

**ASSESSMENT OF LEPTOSPIROSIS KNOWLEDGE, ATTITUDE, AND
PREVENTIVE PRACTICES (KAP) AMONG FOOD HANDLERS IN FOOD
PREMISE, PERAK TENGAH DISTRICT.**

ABSTRACT

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The purpose of this study was to access the leptospirosis knowledge, attitude, and preventive practice (KAP) among 100 food handlers who work in food premises in the Perak Tengah district. A self-administrated bilingual validated questionnaire composed of English and Malay language was given to the selected food handlers. The result showed the average score for food handlers' knowledge, attitudes, and practices were 86%, 83%, and 88%, respectively. The data then analysed using Spearman Rank Order correlation to determine the correlation of food handlers' leptospirosis KAP. This study results in weak positive correlation of knowledge-attitude ($r = 0.329$, $p = 0.001$), attitude-practice ($r = 0.121$, $p = 0.231$) and knowledge-attitude ($r = 0.102$, $p = 0.311$). A statistically significant correlation between knowledge and attitude ($p < 0.05$) of leptospirosis results in knowledge would influence the attitude. One-way ANOVA compared the KAP score between food handlers working from different grades of food premise. Food handlers from grade A food premise scored the highest leptospirosis KAP (88.7 ± 3.8) compared to grade B (82.9 ± 5.1), grade C (76.7 ± 7.4), and no grade food premise (86.9 ± 4.1). This result proved that food handlers working in grade A food premises have better leptospirosis KAP levels than others. Despite the finding of this study, correct information regarding leptospirosis needs to promote and improved.

Keywords: leptospirosis, knowledge, attitude, preventive practice, food handlers

1.0 Introduction

Pest management is a requirement for a food establishment system and constitutes one of the critical demands of proper hygiene practice (CAC, 2003). Type food establishments that were included in this study were restaurants, café and food stalls. There is a persistent threat of pest populations being formed in food processing facilities because food is always available; several areas and entrance points are present for pests to enter and find refuges (Bell, 2014). The surplus of food leftovers, unsanitary conditions, and the indiscriminate disposal of waste, allowing rodents to proliferate in restaurants (Garba et al., 2018). Rodents are capable of spreading pathogenic *Leptospira* spp. Many wild and domestic animals become the reservoirs of leptospirosis, including rats, mice, mongooses, pigs, dogs, and cattle (Ansdell, 2017), and rodents (rats and mice) are most commonly involved in human cases (WHO, 2018). Pathogenic leptospires can survive in the environment and penetrate the human body by cutting and abrasion or mucous membranes (Haake & Levett, 2015).

Leptospirosis is a widespread and potentially fatal zoonosis that is endemic in many tropical countries. Each year it is estimated that leptospirosis causing 1,03 million cases and 58,900 deaths, making it the leading zoonotic cause of morbidity and mortality (Torgerson et al., 2015). In Malaysia, Perak state has the highest fatality rate with 6.81%, followed by Sarawak at 6.42% and Perlis at 6.25%, respectively (Garba et al., 2017). Also, in Perak, 2,065 leptospirosis cases reported from 2011 to 2015, and 28 of the patients were among food handlers (Yu et al. 2015). For instance, in a food premise, someone may

become infected after eating food or drinking water contaminated with urine from an infected animal (CDC, 2017).

Since water and food are always available in the food premises, it attracts rodents to food premises making the food handlers vulnerable to rodent-borne diseases due to exposure in the workplace (Taylor, 2019). Consequently, food handlers were exposed to leptospirosis, making them a high-risk occupation (Azimullah et al., 2016).

The guideline of the food premise grading system had been introduced in January 2014 by the Ministry of Local Government and Housing as a guideline for the local authority. The food premise will be given grades A, B, and C according to the food premise's cleanliness score, and pest control is one of the contributory factors of the cleanliness score (KPKT, 2014). The practical implementation of a pest control program and sufficient knowledge about it can minimise food safety risk, enhance the food safety workplace standards, and an outstanding reputation for the food establishment (Djekic et al., 2019). Besides, the proper integration of knowledge and attitude can transform into effective practices that can decrease or prevent leptospirosis transmission (Abdullah et al., 2019).

Therefore, the food premise has been recognised as an essential environment for food safety education. Although knowledge, attitude and preventive practice (KAP) study towards leptospirosis been widely conducted worldwide, there are limited studies on leptospirosis KAP conducted among food handlers. Thus, this study aimed to assess the level of leptospirosis

knowledge, attitude, and preventive practices (KAP), the correlation of knowledge, attitude and preventive practice (KAP) and comparison between KAP total score and grade of food premise among food handlers in food premises at Perak Tengah district

2.0 Materials and Methods

2.1 *Study Setting*

This KAP study was conducted in Perak Tengah district, Perak state. It is a district with 12,205 hectares (1282.05 sq. km), located in the centre of Perak state. It is situated in an elongated shape from north to south, with Sungai Perak dividing it in half on the left and right. This district comprises 11 localities with 101,128 people (Perak Tengah Info, 2016) (JPS, n.d).

2.2 *Study Design*

A cross-sectional study design was conducted in the selected area.

2.3 *Study Population and Sampling Size*

Perak state is divided into 12 districts, and Perak Tengah district has 11 subdivisions of the district within its territory. From all 11 subdivisions of the district, four subdivisions of the district were selected because these localities are most populated in the Perak Tengah district. These four localities are Mukim Bota, Mukim Belanja, Mukim Lambor, and Mukim Kampung Gajah. Qualified respondents from the population sample, which is food handler, were chosen from the district's four subdivisions making it a cluster sampling. The sample size of this study was calculated using the Raosoft sample size calculator. After calculating the sample size using a 90% confidence interval, a 5% margin of error, and 20000 of expected population size for food handlers in Perak Tengah district, it is resulting in 68 respondents for minimum sample size. The sample size was increased to 100 respondents to avoid incomplete data collection from the minimum sample size. By using cluster sampling, 25

respondents were chosen using convenience sampling from each four subdivision (Table 1). The list of criteria that need to be fulfilled to become the respondents was 18 years old and above, understand Malay language or English, handle the food based on preparation, storage, cooking, and serving of food, and voluntarily agreed to participate.

Table 1: The distribution of respondents according to the subdivision of the district.

Subdivision of district	Amount of respondents
Bota	25
Belanja	25
Lambor	25
Kampung Gajah	25
Total	100

2.4 Instrument

This study was using a set of KAP questionnaire that had been adapted and modified from previous studies related to KAP of leptospirosis (Djekic et al., 2019; Abdul Mutalib et al., 2012; Samsudin et al., 2020) and from the Malaysian Food Safety Act (Food Hygiene Regulation, 2009). The questionnaire was made up of dual language (Malay language and English), and it was distributed to the food handlers who were agreed to participate in this study. The questionnaire consists of 4 main sections covering the

respondent demographic information, knowledge about leptospirosis, attitude towards leptospirosis, and leptospirosis preventive practices.

The study instrument's content validity was conducted through discussion and cross-checking with the expert in the study field. A pilot study was then conducted by pre-test the questionnaire among 11 food handlers working in the food premise in the Perak Tengah district. An internal consistency reliability test was conducted as the assessment of questionnaire reliability. Cronbach's Alpha coefficient with acceptable result was obtained (knowledge, $\alpha = 0.820$; attitude, $\alpha = 0.820$; and preventive practices, $\alpha = 0.753$).

Knowledge level of leptospirosis among food handlers was assessed by asking 38 questions about knowledge of leptospirosis. The questions focused on respondents' understanding of the causative agent, mode of transmission, signs and symptoms, risk factors, treatment and diagnosis, and leptospirosis prevention. There were also questions on causes of rat attack, the sign of rat infestation, and closure of food premise due to rat presence. Respondents were given three options to answer questions in this section: 'True,' 'False,' and 'Unsure.'

Next for the attitude section comprises 13 questions that included the respondents' attitude towards leptospirosis prevention. It consists of the risk of infection due to workplace exposure, environmental setting, and interest. The respondents' understanding of the disease's progress once tested positive, including complication and death, an attitude of leptospirosis prevention from

the aspects of personal hygiene and environmental cleanliness. Likert scale was used to assess the questions in this section. The score of “1”, “2”, “3”, “4” and “5” for “strongly agree,” “agree,” “neutral,” “disagree,” and “strongly disagree” were given to positive attitude while for negative attitude, the score will be given adversely.

The last section was the preventive practices sections, which were composed of 14 questions. This section’s questions were also divided into sub-sections focused more on preventive measures taken, such as respondents’ hygiene, environmental hygiene, wear specific protection and eradication at source actions. Preventive practices’ questions were answered as “Yes,” “No,” or “Unsure.”

2.5 Data Decode

After collecting the data, the data will be decoded first before analysed. In the knowledge section, the value was given for each answer choice of “True,” “False,” and “Unsure.”. For each question that answers with “True,” 3 points were given, “Unsure” was given 2 points while 1 point was given to “False.” Meanwhile, for the specific questions in the knowledge section, which are questions number 24, 28, 32, and 37, the score was given adversely. After that, the total score for each respondent was calculated and converted into a percentage. Respondents who are score 60% and above in the knowledge section can be categorised as having good knowledge about leptospirosis. In comparison, those who scored below 60% have been categorised as having poor knowledge.

In the attitude section, the data score were decoded into “5”, “4”, “3”, “2” and “1” for “strongly agree,” “agree,” “neutral,” “disagree,” and “strongly disagree” specifically for positive attitude questions. In contrast, the score was given adversely for the negative attitude questions: questions number 46 and 50. Each respondents’ total score was calculated as being converted into a percentage. Respondents who scored 80% and above can be categorised as having a good attitude, while for the respondents who scored below 80%, it can be classified as having a poor attitude.

As for the last sections of a questionnaire, which is preventive practices of leptospirosis, the same score was given as the knowledge section. For every question that answers “True,” it was given 3, while “Unsure” and “False” answer choices were given 2 and 1 points. All the scores for each respondent were totalled up and converted into a percentage. Those respondents who scored 80% and above can be categorised as practising acceptable leptospirosis preventive practices, while respondents who scored below 80% were classified as practising poor preventive techniques.

2.6 Data Analysis

IBM SPSS Statistics Version 25 software was used to analyse the data in this study. Descriptive statistics were used to determine the respondents’ demographic and each respondents’ leptospirosis level of knowledge, attitude, and preventive practices. Bivariate data analysis, non-parametric Spearman Rank Order correlation was used to assess the correlation between food handlers’ knowledge, attitude and preventive practices (KAP) towards

leptospirosis and $p\text{-value} < 0.05$ was considered as statistically significant correlation. Comparing the food premise grade of cleanliness with the food handlers' KAP score, one-way analysis of variance (ANOVA) was being used to analyse the data and $p\text{-value} < 0.05$ was considered a statistically significant difference.

3.0 Results

3.1 *Demographic Data*

Based on Table 2, 100 respondents participated in this study, with 48 (48%) males, while 52 (52%) are females. The age for participant mostly from 45 to 54 years old (30%), then 55 years old and above (20%), 35 to 44 years old (19%), 25 to 34 years old (18%), and the least is below 24 years old (13%). About more than a half of the respondents' highest education is a secondary school (57%), while respondents who have high education (35%) and the least is a primary school (8%).

Surprisingly, almost half of the respondents (41%) involved in the food and beverage industry (F&B) for 11 years and above, while only 5 (5%) respondents involved in the F&B industry for less than one year. Moreover, 31 respondents (31%) have been working for 11 years, and more in the current working place, 23 and 20 respondents have been working in the current workplace for 2 to 4 years and 5 to 7 years respectively. However, 91% of the respondents have never appointed a pest control company to do the pest management services in their food premise. Only nine respondents said they had assigned the pest control company to do the pest management activities on their establishment. Lastly, from a total of 100 respondents, 16 respondents (16%) were working in food premise, which got grade A and 14 respondents (14%) from grade B. Meanwhile, 11 respondents worked in grade C food premise and the rest, which were the highest group proportion with 59 respondents were worked in food premise that have no grade of cleanliness.

Table 2: The socio-demographic characteristics data of the respondents (n=100)

Factors	Socio-demographic factors	n (%)
Gender	Male	48 (48)
	Female	52 (52)
Age	Below 24 years old	13 (13)
	25 to 34 years old	18 (18)
	35 to 44 years old	19 (19)
	45 to 54 years old	30 (30)
	55 years old and above	20 (20)
Highest Education	Primary School	8 (8)
	Secondary School	57 (57)
	High Education	35 (35)
Total work experience in the food and beverage industry	Less than 1 years	5 (5)
	2 to 4 years	23 (23)
	5 to 7 years	20 (20)
	8 to 10 years	11 (11)
	11 years and above	41 (41)
Total work experience in the current workplace	Less than 1 year	11 (11)
	2 to 4 years	22 (22)
	5 to 7 years	26 (26)
	8 to 10 years	10 (10)
	11 years and above	31 (31)
Have you ever appointed a pest control company to provide pest management services at your food premises	Yes	9 (9)
	No	91 (91)
The grade of the cleanliness of your food premise	Grade A	16 (16)
	Grade B	14 (14)
	Grade C	11 (11)
	No grade	59 (59)

3.2 *Leptospirosis Level of Knowledge, Attitude and Preventive Practices*

3.2.1 Description of Knowledge of Leptospirosis

The distribution of each of the questions in the knowledge section has been described in table 3. Almost half of the respondents (49%) were unsure

of rat urine diseases, known as leptospirosis, while 45% of food handlers knew about it. Interestingly, 74% answered correctly leptospirosis caused by bacteria, and 84% knew leptospirosis is an animal-borne disease. Most of the food handlers knew the causes of rat attacks in the food premise. Ninety-two per cent answered garbage not well managed is the cause of rodents, 91%, and 80% of food handlers correctly answered store food wrongly and stored unused item and equipment untidy, causing the rat attack in food premise. As the sign of rat infestations in the food premise, most of the food handlers answered the questions correctly, but 82% responded wrongly that rodents' urine marks could be seen under the UV light. Besides, only 43% and 55% answered correctly that dirt marks such as greasy on the wall or dry passages and the presence of rodents hole are the significant signs of rodents presence in food premise. Next, only 30% of food handlers knew a person can get infected with leptospirosis through cuts and wound on the body and 67% aware that leptospirosis cannot be transmitted through mosquito bites. As for the sign, symptoms, and complications of leptospirosis, 56% were conscious muscle pain is the symptom of leptospirosis. Still, only 27% knew the yellowing of the skin and eye is the sign of leptospirosis. In terms of leptospirosis complications, 81% knew leptospirosis could lead to death, and only 55% knew leptospirosis could cause lung and kidney failure.

Seventy-nine per cent aware that participate in recreational activities is the risk factor for getting leptospirosis. Sixty-five per cent knew that living near the flood area is one of the risk factors for getting leptospirosis. More than half of the participants knew that leptospirosis could be treated using antibiotics

(53%), and leptospirosis can be detected through blood screening (62%). Meanwhile, 37% said that a vaccine is available to prevent leptospirosis. The study also found that most of the respondents (99%) aware of preventing leptospirosis, cleanliness of house or workplace, and personal hygiene should be prioritised. Following by install the rat traps (98%), proper storing of food and goods (92%), dispose of unused items (92%), avoid walking without shoes (83%) and keep the food by placed or stacked with a minimum space of 15cm between the wall of the storage facility and the food stored; and 20 cm above the floor (80%). Lastly, 81% of participants aware food premise can be closed under the Food Act 1984, Section 11, if rodents are found in the food premise, while 7% and 12% answered food premise would not be closed and unsure about it.

Table 3: Distribution of leptospirosis' knowledge score among food handlers

Knowledge	True (%)	False (%)	Unsure (%)
Rat urine disease is also known as leptospirosis	45	6	49
The causative agent of leptospirosis			
Leptospirosis caused by bacteria	74	7	19
Leptospirosis is an animal-borne disease	84	1	15
Causes of rat attacks in the food premises			
Storing food in the wrong way, such as not covering food or food stored in unpacked packaging.	91	4	2
Unused items and equipment are stored untidy	80	9	11
Garbage is not well managed	92	1	2
Sign of rat infestation in the food premise			
Dirt marks such as greasy on walls or dry passages	43	29	28
Gnaw marks on wires, pipes, packaged goods, and woods	75	13	12
Torn food packages	78	14	8
Urine marks that can be seen under UV light	18	39	43

Presence of rodents holes	55	24	21
There is a distinctive smell of mice that stink and sting	87	9	4
The presence of rats can be seen	89	7	4
There are rats' droppings in the premise	91	5	4
Rat carcasses	90	6	4
Mode of transmission for leptospirosis			
Have cuts and wound on the body	30	37	33
Mosquito's bites	5	67	28
Eating contaminated food	72	10	18
Signs, symptoms and complication of leptospirosis			
Muscle pain	56	7	37
Yellowing of eyes and skin	27	19	54
No symptoms	7	63	30
Lung and kidney failure	55	6	39
Death	81	2	17
A risk factor of getting leptospirosis			
Participate in recreational activities	79	12	9
Cleaning outside house and drain	36	45	19
Eating street food	49	25	26
Live near flood area	65	16	19
Treatment and diagnosis for leptospirosis			
Treat by antibiotic	53	7	40
Blood screening	62	4	34
Prevent by vaccination	37	20	43
How to Prevent Leptospirosis			
Cleanliness in the house/workplace area should be prioritised	99	0	1
Personal hygiene should be prioritised	99	0	1
Proper storing food/ goods to avoid contamination	92	1	7
Store the food by placed or stacked with a minimum space of 15cm between the wall of the storage facility and the food stored; and 20 cm above the floor	80	2	18
Dispose of unused items such as empty cardboard boxes, pallets, newspapers, or any other items	92	4	4
Avoid walking without shoes	83	6	11
Install rat trap	98	2	0
Closing of food premises			
Food premises may be closed under the Food Act 1984, Section 11 if rats are found in food premises	81	7	12

Each respondent's total score has been calculated according to the respondent's answers to each question, and points were given based on the respondent's choice of the answer, as stated in 4.2.5. If the respondents scored 60% and above, the respondents can be categorised as having good knowledge in leptospirosis. Based on figure 1, 98% of the respondents had good knowledge, while only 2% of the respondents had poor knowledge. Their score for the knowledge questions section almost achieved 60%, which were 57.02% and 58.77%.

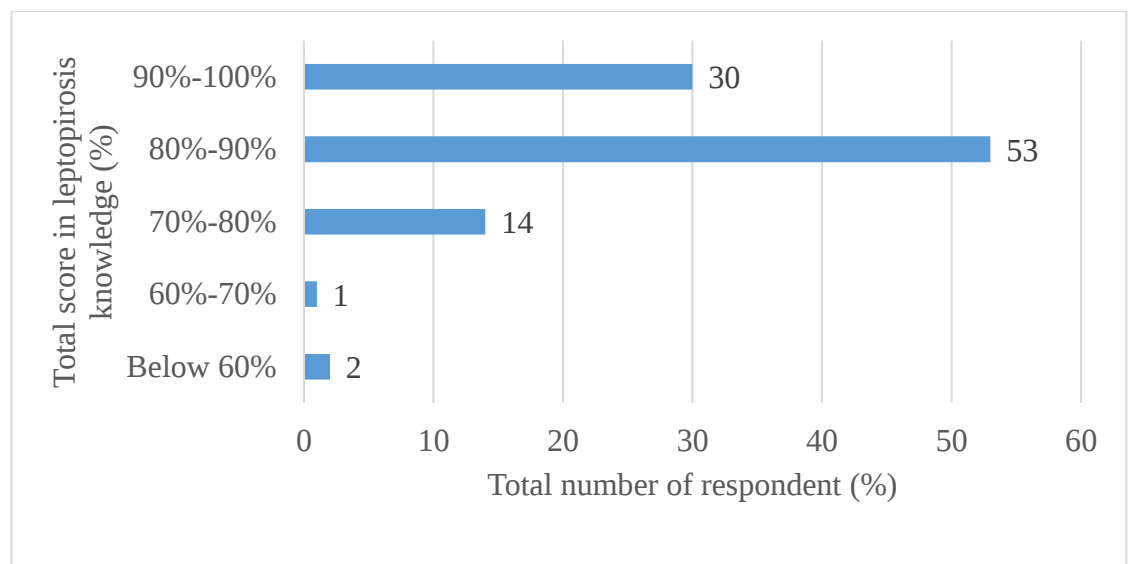


Figure 1: The percentage of leptospirosis' knowledge total score of the food handlers

3.2.2 Description of Attitude of Leptospirosis

In the attitude section, 13 statements can determine whether the respondents had a positive attitude or a negative attitude toward preventing leptospirosis. The majority of the respondents strongly agreed (55%) and agreed (39%) that it is dangerous to eat food contaminated with rat excretion.

Most of the participants strongly agreed (59%) and agreed (28%) that the presence of rats in the house/workplace may cause leptospirosis. Respondents agreed (93%) that an uncovered dustbin can attract rats to the food premise and agreed (86%) by closing any holes, cracks, and crevices in the food premises can block rats' passage into the premise. Meanwhile, on wading in the flood 61% agreed it could pose a risk of getting leptospirosis infection, while 35% disagreed about it and 14% were neutral. Half of the participants (50%) agreed their occupation could expose them to leptospirosis infection, but 33% disagreed about it, and the rest is neutral. Also, most respondents (65%) agreed that certain hobbies or recreational activities could lead to getting leptospirosis easily, while 21% had an undecided perception of this statement, and the rest disagreed about it.

The majority of the respondents agreed (94%) unclean environment making it easier to get infected. Also, most food handlers were found to be agreed that early treatment is vital to prevent severe complications and death due to leptospirosis. Lastly, most participants agreed, knowing about leptospirosis and wearing personal protective equipment (PPE) during cleaning activities can prevent leptospirosis transmission.

Table 4: Distribution of leptospirosis' attitude score among food handlers

Attitude	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)
Food contaminated with rat excretion are not dangerous to eat	3	1	2	39	55
The presence of rats in the house/workplace may cause leptospirosis	59	28	7	4	2
Uncovered dustbin may attract rats to the area	61	32	3	3	1
Closing any holes, cracks, and crevices in the food premises can block the passage of rats into the premise	49	37	9	5	0
Wading in the flood does not pose a risk of infection	14	11	14	44	17
Your occupation may expose you to leptospirosis	26	24	17	28	5
Your hobby/outdoor activity may cause you to get leptospirosis easily	30	35	21	10	4
Unclean environment makes you more prone to have leptospirosis.	47	47	6	0	0
Immediate treatment for leptospirosis may avoid more serious complication	43	49	7	1	0
Delayed for leptospirosis treatment may cause death	45	49	6	0	0
Leptospirosis may cause organ complications	41	49	10	0	0

Know about leptospirosis may help in the prevention of the disease	43	52	5	0	0
Wearing personal protective equipment (PPE) during cleaning activity is one of disease prevention	34	52	9	3	2

As for the attitude score, if the respondents get the total score below 80%, thus the respondents can be categorised as having a negative attitude toward leptospirosis prevention. All respondents' attitude scores showed that 41% of the respondents could be classified as having a negative attitude, while 59% of them had a positive attitude towards leptospirosis prevention.

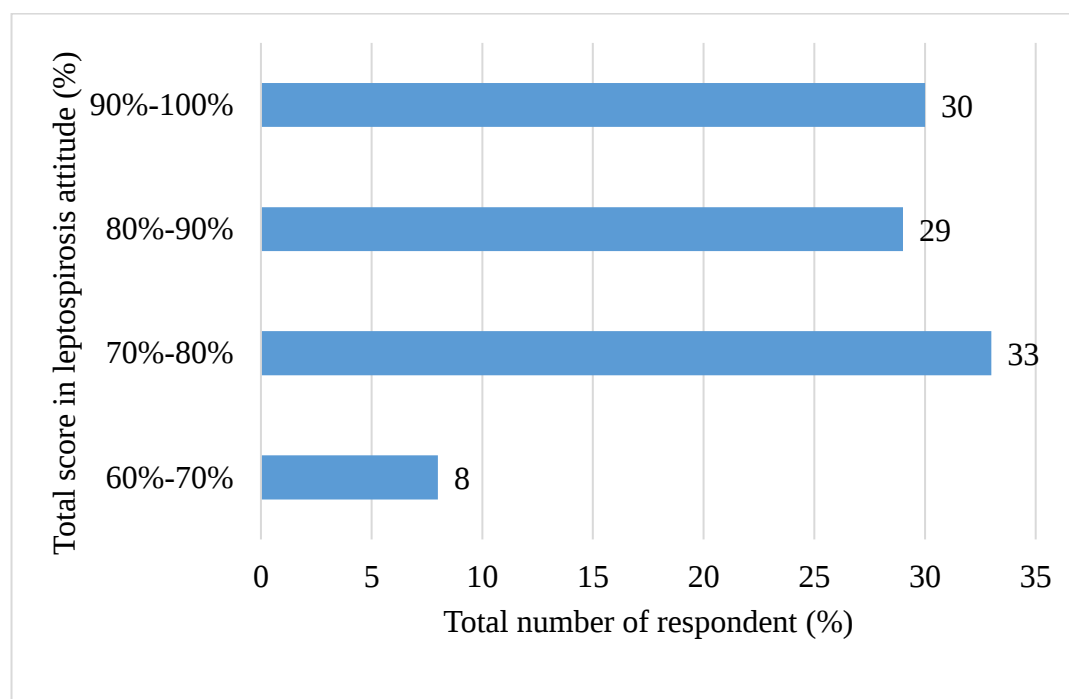


Figure 2: Percentage of leptospirosis' attitude total score of the food handlers.

3.2.3 Description of Preventive Practices of Leptospirosis

According to table 7, the majority of the respondents are practising good hand hygiene. Ninety-nine per cent would wash their hands with water and soap after using the toilet, and 96% would wash their hands with water and soap before and after preparing the food or work. In terms of environmental hygiene, 97% of participants would wash the equipment before and after the business hour, 96% would wash or clean the food premise after the trade, 88% would dispose of their waste into provided bins, and 90% would dispose of any unused items available in food premise.

Ninety-four per cent of the food handlers wear shoes or boots, while only 69% wear an apron during working. Also, 95% of food handlers would cover the wound using the plaster neatly. It was found that 84% of the participants would store stuff and food inside the sealed container at the end of the business. As for the eradication at the source, only 60% close any holes, cracks, and crevices in the food premises, and 91% of the food handlers would inspect the food premise to detect any sign of rats infestations. The number of food handlers that use rat poison is minimal, with only 32% and 53% of the food handlers using rat traps to reduce the rats' population.

Table 5: Distribution of leptospirosis' preventive practices score among food handlers

Preventive practices	Yes (%)	No (%)	Unsure (%)
Did you wash your hands with water and soap before and after using the toilet	99	1	0
Did you wash your hands with water and soap before and after preparing food/work	96	3	1
Did you wash the equipment used before and after the trade	97	3	0
Did you wash/clean food premise after the trade	96	4	0
Did you throw the trash into bins that are provided	88	11	1
Do you dispose of unused items such as empty cardboard boxes, pallets, newspapers, or other items found in food premises	90	9	1
Did you wear shoes/boot during working	94	5	1
Did you wear an apron during working	69	30	1
Did you cover each wound using a plaster neatly	95	1	4
Did you store stuff and food at the end of business inside sealed containers to prevent contamination of rats at night	84	13	3
Did you close any holes, cracks, and crevices in the food premises can block the passage of rats into the premise	60	40	0
Do you inspect food premises to detect any signs of rat infestation	91	7	2
Did you use a rat poison to reduce population of rats in the food premise	32	67	1
Did you use rat trap to reduce population of rats in the food premise	53	46	1

In the leptospirosis preventive practices section, food handlers can be categorised as having an acceptable preventive practice towards leptospirosis if they score more than 80%. In comparison, if the food handlers score less than

80%, the food handlers were categorised as having unacceptable preventive practices. 11% of respondents were classified as practising a poor preventive method of leptospirosis, but 89% of respondents were categorised as having adequate preventive procedures of leptospirosis due to their total score in practice questions.

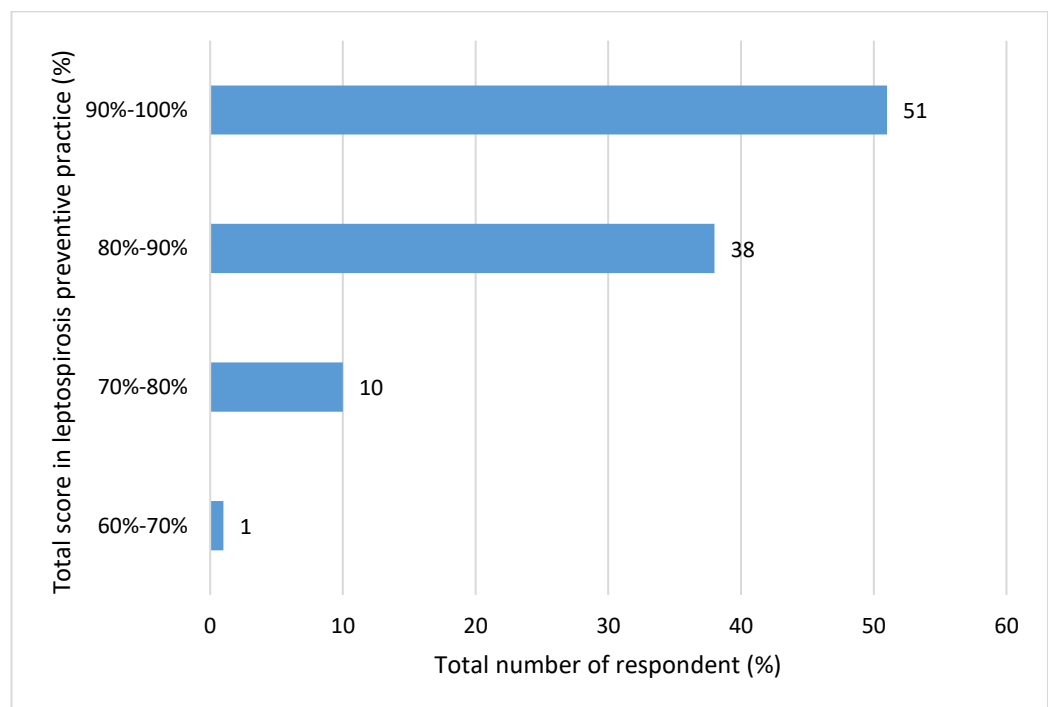


Figure 3: Percentage of leptospirosis’ preventive practice total score of the food handlers.

3.3 *Correlation of food handlers’ knowledge, attitude, and practices towards leptospirosis.*

Spearman Rank-Order correlation was conducted to analyse the correlation of food handlers’ KAP towards leptospirosis. Spearman Rank-Order correlation has been known as a non-parametric measure of strength as the direction of association that occurs between two variables.

According to table 6, the correlation between all of the variables was weak positive linear. The correlation between food handlers' knowledge and attitude towards leptospirosis is a weak positive linear relationship ($r = 0.329$), but there is a statistically significant difference between those two variables ($p = 0.001$) as $p < 0.05$. Next, the Spearman rank correlation between food handlers; attitude and practice towards leptospirosis resulting in weak positive linear relationship, which also no statistically significant difference ($r = 0.121$, $p = 0.231$). Also, there is a weak positive linear correlation between food handlers' knowledge and practices, with no statistically significant difference ($r = 0.102$, $p = 0.311$).

Table 6: Spearman Rank-Order between knowledge, attitude and practice

	<i>p</i> - value	Correlation coefficient (<i>r</i> -value)
Knowledge α Attitudes	0.001	0.329
Attitudes α Practices	0.231	0.121
Knowledge α Practices	0.311	0.102

3.4 Comparison between the food premise grade and KAP score.

One-way analysis of variance (ANOVA) was conducted to compare the food handlers' leptospirosis KAP score with the grade of their food premise's cleanliness to achieve his study's third objective.

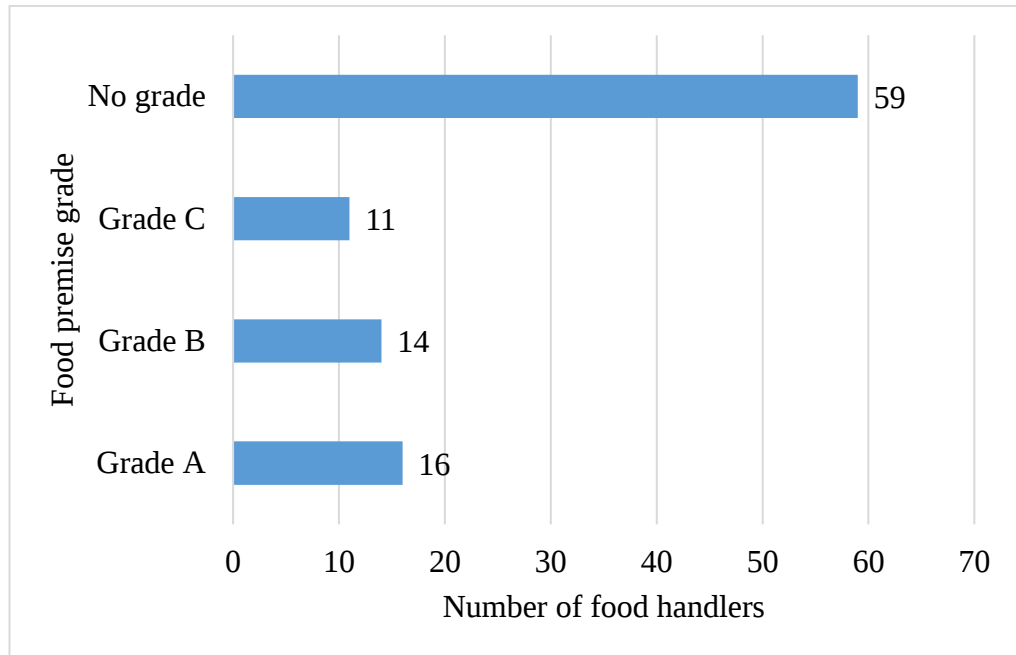


Figure 4: Number of food handlers based on the grade of food premise.

Table 7 shows ANOVA test results; food handlers from grade A food premise scored the highest leptospirosis KAP score (88.7 ± 3.8) while food handlers from grade C scored the lowest (76.7 ± 7.4). Meanwhile, food handlers from grade B food premise scored (82.9 ± 5.1) and food handlers from no grade food premise scored the second-highest after grade A food premise (86.9 ± 4.1). It also can be seen that there is a statistically significant difference in the mean of KAP scored between the different grades of a food premise with the significance value is less than 0.001 ($p < 0.05$). There is a statistically significant difference in the mean of KAP score between food handlers from grade A, grade B and grade C food premise. The KAP score of food handlers from no grade food premise did not have a statistically significant difference with grade A food premise but have a statistically significant difference with grade B and grade C food premise.

Table 7: Comparison between food handlers' leptospirosis KAP score and food premise grade

Grade of a food premise	n	KAP score (%)
		Mean $\pm$ SD
Grade A	16	88.7 $\pm$ 3.8 ^a
Grade B	14	82.9 $\pm$ 5.1 ^b
Grade C	11	76.7 $\pm$ 7.4 ^c
No grade	59	86.9 $\pm$ 4.1 ^{a,d}

Values in the same row and subtable not sharing the same superscript (a, b, c,d) are significantly different at $p < 0.05$ in the two-sided test of equality for column means. Tests assume equal variances and are adjusted for all pairwise comparisons within a row of each innermost subtable using Tukey's range test.

It can be concluded that food handlers from grade A food premise has a higher KAP level of leptospirosis compared to food handlers from grade B, C and no grade of food premise.

4.0 Discussion

One of the risk factors causing leptospirosis infection in humans is the individual's occupation (Haake & Levett, 2015). Research conducted by Samsudin et al. (2018) shows that *Leptospira* antibodies are highly seroprevalent among food handlers. 49.5% of food handler screened seropositive for *Leptospira* antibodies indicates that they had numerous exposure to leptospirosis from the past, which could be from their job. The food handlers' workplace provides a conducive environment that attracts the rodent's presence, causing the food handlers to be exposed to the infected rodents (Taylor, 2019). Therefore, the leptospirosis KAP assessment needs to be done in order to identify the food handler's knowledge, attitude and practice of leptospirosis, whether knowledge and attitude influence one preventive practice and comparison the food handlers' KAP level who work in high-grade and low-grade food premise.

4.1 *Knowledge, Attitude and Preventive Practice of Leptospirosis*

As expected, almost half of the participants (49%) were unsure of rat urine disease, also known as leptospirosis. The previous study by Nozmi et al.(2018) also reported a similar result; this could be due to 'rat urine diseases' that has been accepted by the Malaysians' community as a term for leptospirosis for several decades. This is because the phrase itself usually portrayed by Malaysians' newspapers and broadcast media (Hin et al., 2012). However, since leptospirosis is not only being caused by a rodent (Ansdell, 2017); thus, correct

information should be spread so that appropriate preventive measures can be done. Many respondents were well aware leptospirosis is being caused by bacteria, and it is an animal-borne disease. This finding is quite the same as Nozmi et al.(2018) but contradicts Samsudin et al.(2020), which could be due to respondents not understanding the word zoonosis, especially among non-Malaysia respondent resulting in cannot answer it correctly. Since most food handlers responded correctly to the causes of rat attacks in a food premise, food handlers need to control those causes from happening to avoid rodents from coming to a food establishment. Participants were also very conscious of the sign of rat infestations in the food premise. Thus, it becomes no problem for the participants to notice any rat infestation sign while inspecting the food premise. Only a small portion of respondents knew leptospirosis could be transmitted through the body's cuts and wound. Many respondents (73%) were unaware of yellowing of eyes, and skin is one of the leptospirosis sign and symptoms. These findings were the same as these past studies (Nozmi et al., 2018; Samsudin et al., 2020). It merely indicates that the local community has the same knowledge about leptospirosis, even though it comes from different socio-demographics. Besides, most food handlers were well aware of risky activities that have high chances of causing one to get infected and treatment and diagnosis needed for leptospirosis. Even if 20% of respondents thought vaccine is available to prevent leptospirosis, but the more significant portion of respondents were unsure about it.

Compared to past study, there is an improvement in the respondents' understanding of leptospirosis vaccination (Samsudin et al., 2020). The findings on food handlers' knowledge about leptospirosis prevention are higher than those obtained by these past studies (Halim et al., 2019; Nozmi et al., 2018; Samsudin et al., 2020). It can be concluded that food handlers are conscious of preventing leptospirosis, especially in terms of personal hygiene and cleanliness of the house or workplace. The majority of respondents were mindful of food premise closure under the Food Act 1984 if rodents were founded in the food premise, which could lead food handlers to prevent rodents from coming to the food premise. It can be concluded that food handlers who were working in the food premise in the Perak Tengah district have good knowledge of leptospirosis. Even though two respondents can be classified as having a poor leptospirosis' knowledge, but those respondents scored almost 60%. Ninety-eight respondents can be categorised as having good knowledge with a mean of 86.04%. Compared to past studies, most respondents had poor knowledge of leptospirosis (Halim et al., 2019; Mohamad Azfar et al., 2018; Nozmi et al., 2018; Samsudin et al., 2020). One of those past studies showed a significant difference between the leptospirosis knowledge level of Malaysian and non-Malaysian wet market workers because of poor accessibility of health education programme making them had more health disadvantages in Malaysia (Samsudin et al., 2020).

In terms of attitude score, 41% of the respondents were having negative attitude while 59% were having a positive attitude towards leptospirosis. The mean attitude score was 83.22% showing that more than half of the food handlers were having a positive attitude. These findings were also similar to past studies among agriculture and town-service worker. Agriculture workers, with 79.69%, had a satisfactory attitude towards leptospirosis, while town service workers also showed the same trend as 52.0% were having an acceptable score (Halim et al., 2019; Mohamad Azfar et al., 2018). A similar result was reported from studies among wet market workers as most of the respondents had a positive attitude, but in certain aspects, there were different opinion between Malaysian and non-Malaysian wet market workers. Almost half of the non-Malaysian wet market workers were undecided about their occupation, and few hobbies and outdoor activities could pose a risk of having leptospirosis. These are mainly due to their intention to come to Malaysia to work hard to make a living; thus, they were unconscious of the correlation between their occupation and outdoor activities with leptospirosis (Samsudin et al., 2020). Meanwhile, another study resulted in different data, as 90.3% of Hulu Langat's local community had an unacceptable attitude. The local community did not reflect their good knowledge by the acceptable attitude, deducing that good knowledge would not influence the attitude (Nozmi et al., 2018).

As for the preventive practices, only 11% of the respondents practising an unacceptable preventive practice of leptospirosis. The

rest, 89% can be categorised as having acceptable leptospirosis preventive practice. Also, the mean reading of preventive practice score is 88.19% showing that overall, the leptospirosis preventive practice level among the food handlers was acceptable. Most of the respondents prioritised hygiene, with 99% wash hands with water and soap before and after using the toilet and 96% washed hands with water and soap before and after preparing food/work. Past studies also showed that food handlers were practising good hygienic practices (Abdul-Mutalib et al., 2012; Asmawi et al., 2018). However, only 69% of food handlers used an apron during working; this finding was significantly high compared to Abdul-Mutalib et al.(2012). Moreover, only a small portion of respondents used rat poison to reduce the rat population and more than half used a rat trap. But according to Samsudin et al.(2020), eradication from source by using rat poison and rat traps is the most effective control measure for the occupational setting.

After comparing the result with the past studies, most of the studies resulting in most respondents were having an unacceptable attitude. 69.1% of Hulu Langat's local community, 72.51% of agriculture workers and 60.1% of town-service workers can be categorised as having an intolerable leptospirosis practice (Halim et al., 2019; Mohamad Azfar et al., 2018; Nozmi et al., 2018). Only the study among the wet market workers showed that most of them were practising the good preventive practice of leptospirosis in all aspects, including personal hygiene, environmental hygiene, specific

protection, isolation and eradication from source (Samsudin et al., 2020).

4.2 *Correlation between food handlers' knowledge, attitude and preventive practices towards leptospirosis.*

Based on table 6, the Spearman rank-order correlation among the knowledge, attitude and preventive practices (KAP) of food handlers towards leptospirosis, resulting in a weak positive linear correlation. The correlation between knowledge-attitude was ($r = 0.329$, $p = 0.001$), attitude-preventive practice ($r = 0.121$, $p = 0.231$) and knowledge-preventive practice ($r = 0.102$, $p = 0.311$). Correlation between knowledge-attitude is the only correlation with a significant difference, $p < 0.05$, which means that food handlers' knowledge in leptospirosis influences the attitude towards leptospirosis. Since the r -value less than 0.7, thus the correlation is weak positive, making that food handlers' leptospirosis knowledge does not completely affect the food handlers' attitude towards leptospirosis.

There is also a past study resulting in the statistically significant positive correlation between knowledge and attitude (Manlapaz et al., 2019), but there is also a study that found a high level of knowledge can contribute to the acceptable practices, while attitude will not influence the practice level (Ricardo et al., 2018). This statement had been strengthened from other studies that prove that knowledge and attitude had a significant relationship with the practice (Abdul-Mutalib

et al., 2012). Between both variables, knowledge has been known to be the most influential factors that determine the practice, while another study found attitude score has the strongest correlation with the practice score with knowledge become the main factor in influencing the attitude and practice of food handlers (Asmawi et al., 2018; Ismail et al., 2016). But in this study, there is no statistically significant positive correlation between attitude and practice and between knowledge and practice. It is proved that even the food handlers have a high level of knowledge related to leptospirosis, it still is not effective in improving the leptospirosis practices of food handlers. If the food handlers have a positive attitude towards leptospirosis, it will not make the food handlers practice adequate preventive measures of leptospirosis (Manlapaz et al., 2019). This study's objective finding is that a high level of leptospirosis knowledge will positively affect leptospirosis attitude.

.4.3 Comparison Between The KAP Score and Grade of Food Premise

Food premise inspection has been known as part of the basis routine conducted by the Ministry of Health, Malaysia, and certificate and grade will be given to the premise (Ministry of Health, 2020). Based on Majlis Bandaraya Seberang Perai (MPSP) (2012), the grading system will be given according to many essential aspects in order to determine the level of cleanliness of the food premise, including pest control and prevention. Grade A and B food premise were scored 100%-80% and 65% to 79%. Whereas grade C food premise scores

50% to 64%. It can be concluded that the lower the scores, the dirtier the food premise. Table 7 found that food handlers from grade A food premise scored the significant highest for leptospirosis KAP (88.7 ± 3.8) compared to food handlers from grade B (82.9 ± 5.1) and grade C food premise. Food handlers from grade C food premise significantly scored the lowest of leptospirosis KAP (76.7 ± 7.4). There is no significant correlation between food handlers KAP scores of grade A and no grade food premise, but the no grade food handlers KAP score mean was 86.9 ± 4.1 .

Thus, it can be said that the grade of food premise determines the leptospirosis KAP level of the food handlers. Food handlers from grade A food premise have the highest level of knowledge, attitude and preventive practices towards leptospirosis. The food handlers' education level could be one factor that influenced food safety and hygiene (Lee et al., 2017). This could be because when food handlers have a high educational level, they are more likely to adhere to food safety practices. They would have benefited more from training and food inspectors' instructions. Apart from that, the food handlers' age and experiences significantly correlate with food safety knowledge (Taha et al., 2020). Under the Food Act 1983, all food handlers must attend and complete the safe food handling training course which been established by the Malaysian government (Lee, Abdul Halim, Thong, & Chai, 2017). Although some of the food handlers found to have a clear understanding of their duties in terms of food safety, they were

not always found to bring this knowledge into practice and attitudes (Pacholewicz et al., 2016). It is employers' responsibilities to ensure food handlers attend the food safety training course and practising adequate food safety procedures (Zanin et al., 2017). Since leptospirosis KAP is part of pest control and prevention in measuring the cleanliness level of food premise. Thus, this proves that the food handlers at high-grade food premise have a high level of knowledge, attitude and preventive practice to ensure food safety produces. Since high-grade food premise achieves the grade due to the food handler practising adequate food safety measures in the premise and adversely for the lower grade of food premise.

5.0 Conclusion

Food handlers had been proven to have adequate knowledge, attitude, and preventive practice (KAP) of leptospirosis as the mean reading for each KAP score results in an acceptable level. The study concluded that a significant correlation between knowledge and attitude meant that a high level of knowledge results in a good attitude. Moreover, food handlers from grade A food premise significantly scored the highest for the leptospirosis KAP compared to food handlers. This outcome proved that food handlers from grade A food premise have good knowledge, attitude and preventive practice related to food safety resulting in a clean and safe food premise environment. Even though leptospirosis knowledge is adequate, correct information about leptospirosis should be promoted through different media such as newspapers, television, and the internet since many food handlers did not know rat urine diseases known as leptospirosis and the mode of transmission of leptospirosis. In order to produce a more impactful study, it is recommended to increase respondents' sample size or enlarge the study area in further research.

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APPENDIX



UNIVERSITI TEKNOLOGI MARA

FAKULTI SAINS KESIHATAN

SARJANA MUDA KESIHATAN DAN KESELAMATAN PERSEKITARAN (HS243)

Responden yang dihormati,

Saya, Norhazirah binti Muhamad Hamlun merupakan pelajar tahun akhir program Ijazah Sarjana Muda Kesihatan dan Keselamatan Persekitaran (Kepujian) dari Fakulti Sains Kesihatan, UiTM Kampus Puncak Alam. Bagi memenuhi syarat kursus BHS590 (Projek Penyelidikan), saya menjalankan kajian ***"Penilaian Pengetahuan, Sikap, dan Amalan Pencegahan Leptospirosis (KAP) di kalangan Pengendali Makanan di Premis Makanan, Daerah Perak Tengah."*** Objektif kajian ini adalah untuk menilai pengetahuan, sikap, dan amalan pencegahan leptospirosis (KAP) di kalangan pengendali makanan yang bekerja di premis makanan di daerah Perak Tengah.

Saya amat menghargai sekiranya anda dapat meluangkan masa selama lebih kurang 15-20 minit untuk menjawab soal selidik ini. Oleh itu, saya memerlukan kerjasama ikhlas anda untuk melengkapkan soal selidik ini. Dengan menjawab soal selidik ini, anda bersetuju untuk mengambil bahagian dalam pengumpulan data ini. Maklum balas anda daripada tinjauan ini akan digunakan untuk TUJUAN PENYELIDIKAN dan AKADEMIK saya sahaja dan ia akan disimpan secara **SANGAT SULIT**.

KRITERIA UNTUK MENJAWAB KAJI SELIDIK INI:

1. Pengendali makanan yang bekerja di premis makanan.
2. Memahami Bahasa Melayu atau Bahasa Inggeris.
3. Pengendali makanan yang mengendalikan makanan berdasarkan aspek penyediaan, penyimpanan, memasak dan penyediaan makanan.

Sekiranya ada pertanyaan, sila hubungi saya, Norhazirah Muhamad Hamlun di norhazirahqirani@gmail.com atau 0 11-36653128. Kerjasama dan maklum balas anda amat dihargai. Terima kasih.

Penyelidik,

Norhazirah Binti Muhamad Hamlun



UNIVERSITI TEKNOLOGI MARA
FACULTY OF HEALTH SCIENCE
BACHELOR IN ENVIRONMENTAL HEALTH AND SAFETY (HS243)

Dear respondents,

I am Norhazirah binti Muhamad Hamlun, a final year student from Bachelor of Environmental Health and Safety (Hons.), Faculty of Health Science, UiTM Campus Puncak Alam. Due to the requirement for my BHS590 (Research Project), I am conducting a study of ***“Assessment of Leptospirosis Knowledge, Attitude, and Preventive Practices (KAP) among Food Handlers in Food Premise, Perak Tengah District.”*** The objective of this study is to evaluate the leptospirosis knowledge, attitudes, and preventive practices (KAP) among food handlers who are working in the food premises in Perak Tengah district.

I would really appreciate it if you could take about 15-20 minutes to answer this questionnaire. Therefore, I need your sincere cooperation to complete this questionnaire. By answering this questionnaire, you are agree to take part in this data collection. Your response in this survey will be used for my RESEARCH and ACADEMIC PURPOSES only and it will be kept **STRICTLY CONFIDENTIAL**.

CRITERIA FOR ANSWERING THIS QUESTIONNAIRE:

1. Food handlers who working in food premise.
2. Understand Malay language or English.
3. Food handlers that handles the food based on the aspect of preparation, storage, cooking and serving of food.

If you have any inquiries, feel free to contact me, Norhazirah Muhamad Hamlun at norhazirahqirani@gmail.com or 0 11-36653128. Your cooperation and feedback are really appreciated. Thank you.

Researcher,

Norhazirah Binti Muhamad Hamlun

Borang Izin¹

Untuk menyertai penyelidikan ini, anda atau penjaga sah perlu menandatangani Borang Izin ini.

Saya dengan ini mengesahkan bahawa saya telah memenuhi syarat umur dan berupaya bertindak bagi pihak saya sendiri/ sebagai² penjaga yang sah dalam perkara-perkara berikut:

1. Saya memahami ciri-ciri dan skop penyelidikan ini.
2. Saya telah membaca dan memahami semua syarat penyertaan penyelidikan ini.
3. Saya berpuas hati dengan jawapan pada kemusykilan saya tentang penyelidikan ini.
4. Saya secara sukarela bersetuju menyertai penyelidikan ini dan mengikuti segala atur cara dan memberi maklumat yang diperlukan kepada penyelidik seperti yang dikehendaki.
5. Saya boleh menarik diri daripada penyelidikan ini pada bila-bila masa tanpa memberi sebab.
6. Saya telah pun menerima satu salinan Borang Maklumat Subjek dan Borang Izin.
7. Selain daripada kecederaan yang disebabkan oleh kelalaian dan kecuaiannya penyelidik, saya dengan ini melepaskan dan menggugurkan UiTM dan semua penyelidik dari semua liabiliti berhubung dengan, wujud dari atau berkaitan dengan penyertaan saya. Saya bersetuju untuk menjadikan mereka tidak bertanggungjawab terhadap apa-apa kemudaratan atau kerugian yang mungkin akan saya tanggung disebabkan oleh penyertaan saya.

Nama Subjek/ Wakil Sah yang berkuatkuasa	Tandatangan
No. Kad Pengenalan	Tarikh
Nama Saksi ³	Tandatangan
No. Kad Pengenalan	Tarikh
Nama Penyelidik/Pengambil Izin	Tandatangan
No. Kad Pengenalan	Tarikh

¹ Salinan asal disimpan oleh Penyelidik Utama dan satu salinan diserahkan kepada subjek.

² Potong mana yang tidak berkenaan.

³ Saksi dimestikan bagi izin secara lisan.

Consent Form

To become a subject in the research, you or your legal guardian is advised to sign this Consent Form.

I herewith confirm that I have met the requirement of age and am capable of acting on behalf of myself /* as a legal guardian as follows:

1. I understand the nature and scope of the research being undertaken.
2. I have read and understood all the terms and conditions of my participation in the research.
3. All my questions relating to this research and my participation therein have been answered to my satisfaction.
4. I voluntarily agree to take part in this research, to follow the study procedures and to provide all necessary information to the investigators as requested.
5. I may at any time choose to withdraw from this research without giving reasons.
6. I have received a copy of the Subjects Information Sheet and Consent Form.
7. Except for damages resulting from negligent or malicious conduct of the researcher(s), I hereby release and discharge UiTM and all participating researchers from all liability associated with, arising out of, or related to my participation and agree to hold them harmless from any harm or loss that may be incurred by me due to my participation in the research.

Name of Subject/Legal Guardian	Signature
I.C No	Date
Name of Witness	Signature
I.C No	Date
Name of Consent Taker	Signature
I.C No	Date

¹ Original signed copy is to be retained by the Principal Investigator.

² Delete whichever is not applicable.

³ A witness is only required for oral consent.

BAHAGIAN A: DATA DEMOGRAFI RESPONDEN
SECTION A: SOCIO-DEMOGRAPHIC INFORMATION

Sila jawab semua soalan dengan tandakan (✓) dalam kotak berkaitan di bahagian A ini
Please answer all questions by ticking (✓) in the related box only in this section A

1. Jantina: Lelaki ☐ Perempuan ☐
Gender: Male Female
2. Umur: Bawah 24 tahun ☐ 25-34 tahun ☐ 35-44 tahun ☐
Age: Below 24 years old 25-34 years old 35-44 years old
45-54 tahun ☐ 55 tahun dan ke atas ☐
45-54 years old 55 years old and above
3. Pendidikan paling tinggi: Sekolah Rendah ☐ Sekolah Menengah ☐
Highest education: Elementary High School
Pendidikan Tinggi ☐
High Education
4. Jumlah pengalaman bekerja dalam kurang dari 1 tahun ☐ 2 hingga 4 tahun ☐
bidang makanan dan minuman : less than 1 year 2 to 4 years
Total work experience in food and beverage industry:
5 hingga 7 tahun ☐ 8 hingga 10 tahun ☐
5 to 7 years 8 to 10 years
11 tahun dan ke atas ☐
11 years and above
5. Jumlah pengalaman bekerja di tempat kurang dari 1 tahun ☐ 2 hingga 4 tahun ☐
kerja sekarang: less than 1 year 2 to 4 years
Total work experience in current workplace:
5 hingga 7 tahun ☐ 8 hingga 10 tahun ☐
5 to 7 years 8 to 10 years
11 tahun dan ke atas ☐
11 years and above
6. Adakah anda pernah melantik syarikat kawalan haiwan perosak untuk memberikan perkhidmatan pengurusan haiwan perosak di premis makanan anda?:
Have you ever appointed a pest control company to provide pest management services at your food premises?
Ya/Yes ☐ Tidak/ No ☐
7. Gred premis makanan anda: Gred A ☐ Gred B ☐ Gred C ☐ Tiada gred ☐
Your food premise grade: Grade A Grade B Grade C No grade

BAHAGIAN B: PENGETAHUAN TENTANG LEPTOSPIROSIS

SECTION B: LEPTOSPIROSIS KNOWLEDGE

Sila jawab semua soalan dengan menandakan (✓) dalam kotak 'BETUL', 'SALAH' atau 'TIDAK PASTI' di bahagian B ini.

Please answer all questions by ticking (✓) in the 'TRUE', 'FALSE' or 'UNSURE' box in this section B.

Bil No.		BETUL TRUE	SALAH FALSE	TIDAK PASTI UNSURE
8.	Penyakit kencing tikus juga dikenali sebagai leptospirosis <i>Rat urine disease is also known as leptospirosis</i>			

Ejen penyebab kencing tikus: *Causative agent of leptospirosis:*

	BETUL TRUE	SALAH FALSE	TIDAK PASTI UNSURE
9. Leptospirosis disebabkan oleh bakteria <i>Leptospirosis caused by bacteria</i>			
10. Leptospirosis adalah penyakit bawaan haiwan <i>Leptospirosis is an animal-borne diseases</i>			

Punca serangan tikus di premis makanan *Causes of rat attacks in the food premises*

	BETUL TRUE	SALAH FALSE	TIDAK PASTI UNSURE
11. Cara penyimpanan makanan yang salah seperti tidak menutup makanan atau makanan disimpan di dalam bungkusan tidak berkedap. <i>Storing food in a wrong way such as not covering food or food stored in unpacked packaging.</i>			
12. Barangan dan peralatan yang tidak digunakan disimpan dengan tidak kemas <i>Unused items and equipment are stored untidy</i>			
13. Sampah tidak diuruskan dengan baik <i>Garbage is not well managed</i>			

Tanda serangan tikus di premis makanan *Sign of rat infestation in the food premise*

	BETUL TRUE	SALAH FALSE	TIDAK PASTI UNSURE
14. Tanda kotoran seperti berminyak atau gris di dinding atau laluan kering <i>Dirt marks such as greasy on walls or dry passages</i>			
15. Kesan gigitan pada wayar, paip, barang berbungkus dan kayu. <i>Gnaw marks on wires, pipes, packaged goods and woods.</i>			
16. Bungkusan makanan yang koyak. <i>Torn food packages.</i>			

17. Kesan air kencing yang boleh dilihat di bawah cahaya UV
Urine marks that can be seen under UV light
18. Adanya lubang kediaman tikus.
Presence of rodents holes.
19. Terdapat bau khas tikus yang busuk dan menyengat.
There is a distinctive smell of mice that stink and sting.
20. Kelibat tikus dapat dilihat.
The presence of rats can be seen
21. Terdapat najis tikus di dalam premis.
There are rats' droppings in the premise.
22. Bangkai tikus.
Rat carcasses.

Kaedah jangkitan kencing tikus :
Mode of transmission for leptospirosis:

23. Mempunyai luka di badan
Have cuts and wound on the body
24. Gigitan nyamuk
Mosquito's bites
25. Makan makanan yang tercemar
Eating contaminated food

BETUL TRUE	SALAH FALSE	TIDAK PASTI UNSURE

Tanda, gejala dan komplikasi kencing tikus:
Signs, symptoms and complication of leptospirosis:

26. Sakit otot
Muscle pain
27. Mata dan kulit bertukar menjadi kuning
Yellowing of eyes and skin
28. Tiada gejala
No symptoms
29. Kegagalan paru-paru dan buah pinggang
Lung and kidney failure
30. Kematian
Death

BETUL TRUE	SALAH FALSE	TIDAK PASTI UNSURE

Faktor risiko mendapat jangkitan kencing tikus:
Risk factor of getting leptospirosis:

31. Mengambil bahagian dalam aktiviti rekreasi
Participate in recreational activities
32. Membersihkan kawasan luar rumah dan longkang
Cleaning outside house and drain

BETUL TRUE	SALAH FALSE	TIDAK PASTI UNSURE

33.	Makan makanan jalanan <i>Eating street food</i>			
34.	Tinggal berhampiran kawasan banjir <i>Live near flood area</i>			

Rawatan dan diagnosis untuk kencing tikus:
Treatment and diagnosis for leptospirosis:

	BETUL <i>TRUE</i>	SALAH <i>FALSE</i>	TIDAK PASTI <i>UNSURE</i>
35.	Rawat dengan antibiotik <i>Treat by antibiotic</i>		
36.	Pemeriksaan darah <i>Blood screening</i>		
37.	Cegah dengan vaksinasi <i>Prevent by vaccination</i>		

Cara-cara pencegahan kencing tikus:
How to Prevent Leptospirosis:

	BETUL <i>TRUE</i>	SALAH <i>FALSE</i>	TIDAK PASTI <i>UNSURE</i>
38.	Kebersihan di kawasan rumah / tempat kerja harus diutamakan <i>Cleanliness in house/workplace area should be prioritized</i>		
39.	Kebersihan diri harus diutamakan <i>Personal hygiene should be prioritized</i>		
40.	Menyimpan makanan / barang dengan betul untuk mengelakkan pencemaran <i>Proper storing food/ goods to avoid contamination</i>		
41.	Makanan disimpan dengan ditempatkan atau disusun dengan jarak minimum 15 cm di antara dinding kemudahan penyimpanan dan makanan itu disimpan; dan 20 cm dari atas lantai. <i>Store the food by placed or stacked with a minimum space of 15cm between the wall of storage facility and the food stored; and 20 cm above the floor.</i>		
42.	Membuang barang-barang yang tidak digunakan lagi seperti kotak karton kosong, palet, surat khabar atau barangan lain. <i>Dispose of unused items such as empty cardboard boxes, pallets, newspapers or any other items.</i>		
43.	Elakkan berjalan tanpa kasut. <i>Avoid walking without shoes.</i>		
44.	Pasang perangkap tikus. <i>Install rat trap.</i>		

Penutupan premis makanan:
Closing of food premises:

45. Premis makanan boleh ditutup di bawah Akta Makanan 1984, Seksyen 11 jika tikus dijumpai di premis makanan.
Food premises may be closed under the Food Act 1984, Section 11 if rats are found in food premises.

BETUL TRUE	SALAH FALSE	TIDAK PASTI UNSURE

BAHAGIAN C: SIKAP TERHADAP LEPTOSPIROSIS

SECTION C: Attitude Of Leptospirosis

Sila jawab semua soalan dengan menandakan (✓) dalam kotak yang disediakan di bahagian C ini mengikut skala yang diberikan.

Please answer all questions by tick (✓) in the box provided in this section C according to the scale provided.

1	2	3	4	5
Sangat Bersetuju <i>Strongly Agree</i>	Bersetuju <i>Agree</i>	Tidak Pasti <i>Neutral</i>	Tidak Bersetuju <i>Disagree</i>	Sangat Tidak Bersetuju <i>Strongly Disagree</i>

Bil. No	Pernyataan Statement	Skala Scale				
		1	2	3	4	5
46.	Makanan yang tercemar dengan najis tikus tidak berbahaya untuk dimakan. <i>Food contaminated with rat excretion are not dangerous to eat.</i>					
47.	Kehadiran tikus di rumah / tempat kerja boleh menyebabkan leptospirosis <i>Presence of rats in house/workplace may cause leptospirosis.</i>					
48.	Tong sampah yang tidak ditutup boleh menarik tikus ke kawasan itu. <i>Uncovered dustbin may attract rats to the area.</i>					
49.	Menutup sebarang lubang, rekahan dan retakan yang terdapat di premis makanan boleh menghalang laluan tikus masuk ke premis. <i>Closing any holes, cracks and crevices in the food premises can block the passage of rats into the premises.</i>					
50.	Mengharungi banjir tidak menimbulkan risiko jangkitan <i>Wading in the flood does not pose a risk of infection</i>					

1	2	3	4	5
Sangat Bersetuju <i>Strongly Agree</i>	Bersetuju <i>Agree</i>	Tidak Pasti <i>Neutral</i>	Tidak Bersetuju <i>Disagree</i>	Sangat Tidak Bersetuju <i>Strongly Disagree</i>

Bil. No	Penyataan Statement	1	2	3	4	5
51.	Pekerjaan anda boleh mendedahkan anda kepada leptospirosis. <i>Your occupation may expose you to leptospirosis.</i>					
52.	Hobi / aktiviti luar boleh menyebabkan anda mudah terkena leptospirosis. <i>Your hobby/outdoor activity may cause you to get leptospirosis easily.</i>					
53.	Persekitaran yang tidak bersih menjadikan anda lebih mudah terkena leptospirosis. <i>Unclean environment makes you more prone to have leptospirosis.</i>					
54.	Rawatan segera untuk leptospirosis dapat mengelakkan komplikasi yang lebih serius. <i>Immediate treatment for leptospirosis may avoid more serious complication.</i>					
55.	Kelewatan untuk rawatan leptospirosis boleh menyebabkan kematian. <i>Delayed for leptospirosis treatment may cause death.</i>					
56.	Leptospirosis boleh menyebabkan komplikasi organ. <i>Leptospirosis may cause organ complications.</i>					
57.	Mengetahui mengenai leptospirosis boleh membantu dalam pencegahan penyakit. <i>Know about leptospirosis may help in prevention of the disease.</i>					
58.	Memakai alat pelindung diri (PPE) semasa aktiviti pembersihan adalah salah satu pencegahan penyakit. <i>Wearing personal protective equipment (PPE) during cleaning activity is one of disease prevention.</i>					

BAHAGIAN D: AMALAN PENCEGAHAN LEPTOSPIROSIS

SECTION D: PREVENTIVE PRACTICES FOR LEPTOSPIROSIS

Sila jawab semua soalan dengan menandakan (✓) dalam kotak 'YA', 'TIDAK' atau 'TIDAK PASTI' di bahagian D ini.

Please answer all questions by ticking (✓) in the 'YES', 'NO' or 'UNSURE' box in this section D.

Kebersihan diri

Personal Hygiene

59. Adakah anda mencuci tangan dengan **air dan sabun** sebelum dan selepas menggunakan tandas?

*Did you wash your hands with **water and soap** before and after using the toilet?*

☐

Ya/ Yes

☐

Tidak/ No

☐

Tidak pasti/Unsure

60. Adakah anda mencuci tangan dengan **air dan sabun** sebelum dan selepas menyediakan makanan /kerja?

*Did you wash your hands with **water and soap** before and after preparing food/work?*

☐

Ya/Yes

☐

Tidak/No

☐

Tidak pasti/Unsure

Kebersihan Alam Sekitar

Environmental Hygiene

61. Adakah anda mencuci peralatan yang digunakan sebelum dan selepas perniagaan.

Did you washing the equipment used before and after the trade.

☐

Ya/Yes

☐

Tidak/No

☐

Tidak pasti/Unsure

62. Adakah anda mencuci / membersihkan premis makanan.

Did you washing/cleaning food premise.

☐

Ya/Yes

☐

Tidak/No

☐

Tidak pasti/Unsure

63. Adakah anda membuang sampah ke tong sampah yang disediakan

Did you throwing trash into bins that are provided.

☐

Ya/ Yes

☐

Tidak/No

☐

Tidak pasti/Unsure

64. Adakah anda membuang barang-barang yang tidak digunakan lagi seperti kotak karton kosong, palet, surat khabar atau barangan lain yang terdapat di premis makanan.

Did you dispose of unused items such as empty cardboard boxes, pallets, newspapers or other items found in food premises?

☐

Ya/ Yes

☐

Tidak/No

☐

Tidak pasti/Unsure

Perlindungan Khusus

Specific Protection

65. Adakah anda memakai kasut /but semasa bekerja?

Did you wearing shoes/boot during working?

☐

Ya/Yes

☐

Tidak/No

☐

Tidak pasti/Unsure

66. Adakah anda memakai apron semasa bekerja?

Did you wearing apron during working?

☐

Ya/ Yes

☐

Tidak/ No

☐

Tidak pasti/Unsure

67. Adakah anda menutup setiap luka menggunakan plaster dengan kemas?

Did you covering each wound using a plaster neatly?

☐

Ya/Yes

☐

Tidak/No

☐

Tidak pasti/Unsure

68. Adakah anda menyimpan barang dan makanan di dalam bekas tertutup untuk mengelakkan pencemaran tikus pada waktu malam.

Did you storing stuff and food at the end of business inside sealed containers to prevent contamination of rats at night.

☐

Ya/Yes

☐

Tidak/No

☐

Tidak pasti/Unsure

Pembasmian pada sumber

Eradication at source

69. Adakah anda menutup sebarang sebarang lubang, rekahan dan retakan yang terdapat di premis makanan yang boleh menghalang laluan tikus masuk ke dalam premis.

Did you closing any holes, cracks and crevices in the food premises can block the passage of rats into the premise.

☐

Ya/ Yes

☐

Tidak/No

☐

Tidak pasti/Unsure

70. Adakah anda membuat pemeriksaan di premis makanan untuk mengesan sebarang tanda-tanda serangan tikus.

Did you inspecting food premises to detect any signs of rat infestation.

☐

Ya/ Yes

☐

Tidak/No

☐

Tidak pasti/Unsure

71. Adakah anda menggunakan racun tikus untuk mengurangkan populasi tikus di premis makanan.

Did you use a rat poison to reduce population of rats in the food premise.

☐

Ya/ Yes

☐

Tidak/No

☐

Tidak pasti/Unsure

72. Adakah anda menggunakan perangkap tikus untuk mengurangkan populasi tikus di premis makanan.

Did you use rat trap to reduce population of rats in the food premise.

☐

Ya/ Yes

☐

Tidak/No

☐

Tidak pasti/Unsure