *Food Safety & Quality Division, MOH – Annual Report, March 2001*, 1–32.
- Mohd. Firdaus Siau, A., Son, R., Mohhiddin, O., Toh, P. S., & Chai, L. C. (2015). Food court hygiene assessment and food safety knowledge, attitudes and practices of food handlers in Putrajaya. *International Food Research Journal*, 22(5), 1843–1854.
- Mustaffa, N. A., Rahman, R. A., Hassim, M. H., & Ngadi, N. (2017). Evaluation of knowledge, attitude and practices of food handlers in campus cafeterias. *Chemical Engineering Transactions*, 56, 1297–1302. <https://doi.org/10.3303/CET1756217>
- Ncube, F., Kanda, A., Chijokwe, M., Mabaya, G., & Nyamugure, T. (2020). Food safety knowledge, attitudes and practices of restaurant food handlers in a lower-middle-income country. *Food Science and Nutrition*, 8(3), 1677–1687. <https://doi.org/10.1002/fsn3.1454>

- Nee, S. O., & Sani, N. A. (2011). Assessment of Knowledge, Attitudes and Practices (KAP) Among food handlers at residential colleges and canteen regarding food safety. *Sains Malaysiana*, 40(4), 403–410.
- Nur Izyan, F. R., Zuraini, M. I., Maria, M. S., Lovelyna, B. J., Maimunah, M., & Saidatul Afzan, A. A. (2019). A preliminary study on food safety knowledge, attitude and practices among home-based food providers in Klang Valley, Malaysia. *Malaysian Applied Biology*, 48(2), 157–160.
- Nyawo, T., Kesa, H., & Onyenweaku, E. (2021). Food Safety and Hygiene: Knowledge, Attitude and Practices among Food Handlers. *African Journal of Hospitality, Tourism and Leisure*, Volume 10(2), 547–558. <https://doi.org/10.46222/ajhtl.19770720.117>
- Poojar, B., Ommurugan, B., Adiga, S., Thomas, H., Sori, R. K., Poojar, B., Hodlur, N., Tilak, A., Korde, R., Gandigawad, P., In, M., Sleep, R., Albino, D., Rats, W., Article, O., Schedule, P., Injury, C. C., Sori, R. K., Poojar, B., ... Gandigawad, P. (2017). Methodology Used in the Study. *Asian Journal of Pharmaceutical and Clinical Research*, 7(10), 1–5. <https://doi.org/10.4103/jpbs.JPBS>
- Putri, M. S., & Susanna, D. (2021). Food safety knowledge, attitudes, and practices of food handlers at kitchen premises in the port ‘X’ area, north Jakarta, Indonesia 2018. *Italian Journal of Food Safety*, 10(4). <https://doi.org/10.4081/ijfs.2021.9215>
- Suhaila, A., Ariffin, H. F., Sanny, M., Fatimah, U., & Hasni, M. F. (2020). Knowledge, Attitude, and Practice on Food Safety Culture Among Kitchen

Employees of Malaysian Government Hospitals. *ESTEEM Journal of Social Sciences and Humanities*, 4, 180–195.

Thangayah, C. (2009). *FOOD HYGIENE REGULATIONS 2009*.

Yesigat, T., Jemal, M., & Birhan, W. (2020). Prevalence and Associated Risk Factors of Salmonella, Shigella, and Intestinal Parasites among Food Handlers in Motta Town, North West Ethiopia. *Canadian Journal of Infectious Diseases and Medical Microbiology*, 2020. <https://doi.org/10.1155/2020/6425946>



UNIVERSITI
MALAYSIA
KELANTAN

FYP FPV