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FULL PAPER

Relationships between knowledge, attitude, and practices of food safety and hygiene among Muslim food truck handlers in the Klang Valley, Malaysia

[2]Asha'ari, N.M.H. and [1,2,*]Kamarulzaman, N.H.

[1]*Department of Agribusiness and Bioresource Economics, Faculty of Agriculture, Universiti Putra Malaysia, 43400 UPM, Serdang, Selangor, Malaysia*
[2]*Halal Products Research Institute, Universiti Putra Malaysia, 43400 UPM, Serdang, Selangor, Malaysia*

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Abstract

Nowadays, the food truck business is gaining more popularity in Malaysia. It is a new trend for the new generation of street food lovers as a food service of ready-to-eat and fast food. Essentially, the fundamental aspects of halal food production include cleanliness, free from contamination, and healthy food. The processes include every aspect of personal hygiene, dress, equipment, and premise where food is processed and prepared. However, the outbreak of foodborne diseases is the consequence if there is an element of carelessness during the processing and handling of food, which is supposed to be in a more hygienic and safer environment. Unsanitary food handling procedures, poor water quality, and an unhygienic working environment were among the causes of foodborne illness cases in Malaysia. Therefore, the main objective of this study was to investigate the relationships between knowledge, attitude, and practices of food safety and hygiene among Muslim food truck handlers. Using convenience sampling, the data were collected from 121 Muslim food truck handlers in the Klang Valley in Peninsular Malaysia. A quantitative research survey was conducted using a structured, self-administered questionnaire to obtain responses from Muslim food truck handlers. Statistical analyses including descriptive analysis, Pearson correlation analysis, and Chi-square analysis were employed in this study. The findings showed that decent knowledge, attitude, and practices of food safety and hygiene among Muslim food truck handlers are crucial. These attributes have significant relationships, indicating that a better understanding of Muslim food truck handlers in terms of their knowledge, attitude, and practices of food safety and hygiene is critical to the long-term sustainability of the food truck business industry.

1. Introduction

The halal food industry is critical to Malaysians because halal food synonym with safe to eat, use, and purchase (Elasrag, 2016). In general, Muslim consumers must ensure that the food they eat meets the halal requirements of Islamic law. Demand for halal food is accelerating with an increased level of awareness among 60.4% of the Muslim population in Malaysia who are looking for food that meets Islamic requirements (Ariffin, 2009; Said *et al.,* 2014). The growth of the Malaysian halal industry, which successfully operates in the local and international halal markets, particularly in the food industry, has raised Malaysia's prominence on the global stage. The local halal industry currently contributes less than 2% of the gross domestic product (GDP), but by 2020, it was expected to rise to about 5.8% (Said *et al*., 2014). According to Che Omar *et al*. (2013), the growth of the halal industry in Malaysia shows great potential for improved profitability and business opportunities that can be exploited through the demand for halal products.

One of the businesses that contribute significantly to the halal food industry in Malaysia is food trucks. The food truck business is one example of small and medium enterprises (SMEs). It is a big part of the economy in Malaysia and is highly recommended by the Malaysian government for business expansion because of the opportunities in the food industry. The food truck business has positively contributed to the growth of the economy (Abd Wahab *et al.,* 2017; Fahlevi *et al.*, 2019). Currently, the food truck business is gaining increased popularity in Malaysia and is becoming a trend among

*Corresponding author.
Email: *nitty@upm.edu.my*

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young entrepreneurs who sell various types of food by using food trucks. In addition, the food truck market has grown rapidly in the last several years, driven by the food truck emergence, the appeal is to serve food at lower prices but with good quality of food (Mokhtar *et al.,* 2017). In a survey conducted to uncover out-of-home dining habits of Malaysian consumers, about 67% of Malaysians reportedly eat outside at least once a week (Poulain *et al*., 2020).

Given its importance and significant role in the food consumption industry outside of the home, food truck handlers need to ensure their access to safe and halal food considering the hygienic-sanitary perspective since food trucks are itinerant commercial. Ruslan *et al*. (2018) reported that in terms of quality and health, the feature of food quality from the Islamic point of view has a very wider definition, also taking into account the aspects of holiness and the ability to eat halal compared to conventional food quality. The authors further argued that many factors affect the food consumption of consumers, not only halal, but also food safety, hygiene, and quality. Apart from its economic contribution to the halal food industry in Malaysia, the food truck handlers must provide food that is Shariah-compliant and guaranteed to maintain food hygiene for Muslim consumers. Food hygiene means a certain condition or measure that is needed to ensure the safety of food, from production to consumption (Wallace *et al.*, 2018).

Consumers, in general, prefer nutritious, healthy, and wholesome food. In addition, the rising incomes and urbanization in Malaysia have changed consumers' perspectives and behaviours to be more aware and demand quality, safe, and healthy food especially in the food truck business (Mohamad Saber *et al.*, 2020; Gopi and Samat, 2020; Loh and Hassan, 2021). Thus, food safety and hygiene are also becoming essential considerations among consumers in terms of food consumption (Ahmad *et al.,* 2013). Food safety means that there is no risk of suffering bouts from the intake of a particular food (Henson and Traill, 1993). However, when producing and offering halal food to consumers, a range of Islamic standards should be met during the production process, including slaughtering, storage, display preparation, and overall hygiene and sanitation (Ambali and Bakara, 2014).

The food truck businesses appeared to have sustained growth despite not having any special discrete licenses in most businesses (Abd Wahab *et al*., 2017). Though, the popularity of food trucks presents a growing concern to the public, particularly on the standards of food safety and hygiene issues, which may be lacking to meet the needs of the public. Food safety and hygiene are among the common practice determinants that will be examined before consumers make their purchasing decisions. Food safety issues had become a priority with the change in Malaysians' lifestyles eating outside and buying readymade food (Son *et al.*, 2015; Haryani *et al.*, 2017). Consumers are concerned about the food operator's ability to apply correct food handling practices and the sanitary state of the truck when the operation process is carried out in a very crowded area, which may make customers feel unsafe when visiting the business (Arikiah, 2019). Furthermore, food that is often sold in unsatisfactory hygiene conditions has a high possibility to contribute to foodborne diseases and illness (Habib, 2016). Food safety and hygiene practices among food truck handlers are critical issues that must be monitored and applied in all aspects of delivering food to consumers. Furthermore, cases of foodborne diseases commonly associated with food trucks are still reported in Malaysia. Thus, ensuring the food safety of food trucks is a major challenge. The vehicles are exposed to environmental conditions and usually do not present adequate infrastructure to ensure the safe production of food. Moreover, poor handling coupled with possible negligence in food handling practices on the premises could result in food contamination, which leads to illness outbreaks if serious (Abdul-Mutalib *et al*., 2012). Besides, most of the food trucks are not certified halal by the Department of Islamic Development Malaysia (JAKIM), and the application rate for halal certification by these food trucks remains low (Shahwahid *et al.*, 2018). Hence, these food truck handlers must ensure that the halal status of the food being served is *halalan toyyiban*. Many research on food handlers' knowledge, attitude, and practices have been carried out in Malaysia (Mukhari and Mazilah, 2011; Abdul-Mutalib *et al.*, 2012; Tan *et al.,* 2012; Sani and Siow, 2014; Son *et al.*, 2015; Ismail *et al.*, 2016; Woh *et al.*, 2016; Mamot and Khairuddin, 2018).

Even though food handlers possess the skills and knowledge to handle food safety, human handling errors inherently lead to food poisoning (Ehiri and Morris, 1996; Greig *et al.*, 2007). Asmawi *et al.* (2018) addressed the fact that food handlers' lack of safety knowledge had a detrimental consequence on their handling actions, but that it can be managed via training and experience. Although studies have shown that training may increase knowledge of food safety, it does not always lead to a positive change in attitudes towards food handling (Howes *et al*., 1996; Powell *et al.*, 1997). Besides, knowledge alone is not enough to instill positive attitudes and safe behaviour among food handlers (Ehiri and Morris, 1996). According to Baş *et al.* (2006), attitudes among food handlers towards the prevention and control of foodborne diseases were poor. Hence, attitude is an important predictor of foodborne

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diseases among food handlers. One of the most regularly observed practices that contributed to foodborne disease was a lack of personal hygiene among food handlers (Collins, 1997). Good personal hygiene and appropriate food handling practices can help to reduce disease transmission from food handlers to consumers (Evans *et al.*, 1998). Several studies have proven that the presence of microorganisms in food handlers' hands and the possibility for infected hands to become a source of contamination are attributed to poor personal hygiene, including hand hygiene (Ayçiçek *et al.*, 2004; Shojaei *et al.*, 2006; Lues and Van Tonder, 2007). In light of the above discussions, this study was carried out to investigate the relationships between knowledge, attitude, and practices of food safety and hygiene among Muslim food truck handlers.

2. Methodology

The conceptual framework used in the study was based on several variables (knowledge, attitude, and practices) adapted from relevant studies on food safety and hygiene, food preparation, food storage, working area, and contamination prevention (Abdul-Mutalib *et al.,* 2012; Sani and Siow, 2014; Son *et al.,* 2015). The conceptual framework in Figure 1 shows the relationships between the variables that were measured in this study.

The relationships between dependent and independent variables were determined, and relevant hypotheses were established to measure the relationships, such as the following: -

H_0 - There is no relationship between knowledge and attitude toward food safety and hygiene among Muslim food truck handlers.

H_1 - There is a relationship between knowledge and attitude toward food safety and hygiene among Muslim food truck handlers.

H_0 - There is no relationship between attitude and practices of food safety and hygiene among Muslim food truck handlers.

H_2 - There is a relationship between attitude and practices of food safety and hygiene among Muslim food truck handlers.

H_0 - There is no relationship between knowledge and practices of food safety and hygiene among Muslim food truck handlers.

H_3 - There is a relationship between knowledge and practices of food safety and hygiene among Muslim food truck handlers.

H_0 - There are no associations between the socio-demographic profiles of Muslim food truck handlers and their food safety and hygiene practices.

H_4 - There are associations between the socio-demographic profiles of Muslim food truck handlers and their food safety and hygiene practices.

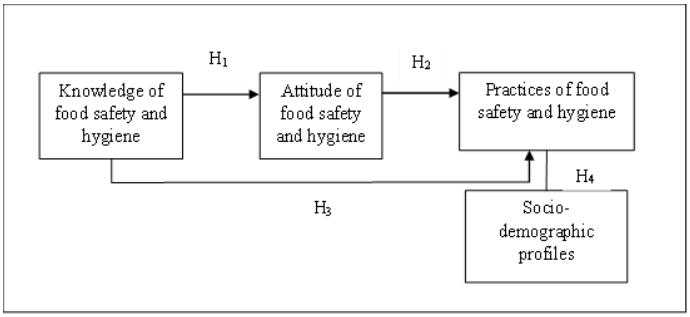

Figure 1. Conceptual framework of knowledge, attitude, and practices of food safety and hygiene among Muslim food truck handlers.
Source: Adapted from Abdul-Mutalib *et al.* (2012); Sani and Siow (2014); Son *et al.* (2015)

The study was carried out in Peninsular Malaysia, covering the areas in the Klang Valley. The Klang Valley encompasses an area centred in Kuala Lumpur and the city suburbs in the state of Selangor. The area was chosen because the majority of food truck handlers are based in the Klang Valley where food trucks have taken over the food scene, particularly in the urban areas. Based on convenience sampling, 121 Muslim food truck handlers in the Klang Valley were selected as the target respondents for this study. Convenience sampling refers to the collection of information from members of the population who were conveniently available to provide information (Sekaran, 2007). Besides, convenience sampling was used to include respondents who fulfilled the inclusion criteria until the required number was achieved (Mulu *et al*., 2021). Face-to-face interviews were carried out by using a structured, administrated questionnaire. There were two main sections in the questionnaire. The first section consisted of questions on the socio-demographic profiles of the respondents. The second section consisted of 3-point Likert scales (1-No, 2-Not Sure, 3-Yes) and 5-point Likert scales (1-Strongly Disagree, 2-Disagree, 3-Neutral, 4-Agree, 5-Strongly Agree) statements related to knowledge, attitude, and practices of food safety and hygiene. The responses obtained from the respondents were analyzed by using descriptive analysis, Pearson correlation analysis, and Chi-square analysis.

Descriptive analysis was used to summarize the socio-demographic profiles of the respondents based on frequency distributions and percentages, which is a simpler depiction of the result to facilitate the understanding of the profiles of Muslim food truck handlers. Pearson correlation analysis was carried out to investigate the relationships between knowledge, attitude, and practices of food safety and hygiene among Muslim food truck handlers. Lastly, the Chi-square

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analysis is one of the simplest approaches used to define a set of associations through cross-tabulation. It is inferential statistics that are typically used to investigate the association between two variables (Pallant, 2005; Field, 2009). It was employed in this study to determine the associations between socio-demographic profiles and food safety and hygiene practices among Muslim food truck handlers.

3. Results and discussion

3.1 Socio-demographic profiles of respondents

Based on the results in Table 1, 76% (92) of the Muslim food truck handlers were male, and the remaining were female (24%, 29). Most of the respondents were aged around 21 - 30 years old, accounting for 53.7% (65). In terms of education level, the highest percentage was diploma level (32.2%, 39). On average, the respondents were well educated because most of them have graduated from a higher level of education. About 50.4% (61) of the respondents were single, and the majority (55.4%, 67) earned a monthly income between RM1,001 - RM3,000. The results also showed that 80.2% (97) of the respondents had been involved in the food truck business for less than or equal to 2 years, while the remaining percentage (19.8%, 24) had more than 3 years of experience. Almost all (94.2%, 114) of the respondents had attended food handling training courses *versus* 5.8% (7) who did not. 94.2% (114) of the respondents had a typhoid injection, while 5.8% of the respondents had not been injected.

Table 1. Socio-demographic profiles of Muslim food truck handlers

Profiles	Frequency (n)	Percentage (%)
Gender		
Male	92	76
Female	29	24
Total	121	100
Age		
18-20 years	3	2.5
21-30 years	65	53.7
31-40 years	34	28.1
41-50 years	14	11.6
Above 51 years	5	4.1
Total	121	100
Education level		
Primary School	0	0
Secondary school	29	24
Certification	19	15.7
Diploma	39	32.2
Degree	20	16.5
Master	14	11.6
Total	121	100
Marital status		
Single	61	50.4
Married	57	47.1
Divorced	3	2.5
Total	121	100
Income		
> RM1,000	11	9.1
RM1,001 - RM3,000	67	55.4
RM3,001 - RM5,000	24	19.8
RM5,001 - RM7,000	11	9.1
RM7,001 - RM9,000	4	3.3
>RM9,001	4	3.3
Total	121	100
Involvement in food truck business		
<2 years	97	80.2
3-4 years	12	9.9
>5 years	12	9.9
Total	121	100
Attend food handler training		
Yes	114	94.2
No	7	5.8
Total	121	100
Typhoid injection		
Yes	114	94.2
No	7	5.8
Total	121	100

n = 121

3.2 Knowledge, attitude, and practices levels of food safety and hygiene

3.2.1 Knowledge level of food safety and hygiene

The responses to the ten statements related to knowledge of food safety and hygiene among Muslim food truck handlers were measured based on the 3-point Likert scales of 1-No, 2-Not Sure, and 3-Yes. All the statements were arranged in descending order of the mean score values. The highest mean score was for the statement "*Keeping the kitchen clean on an ongoing basis is necessary to ensure cleanliness at all times*", with a mean score of 3.00. It indicates that all of the respondents (100%) completely agree with the statement. About 97.5% (118) of the respondents expressed their agreement with the statement "*Wearing gloves when handling food reduces the risk of spreading the infection to consumers and food handlers*", with a mean score of 2.98. About 95% (115) of the respondents agreed that "*Raw materials should be stored separately from cooked food*" (a mean score of 2.95), and 94.2% (114) respondents agreed that "*The use of hats, face masks, gloves, and appropriate clothing can reduce the risk of food contamination*" (a mean score of 2.94). These findings are consistent with Asmawi *et al.* (2018) that adequate knowledge of food safety and hygiene improved handling actions among food handlers. Most of the Muslim food truck handlers expressed their awareness of knowledge on food safety and hygiene, but

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Table 2. Mean score of statements on knowledge of food safety and hygiene among Muslim food truck handlers

Statements	Frequency (n) / Percentage (%)			Mean	SD
	1	2	3		
1. Keeping the kitchen clean on an ongoing basis is necessary to ensure cleanliness at all times.	0	0	100% (121)	3.00	0.000
2. Wearing gloves when handling food reduces the risk of spreading the infection to consumers and food handlers.	0	2.5% (3)	97.5% (118)	2.98	0.156
3. Raw materials should be stored separately from cooked food.	0	5% (6)	95% (115)	2.95	0.218
4. The use of hats, face masks, gloves, and appropriate clothing can reduce the risk of food contamination.	0	5.8% (7)	94.2% (114)	2.94	0.234
5. Foodborne illness is caused by food contaminated with harmful bacteria.	0	6.6% (8)	93.4% (113)	2.93	0.250
6. Improper storage of food can cause health hazards.	0	9.9% (12)	90.1% (109)	2.90	0.300
7. Washing hands before handling food can reduce the risk of contamination.	0	13.2% (16)	86.8% (105)	2.87	0.340
8. Improper cleaning methods for kitchen utensils increase the risk of foodborne illness to consumers.	5.8% (7)	2.5% (3)	91.7% (111)	2.86	0.488
9. Cross-contamination is a major contributing factor to food poisoning.	0	20.7% (25)	79.3% (96)	2.79	0.407
10. Early food preparation is more likely to contribute to food poisoning.	5.8% (7)	19% (23)	75.2% (91)	2.69	0.575
Overall mean and standard deviation				2.89	0.297

n = 121, 1: No, 2: Not Sure, 3: Yes

they were not familiar with the statements "*Cross-contamination is a major contributing factor to food poisoning*" and "*Early food preparation is more likely to contribute to food poisoning*", with mean scores of 2.79 and 2.69, respectively. As indicated in Table 2, the overall mean score for knowledge was 2.89.

Based on the mean score results in Table 2, knowledge level is further classified into two (2) categories, namely adequate knowledge (score 7-10) and inadequate knowledge (score 0-6) which was adapted from Isoni Auad *et al.* (2019). For every statement that received a correct response, 1 mark was given and the wrong response with 0 mark, each added to a total of 10 marks. There were about 89.3% (108 respondents) had adequate knowledge, while 10.7% (13 respondents) had inadequate knowledge of food safety and hygiene (Table 3).

Table 3. Level of knowledge on food safety and hygiene among Muslim food truck handlers

Level	Frequency (n)	Percentage (%)
Adequate knowledge (score 7 - 10)	108	89.3
Inadequate knowledge (score 0 - 6)	13	10.7
Total	121	100

3.2.2 Attitude level of food safety and hygiene

A total of 10 statements based on 5-point Likert scales (1-Strongly Disagree, 2-Disagree, 3-Neutral, 4-Agree, 5-Strongly Agree) were used to measure the attitude among Muslim food truck handlers towards halal food safety and hygiene, based on mean scores. All of the statements were arranged in descending order of the mean score values. The highest mean score was 4.82, indicating that the majority of the respondents showed a highly favourable attitude towards the statement "*I will make sure the kitchen area is always clean*". The second highest mean score was the statement *"I will take leave if I have a foodborne illness",* with a mean score of 4.77. *"I will avoid working with dirty hands"* was the third-highest mean score of 4.74. Meanwhile, the lowest mean score indicated the respondents had a less favourable attitude towards the statement "*I believe raw materials and those that have been cooked must be segregated*" with a mean score of 4.19. The overall mean score for all the 10 statements was 4.63 (Table 4).

Table 5 shows the attitude level of Muslim food truck handlers regarding food safety and hygiene. Those who achieved a total score between 31 and 50 were considered to have a favourable attitude, whereas those who scored under 30 were considered to have an unfavourable attitude. The results revealed that 71.1% (86) of the respondents had a favourable attitude toward food safety and hygiene versus 28.9% (35) with an unfavourable attitude. The classification of two categories of attitude was adapted from Isoni Auad *et al.* (2019).

Table 5. Level of attitude on food safety and hygiene among Muslim food truck handlers

Level	Frequency (n)	Percentage (%)
Favourable (score 31 - 50)	86	71.1
Unfavourable (score 10 - 30)	35	28.9
Total	121	100

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Table 4. Mean score of statements on the attitude of food safety and hygiene among Muslim food truck handlers

Statements	Scale					Mean	SD
	1	2	3	4	5		
	Percentage (%) Frequency (n)						
1. I will make sure the kitchen area is always clean.	0	0	0	18.20% (22)	81.80% (99)	4.82	0.387
2. I will take leave if I have a foodborne illness.	0	0	2.50% (3)	18.20% (22)	79.30% (96)	4.77	0.479
3. I will avoid working with dirty hands.	0	0	5% (6)	15.70% (19)	79.30% (96)	4.74	0.541
4. I will not touch food with an injured hand.	0	0	6.60% (8)	15.70% (19)	77.70% (94)	4.71	0.584
5. I will change the way I handle food when I know it is not right.	0	0	7.40% (9)	16.50% (20)	76% (92)	4.69	0.606
6. I will make sure the work area is clean before I start to work.	0	0	5% (6)	21.50% (26)	73.60% (89)	4.69	0.563
7. I believe it is good to maintain a level of personal hygiene while working.	0	0	2.50% (3)	33.10% (40)	64.50% (78)	4.62	0.536
8. I am aware that improper food storage can cause health hazards.	0	0	2.50% (3)	36.40% (44)	59.50% (72)	4.58	0.544
9. I will separate the kitchen utensils used to prepare raw and cooked food.	0	2.50% (3)	5.80% (7)	34.70% (42)	34.70% (42)	4.46	0.719
10. I believe raw materials and those that have been cooked must be segregated.	0	0	23.10% (28)	34.70% (42)	42.10% (51)	4.19	0.789
Overall mean and standard deviation						4.63	0.575

n = 121, 1: Strongly Disagree, 2: Disagree, 3: Neutral, 4: Agree, 5: Strongly Agree

3.2.3 Practices level of food safety and hygiene

All of the twenty statements were established to measure Muslim food truck handlers on food safety and hygiene practices using 5-point Likert scale (1-Strongly Disagree, 2-Disagree, 3-Neutral, 4- Agree, 5-Strongly Agree) statements. The statements were arranged in descending order of the mean scores. Based on Table 6, the highest mean score was 4.77, indicating that the majority of the respondents agreed with the statement "*I washed my hands after going to the toilet*". With a mean score of 4.71, the statement "*I keep perishable materials in a covered container and separate them from other materials*" was the second most agreed. "*I wash my hands after disposing of food scraps or trash*" had the third-highest mean score of 4.67, whereas the lowest mean score was the statement "*I defrost the food at room temperature*" (4.19). The overall mean score was 4.49.

Table 7 presents the outcomes on the level of practices demonstrated by the Muslim food truck handlers on food safety and hygiene. Based on the result, 49.6% (60) had a high level of practice on food safety and hygiene with a total score between 61 and 100 *versus* 50.4% (61 respondents) with a low level of practice towards food safety and hygiene with a total score between 20 and 60. These results were based on Tuglo *et al.* (2021) and Isoni Auad *et al.* (2019) that the level of practices can be categorized into two categories namely high practices and low practices.

3.3 Relationships between knowledge, attitude, and practices of food safety and hygiene among Muslim food truck handlers

Pearson correlation analysis was used to examine the relationships between knowledge, attitude, and food safety and hygiene practices among Muslim food truck handlers. The Pearson correlation analysis determines the existence of associations, whether positive or negative, as well as the strength of the relationship between each dimension. If the value of the correlation coefficient, r-value, is close to one (1), it suggests that there is a positive linear relationship between the variables, whereas the r-value close to one (-1) implies that there is a negative linear relationship between the variables ($-1 \leq r \leq 1$) (Benesty *et al.*, 2009; Hair *et al.,* 2010). The results of the correlation between the variables are summarized in Table 8. A strong positive and significant correlation was demonstrated between knowledge and attitude, with $r = 0.544$; $p < 0.000$. The p-value of 0.000 indicated that the correlation between the knowledge and attitude among Muslim food truck handlers on food safety and hygiene was significant at a 1% level of significance. Thus, H_0 was rejected. A correlation coefficient of more than 0.5 is considered a strong correlation (Evans, 1996). Also, the attitude was significantly and positively correlated with practices,

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Table 6. Mean score of statements on practices of food safety and hygiene among Muslim food truck handlers

Item	Scale					Mean	SD
	1	2	3	4	5		
	Percentage (%) Frequency (n)						
1. I washed my hands after going to the toilet.	0	0	3.3% (4)	16.5% (20)	80.2% (97)	4.77	0.496
2. I keep perishable materials in a covered container and separate them from other materials.	0	0	3.3% (4)	22.3% (27)	74.4% (90)	4.71	0.523
3. I wash my hands after disposing of food scraps or trash.	0	0	3.3% (4)	26.4% (32)	70.2% (85)	4.67	0.538
4. I wash the kitchen utensils after using them.	0	0	8.3% (10)	17.4% (21)	74.4% (90)	4.66	0.627
5. I make sure the environment is always clean when handling food.	0	0	3.3% (4)	28.1% (34)	68.6% (83)	4.65	0.543
6. I wash my hands immediately before handling food.	0	0	0	38% (46)	62% (75)	4.62	0.487
7. I keep my nails short and clean.	3.3% (4)	3.3% (4)	0	19.8% (24)	73.6% (89)	4.60	0.841
8. I store food properly.	0	0	4.1% (5)	34.7% (42)	61.2% (74)	4.57	0.575
9. I use different cutting boards for raw and cooked food.	2.5% (3)	0	1.7% (2)	31.4% (38)	64.5% (78)	4.55	0.763
10. I keep raw materials and cooked food separately.	0	0	9.9% (12)	26.4% (32)	63.6% (77)	4.54	0.671
11. I will make sure my hands are dry and clean when handling food.	3.3% (4)	0	0	34.7% (42)	62% (75)	4.52	0.807
12. I will make sure the refrigerator temperature always works well.	0	0	3.3% (4)	44.6% (54)	52.1% (63)	4.49	0.565
13. I wear gloves when preparing food that is ready to be eaten.	0	2.5% (3)	8.3% (10)	32.2% (39)	57% (69)	4.44	0.752
14. I don't cough or sneeze towards food to avoid contaminated food.	5% (6)	0	3.3% (4)	35.5% (43)	56.2% (68)	4.38	0.951
15. I touched the food with the injured hand.	5.8% (7)	5% (6)	6.6% (8)	12.4% (15)	70.2% (85)	4.36	1.169
16. I don't wear personal jewellery like watches and rings when handling food.	2.5% (3)	6.6% (8)	7.4% (9)	25.6% (31)	57.9% (70)	4.30	1.030
17. I smoke while working.	10.7% (13)	5% (6)	8.3% (10)	0	76% (92)	4.26	1.400
18. I immediately cleaned up the leftover food spilled on the floor.	0	0.8% (1)	17.4% (21)	36.4% (44)	45.5% (55)	4.26	0.772
19. I take leave if I have a foodborne illness.	8.3% (10)	4.1% (5)	5% (6)	24% (29)	58.7% (71)	4.21	1.231
20. I defrost the food at room temperature.	2.5% (3)	2.5% (3)	16.5% (20)	39.7% (48)	38.8% (47)	4.19	0.935
Overall mean and standard deviation						4.49	0.487

n = 121, 1: Strongly Disagree, 2: Disagree, 3: Neutral, 4: Agree, 5: Strongly Agree

Table 7. Level of practices of food safety and hygiene among Muslim food truck handlers

Level	Frequency (n)	Percentage (%)
High practices (score 61 - 100)	60	49.6
Low practices (score 20 - 60)	61	50.4
Total	121	100

albeit moderately, with $r = 0.414$, $p < 0.000$ at 1% level of significance; thus, H_0 was rejected. The correlation between knowledge and practices was significantly positive but weak correlation with $r = 0.344$, $p < 0.000$ at 1% level of significance. Thus, H_0 was rejected. In this case, a correlation coefficient below 0.4 is considered a low positive correlation (Mukaka, 2012).

3.4 Associations between socio-demographic profiles and food safety and hygiene practices among Muslim food truck handlers

The results of the Chi-square analysis in Table 9 show the relationships between socio-demographic profiles of Muslim food truck handlers and their practices and level of food safety and hygiene. Several socio-demographic profiles were significantly associated with food safety and hygiene practices. Education level

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Table 8. Relationships between knowledge, attitude, and practices of food safety and hygiene among Muslim food truck handlers

Variables		Knowledge	Attitude	Practices
Knowledge	Pearson Correlation Coefficient (r)	1	0.544***	0.344***
	Sig. (2-Tailed)		0	0
	Decision		Reject H_0	Reject H_0
Attitude	Pearson Correlation Coefficient (r)	0.544***	1	0.414***
	Sig. (2-Tailed)	0		0
	Decision	Reject H_0		Reject H_0
Practices	Pearson Correlation Coefficient (r)	0.344***	0.414***	1
	Sig. (2-Tailed)	0	0	
	Decision	Reject H_0	Reject H_0	

n = 121

***Correlation is significant at 1% level of significance

Table 9. Associations between socio-demographic profiles and food safety and hygiene practices among Muslim food truck handlers

Variable	Chi-square value	df	Significant	Decision
Gender	7.95	1	0.105	Fail to reject H_0
Age	14.869	4	0.205	Fail to reject H_0
Marital status	7.285	2	0.226	Fail to reject H_0
Income	12.883	5	0.024**	Reject H_0
Education level	16.764	4	0.002***	Reject H_0
Involvement in the food truck business	3.827	2	0.048**	Reject H_0
Attendance in food handling training course	1.418	1	0.064*	Reject H_0
Typhoid injection	1.418	1	0.234	Fail to reject H_0

n = 121

***Significant at 1% level of significance, **Significant at 5% level of significance, *Significant at 10% level of significance

and attendance in food handling training courses were significant at 1% and 10% levels of significance respectively, whereas income and involvement in the food truck business were significant at 5% level of significance. Thus, H_0 was rejected. Meanwhile, the remaining socio-demographic profiles, namely gender, age, marital status, and typhoid injection were not significant, indicating that there were no associations between Muslim food truck handlers and their practices on food safety and hygiene.

Table 10 presents the frequency attributes of socio-demographic profiles on the level of practices (i.e., low and high) among Muslim food truck handlers. The majority of the respondents who earned between RM1,001 - RM3,000 had a low level of practice (31.4%, 38) in food safety and hygiene. Contrary, respondents of diploma holders had a high level of practice, about 19.8% (24) compared to other levels of education. The majority of the respondents (43.8%, 53) who had been involved in the food truck business for less than 2 years had a low level of practice. Despite having attended training courses in food handling, the majority of food truck handlers (48.7%, 59) still had a low level of practice. Other variables were not significant with the level of practice.

4. Conclusion

The food truck business has gained substantial popularity in Malaysia. Although the businesses show very positive growth, owners of the Muslim food trucks still face issues and problems in food safety and hygiene handling. Understanding the knowledge, attitude, and practices of food safety and hygiene among the food trucks will open up and provide a platform to further develop the halal food industry for more *halalan toyyiban* products in the markets. This study strongly recommends a further emphasis be given to some of the aspects of food safety and hygiene. Continuous education and training on food safety and hygiene must be given to all food handlers to enhance their food handlers' knowledge which seems to be lacking, and to ensure the safety of the food provided. In addition, the enforcement of existing food safety legislation should be carried out more frequently, as well as the establishment of control measures. Interaction between the food truck handlers must be learned, particularly in Muslims, for valuable insights. The government must enforce the operational compliance by the food truck handlers to the hygiene standards issued by the Ministry of Health Malaysia (MOH) and ensure that the quality of the food supply is safe and hygienic. In conclusion, the significance of this study is reflected in the insights obtained on the level of practices among Muslim food truck handlers. These findings are critical to the long-

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Table 10. Crosstab of socio-demographic profiles and Muslim food truck handlers' practices level

Profiles	High Practices		Low Practices	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
Gender				
Male	39	32.2	53	43.8
Female	21	17.3	8	6.61
Age				
≤ 20 years old	3	2.47	0	0
21 - 30 years old	38	31.4	27	22.3
31 - 40 years old	8	6.61	26	21.4
41 - 50 years old	8	6.61	6	4.95
> 50 years old	3	2.47	2	1.65
Marital Status				
Single	35	28.9	26	21.4
Married	22	18.1	35	28.9
Divorced	3	2.47	0	0
Income				
≤ RM1,000	10	8.26	1	0.82
RM1,001 - RM3,000	29	23.9	38	31.4
RM3,001 - RM5,000	15	12.3	9	7.43
RM5,001 - RM7,000	4	3.3	7	5.78
RM7,001 - RM9,000	1	0.82	3	2.47
> RM9,000	1	0.82	3	2.47
Education Level				
Primary school	0	0	0	0
Secondary school	20	16.5	9	7.43
Certificate	6	4.95	13	10.74
Diploma	24	19.8	15	12.3
Degree	8	6.61	12	9.91
Master	2	1.65	12	9.91
PhD	0	0	0	0
Involvement in food truck business				
1 - 2 years	44	36.3	53	43.8
3 - 4 years	10	8.26	6	4.95
> 5 years	6	4.95	2	1.65
Attendance in food handling training course				
Yes	55	45.4	59	48.7
No	5	4.13	2	1.65
Typhoid Injection				
Yes	55	45.4	59	48.7
No	5	4.13	2	1.65

n = 121

term sustainability of the food truck business in the halal industry.

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