Cawangan Terengganu

Available online at
http://journale-academiauitmt.uitm.edu.my
e-Academia Journal

e-Academia Journal of UiTM Cawangan Terengganu 13 (2) 212-226, November 2024

Safe Bites on the Streets: An Analysis of Food Safety and Hygiene Among Shah Alam's Street Food Vendors

Muhammad 'Arif Aizat Bashir[1], Sarah Zaihan[1], *Shahrool Rezza Salim[1], Mohamed Syazwan Osman[2] & Juliana Siregar[3]

[1]Faculty of Hotel and Tourism Management,
Universiti Teknologi MARA
Cawangan Pulau Pinang,
Kampus Permatang Pauh, 13500 Permatang Pauh,
Pulau Pinang, Malaysia

[2]EMZI-UiTM Nanoparticles Colloids & Interface Industrial Research Laboratory,
(NANO-CORE), Universiti Teknologi MARA,
Cawangan Pulau Pinang,
13500 Permatang Pauh, Pulau Pinang,

[3]Fakultas Pariwisata dan Perhotelan
Universitas Negeri Padang,
Jalan Prof. Dr. Hamka, Air Tawar Padang,
Sumatera Barat, Indonesia

*Corresponding author's email: shahrool@uitm.edu.my

Submission date: 20 February 2024 Accepted date: 7 November 2024 Published date: 29 November 2024

To cite this article: Bashir, M. A. A., Sarah Zaihan, Salim, S. R., Osman, M. S. & Siregar, J. (2024). Safe bites on the streets: An analysis of food safety and hygiene among Shah Alam's street food vendors . *e-Academia Journal of UiTM Cawangan Terengganu, 13* (2) 212-226, November 2024

ABSTRACT

Lack of personal hygiene among food handlers and inadequate cleaning practices during food service operations have led to numerous outbreaks of foodborne illness cases in Malaysia. Therefore, the purpose of this study was to investigate the influence of knowledge and attitudes on food safety and hygiene practices among street food vendors in Shah Alam, Malaysia. A sample of 376 street food vendors was surveyed using a structured questionnaire to gather information about their knowledge, attitudes, and food safety and hygiene practices. The study found a significant positive relationship between knowledge and attitudes towards food safety and hygiene practices, indicating the importance of maintaining educational programs for street food vendors to enhance their knowledge and attitudes. This study highlights the importance of addressing the knowledge and attitudes of street food vendors as a crucial step in improving food safety and hygiene in the food service industry. Moreover, the study recommends the implementation of food safety regulations and regular monitoring of street food vendors to ensure the safety of street food for the public. In conclusion, this study sheds light on the critical role of knowledge and attitudes in shaping

food safety and hygiene practices among street food vendors. It highlights the need for ongoing education and training programs, as well as the implementation of regulations and monitoring mechanisms, to ensure the safety of street food consumed by the public. The results of this study are important for policymakers and food safety authorities in their efforts to improve food safety and hygiene in the food service industry.

Keywords: *Street Food Vendors, Food Safety and Hygiene, Knowledge, Attitudes, Practices*

1.0 INTRODUCTION

Foodborne illnesses in Malaysia have been a persistent issue due to improper food handling, unsanitary conditions in restaurants, lack of personal hygiene among food handlers, and inadequate cleaning practices during food service operations (Adham et al., 2018; Ministry of Health Malaysia, 2020; Omar & Ali, 2017). These factors have led to numerous outbreaks of foodborne illnesses and raised concerns about the safety of food consumed by the public. For instance, Adham et al. (2018) reported that between the years of 2000 and 2015, there were more than 50 outbreaks of foodborne illnesses in Malaysia, with the most common causes being Norovirus and Salmonella infections. Similarly, the Ministry of Health Malaysia (2020) reported that foodborne illnesses accounted for a significant proportion of diseases reported in the country, with an estimated 100,000 cases occurring each year.

Despite the prevalence of foodborne illnesses, however, there has been limited research conducted to assess the level of food safety and hygiene knowledge among food handlers in Malaysia and the extent to which they follow best practices (Food and Agriculture Organization of the United Nations, 2020; Institute of Food Technologists, 2021; World Health Organization, 2020). To address this gap in knowledge, it is crucial for food handlers to understand the importance of food safety practices and the underlying concepts that govern food safety and hygiene knowledge. Researchers such as Feleke et al., (2015), Gudbjarnason and Hauksdottir (2010), Hald and Smith (2011), Serrano and Quirós (2015), and Smith and Hald (2010) have identified four critical concepts that form the foundation of food safety and hygiene knowledge, including knowledge of personal hygiene, knowledge of time and temperature control, knowledge of cross-contamination, and knowledge on the causes of foodborne illnesses. By understanding these concepts, food handlers can improve their knowledge and practices and ultimately reduce the risk of foodborne illnesses in Malaysia.

One of these critical concepts is personal hygiene. Proper personal hygiene, including frequent hand washing and the wearing of clean clothes, is essential to preventing the spread of pathogens that cause foodborne illnesses (Barrie, 1996; Jay et al., 1999). This is particularly important in the food preparation, handling, and storage process, as unhygienic methods can foster the growth and spread of bacteria, viruses, and other pathogens (Bas et al., 2006). A second critical concept is time and temperature control. Improper time and temperature control of food is one of the leading causes of foodborne outbreaks (Taffo & Tabit, 2020). Keeping hot food hot and cold food cold is essential to preventing the growth of harmful bacteria, viruses, and other pathogens that can cause foodborne illnesses (Barrie, 1996). Cross-contamination is another critical concept that forms the foundation of food safety and hygiene knowledge (Jay et al., 1999). This occurs when pathogens from one food source are transferred to another and can result from poor food handling practices by food handlers (Bas et al., 2006). Cross-contamination can lead to significant food safety concerns, including foodborne illnesses (Jay et al., 1999). Lastly, knowledge of the causes of foodborne illnesses is critical for food handlers. Foodborne illnesses can result from a combination of several reasons, such as consuming contaminated or spoiled food, inadequate preservation or improper cooking methods, unhygienic handling practices, cross-contamination from food contact surfaces, or from poor personal hygiene (Barrie, 1996; Jay et al., 1999). It is essential that food handlers understand the different causes of foodborne illnesses in order to prevent them from occurring.

In addition to the knowledge and understanding of food safety and hygiene practices, food handlers' attitudes also play a critical role in preventing foodborne illnesses (Alang & Adnan, 2020; Toosi et al., 2020; Zakaria et al., 2019). The attitudes of food handlers towards the implementation of food safety plans are a crucial factor in the success of these plans, as they directly influence the likelihood of foodborne illnesses occurring. The attitudes of food handlers towards food safety practices can be described as the level of positive or negative feelings that they have towards following these practices (Abong et al., 2017;

Antwi et al., 2019; Shaban & El-Gendy, 2019). A positive attitude towards food safety is essential for ensuring that food handling and preparation processes are carried out in a safe and hygienic manner. Food handlers are the gatekeepers of food safety and hygiene, and their role is crucial in ensuring that these practices are strictly followed throughout the entire food chain. They play an especially important role in the stages of food preparation and storage, where the risk of foodborne illnesses is the highest. For this reason, it is essential that food handlers have a satisfactory attitude regarding food safety practices and are motivated to follow these practices.

The importance of food handlers' food safety and hygiene practices in the prevention of foodborne illnesses cannot be overstated, with knowledge and attitudes being crucial determinants (Sharif & Al-Malki, 2010). Despite extensive studies being conducted globally on food handlers' knowledge, attitudes, and practices, highlighting their impact on food safety and hygiene in the food service industry, there is a noticeable lack of empirical evidence in the case of street food vendors in Shah Alam. This is especially concerning given the thriving trend of street food vendors in Malaysia (Ashburne, 2017; Sulaiman et al., 2020), and this would include Shah Alam where the new vendors seem to be popping up everywhere. Without adequate knowledge, attitudes, and practices towards food safety and hygiene, the health of consumers is put at risk, and the food industry in Shah Alam may face significant reputational damage. Furthermore, the lack of research on the subject means that opportunities for improvement in the knowledge, attitudes, and practices of street food vendors in Shah Alam are missed. Hence, it is imperative that further investigation is conducted to fill this research gap, in order to address the potential health risks and to maintain the reputation of the food industry in Shah Alam.

1.1 Research Objectives

This study aims to investigate the influence of knowledge and attitudes on food safety and hygiene practices among street food vendors in Shah Alam. In achieving this purpose, two research objectives were posed, which are:

RO1 : To examine the influence of food safety and hygiene knowledge on its practices among street food vendors in Shah Alam.

RO2 : To determine the influence of food safety and hygiene attitudes on its practices among street food vendors in Shah Alam.

1.2 Research Questions

The following research questions are posed in conjunction with previous objectives and to support the direction of the study:

RQ1 : What is the influence of food safety and hygiene knowledge on its practices among street food vendors in Shah Alam?

RQ2 : What is the influence of food safety and hygiene attitudes on its practices among street food vendors in Shah Alam?

1.3 Research Hypotheses

From the study framework, two directional hypotheses are formulated:

H_1 : Shah Alam's street food vendors' knowledge of food safety and hygiene positively influences their practices.

H_2 : Shah Alam's street food vendors' attitudes toward food safety and hygiene positively influence their practices.

1.4 Study Framework

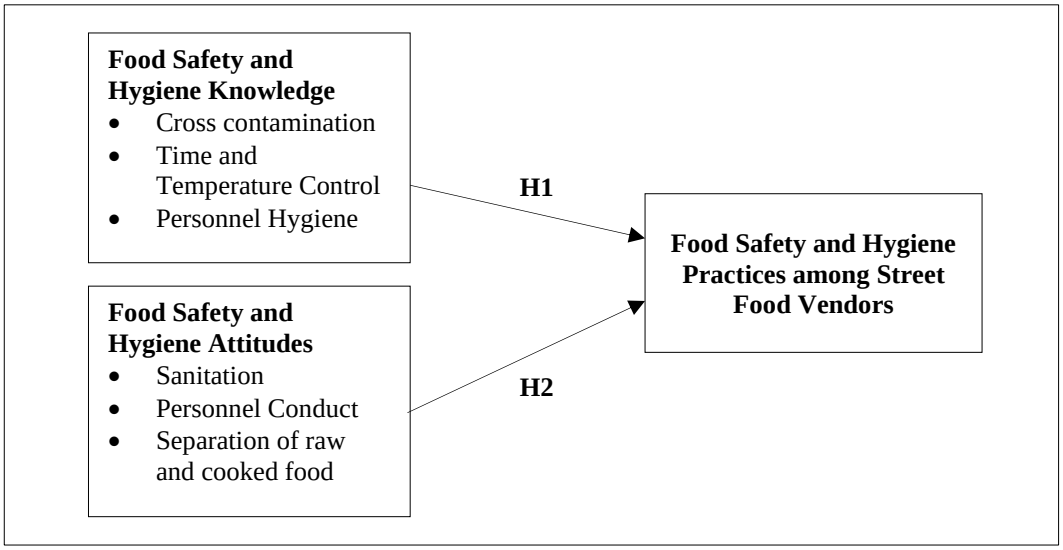

Figure 1: Study Framework

2.0 LITERATURE REVIEW

2.1 Online Knowledge of Food Safety and Hygiene

Over time, consumer trust has been impacted by ongoing issues with food safety incidents and illnesses associated with foodborne illness, which has increased demand for safe food sources (Fung et al., 2018). According to Latip et al. (2020), food safety is important, especially in a country with several food safety issues and concerns about health risks. Particularly, good levels of knowledge towards food safety among food handlers and the effective practices of such knowledge in food handling are imperative in ensuring the safe production of food in any food service operation.

Recent studies have shown the importance of training and education, particularly for food handlers regarding public hygiene measures, because of their ignorance of microbiological food hazards, refrigerator temperature ranges, cross-contamination, and personal cleanliness (Bas et al., 2006; Nee & Sani, 2011). Several researchers such as Feleke et al. (2015), Gudbjarnason and Hauksdottir (2010), Hald and Smith (2011), Serrano and Quirós (2015), and Smith and Hald (2010), have established four crucial concepts that form the basis of food safety and hygiene understanding. These concepts encompass personal hygiene, time and temperature control, cross-contamination, and an understanding of the causes of foodborne illnesses. Education on food safety and hygiene should be given to all food handlers in food processing businesses so as to bring behavioural changes along with the adoption of positive attitudes (Coleman & Roberts, 2005; Powell et al., 1997).

2.1.1 Cross Contamination

According to the Centers for Disease Control and Prevention (2015) and Sanjee and Karim (2016), food contamination can happen at any point in the supply chain. To ensure that food produced and delivered to consumers is safe to eat and free from contamination, it is equally crucial that food handlers are knowledgeable about appropriate hygiene practices (Akabanda et al., 2017; Hedberg et al., 2006). Food handlers have a major responsibility to ensure that food safety procedures are followed during food processing and storage (Sousa, 2008; Rane, 2011).

Hazardous microorganisms can spread, live, and reproduce in large numbers to cause infections if food handlers act improperly and disregard food safety and hygiene standards (Rane, 2011). Numerous studies have shown that food handlers are directly responsible for the handling factors that increase foodborne disease outbreaks, such as improper cooking, temperature abuse during food storage, cross-contamination between cooked and uncooked foods, poor sanitation and hygiene, and the use of unsafe raw materials and water (Ababio & Lovatt, 2015; Basheer et al., 2017).

2.1.2 Time and Temperature Control

The majority of cases of foodborne illnesses are caused by inappropriate food handling procedures, including insufficient food preparation, holding, and temperature control times (Abdul-Mutalib et al., 2012; Buccheri et al., 2007; Ismail et al., 2016; Kibret & Abera, 2012; Sousa, 2008; Stangarlin-Fiori et al., 2016). Furthermore, Sharif et al. (2013) found that 90% of food handlers believed that the correct way to thaw frozen meat was to leave it at room temperature for an entire night. This finding indicates that most food handlers lack knowledge about the proper handling of time and temperature regarding the method of thawing frozen food. Even though food handlers may show knowledge of food safety regarding handling the temperature of food, their performance may not always be consistent with fundamental guidelines since they frequently overlook the necessity to carry out the proper ways of handling foods (Akabanda et al., 2017).

Regarding this, Luna et al. (2019) recommended that food handlers fry eggs at a temperature of more than 100°C for 8 minutes and store food at a low temperature in the refrigerator at home and other food facilities in order to decrease the risk of foodborne illnesses caused by Salmonella and other harmful pathogens. Therefore, it could be concluded that when handling foods, food handlers must have a full awareness of Knowledge of Food Safety and Hygiene with reference to time and temperature regulation (Al-Kandari et al., 2019; Alqurashi et al., 2019; Omemu & Aderoju, 2008; Unusan, 2007).

2.1.3 Personal Hygiene

Tan et al. (2013) defined personal hygiene as having clean hands and clothes, being healthy and having good habits, and having positive attitudes. Potential causes of foodborne illness include inadequate personal hygiene, poor food preparation, and a lack of adoption of basic hygiene procedures by food handlers. Mashuba (2016) and Green et al. (2007) state that, among other places, the mouth, hands, skin, cuts, or sores, and hair can act as carriers of bacteria that might cause contamination and that carry a wide variety of enteropathogens and take part in the transmission of many infections to the consumers.

In fact, poor personal hygiene among individuals who handled the food plays a significant role in its contamination by the disease. According to a microbiological study by Nasrolahei et al. (2017), Staphylococcus aureus and Escherichia coli are among the germs that are regularly detected in the fingernails of butchers, persons who handle fast food, and people who work in school cafeterias. For instance, during the Kelantan typhoid outbreaks, food handlers were discovered to be chronic carriers of Salmonella Typhi, which was discovered in their stool samples. This epidemic was brought on by the issue of inadequate personal hygiene practices (Pang et al., 2015).

2.2 Attitudes toward Food Safety and Hygiene

According to Schwarz (2007), attitudes are evaluative concepts that are connected to how people think, feel, and conduct themselves. These concepts include cognitive, emotional, and behavioural components that suggest what you know, how you feel, and what you do. Fishbein (1967) made a similar argument, arguing that attitudes may have an impact on a person's desire to engage in a specific action or practice, which is related to behaviour. In the context of this study, attitudes about food safety and hygiene are shown by how food handlers think, feel, and act toward the concept of food safety and hygiene, either cognitively, emotionally, or behaviourally.

2.2.1 Sanitation

Sanitation is the development and maintenance of conditions that will prevent food contamination or foodborne illness and reducer disease-causing bacterial levels to a safe level. The attitudes of food handlers toward sanitation procedures may be impacted by working conditions, according to Siau et al. (2015), which may help or hinder safe practice. If food handlers had a proper understanding of and attitudes about food cleanliness and sanitation, foodborne illnesses would therefore have less of an impact on society (Buccheri et al., 2017).

2.2.2 Personnel Conduct

Adzim et al. (2016) and Sharif et al. (2013) stated that it is the responsibility of food handlers to provide safe food, with those who have taken training courses having high and positive attitudes toward safe food handling. According to research by Adesokan et al. (2015) and Park and Lin (2020), there is a significant correlation between knowledge and training when compared to individuals who have not received training or who have received personal conduct. The trained group would therefore have more knowledge about

food safety than the untrained group. Therefore, it is possible that food handlers will engage in that behaviour if they consider that producing and handling food in a hygienic manner is essential and necessary (Adzim et al., 2016). The knowledge taught through food safety training will improve and reflect a change in attitudes, particularly in terms of the food handlers' conduct (Seaman & Eves, 2006).

2.2.3 Separation of Raw and Cooked Foods

Legesse et al. (2017) claim that from food production and manufacture to storage and preparation, food handlers are responsible for maintaining food safety. Food is regarded as safe when it is free of bacteria, pollutants, and unwanted objects, which could be dangerous when food operations lack proper handling and processing (Lund & O'Brien, 2011). Food that is prepared must be kept separate from food that is raw to prevent the spread of dangerous microorganisms. Therefore, it is best to keep raw and prepared food separate in refrigerators, freezers, and display cases throughout storage. Doing so can help prevent the spread of harmful bacteria from raw food to prepared food.

3.0 METHODOLOGY

3.1 Research Design

It is worth mentioning that there are two research questions that were explored in this study. First, does street food vendors' knowledge of food safety and hygiene influence their practices? Next, do street food vendors' attitudes toward food safety and hygiene positively influence their practices? These questions were able to be answered with the help of a proper research design.

Since this study aims to evaluate the roles of knowledge and attitudes on food safety and hygiene towards its practices among street food vendors in Shah Alam, the research approach is considered to be appropriate with a quantitative method. According to Aliaga and Gunderson (2000), the quantitative technique includes gathering, analysing, and interpreting quantitative data. The benefits of this research strategy include the ability to evaluate causal relationships, identify patterns and averages, make predictions, and simplify the information gathered (Bhandari et al., 2021). Besides, this study may be classified as causal research since it aims to establish the influence or cause-and-effect link between two or more variables. The time horizon for this study was cross-sectional since the time frame will only be limited to a specific period of time. This study was conducted in a non-contrived setting as this research was conducted in a natural environment where work proceeds normally, particularly looking at the street food vendors' practices of food safety and hygiene. In other words, the required information for this study was obtained in a non-contrived setting or in a natural environment where activities occur according to normal situations. Individual street food vendors in Shah Alam served as the unit of analysis for this study.

3.2 Population and Sample

The population of this study is the street food vendors that operate in the Shah Alam area. Judgemental sampling is the method used, and this procedure is recommended by Merriam and Tisdell (2015) when subjects are selected based on their expertise in the matter investigated. This method was used because the samples were primarily be chosen based on the researcher's expertise and judgement that meet the requirements to carry out the study's objective, or specifically for this study, the chosen street food vendors. Additionally, judgmental sampling ensures that the sample is representative of the population of interest in terms of demographics and behaviours. The targeted sample size for this study is 300 respondents since a sample size of at least 300 cases or more is considered sufficient to achieve good reliability and validity measures (Blanche et al., 2015; Kirk, 2013; Tabachnick & Fidell, 2019; Trochim & Donnelly, 2008). However, a total of 376 respondents were successfully obtained when data collection processes were completed.

3.3 Instumentation

The instrument used to collect data for this study is questionnaires adapted from Abdul-Mutalib et al. (2012), Buccheri et al. (2010), and Jianu and Chiş (2012).

Table 1: Survey Instruments for the Study Variables

Questionnaire	No. of Items	Sources
Section A: Food Safety and Hygiene Knowledge	8	Buccheri et al. (2010)
Section B: Food Safety and Hygiene Attitude	11	Jianu and Chiș (2012)
Section C: Food Safety and Hygiene Practices	12	Abdul-Mutalib et al. (2012) and Buccheri et al. (2010)
Section D: Demographic Profile	5	Researcher

3.4 Data Analysis

The IBM SPSS Statistic Version 29 software was utilized to examine all the statistical data. Frequency, descriptive, and simple linear regression analyses were employed to evaluate the obtained data. First, the descriptive analysis evaluates data from all sections of the questionnaires, as it could describe and summarize the data obtained and offer a simpler interpretation (Bhandari, 2021). Next, the demographic data of respondents, such as age, gender, income, and marital status, will be quantified in terms of percentage and frequency in section A. The data were next being measured and evaluated in sections B until D using the mean and standard deviation. In order to answer the research questions, the first and second questions were addressed using simple linear regression, which is intended to evaluate if each independent variable influences the dependent variable

4.0 FINDINGS

4.1 Reliability Coefficient

Prior to collecting data and conducting additional analysis to fulfil the objectives and research question, the internal reliability test was carried out. This assessment is crucial to generate information on how much consistency is presented among the ratings given by respondents in all the data collected during the pilot study. The reliability of the instrument is vital since it reflects the accuracy of the measurement method, which is the scale's internal consistency (Pallant, 2005). The followings are the reliability test results that have been conducted for every section of the questionnaire.

Table 2: Reliability Coefficients for Each Section of The Questionnaire

Questionnaire	No. of Items	Cronbach's Alpha
Section A: Food Safety and Hygiene Knowledge	8	.727
Section B: Food Safety and Hygiene Attitude	11	.862
Section C: Food Safety and Hygiene Practices	12	.883

Note: No. of respondents = 376

Based on Table 1, section C, which is the food safety and hygiene practices, has the highest coefficient alpha value, which is .883, followed by section B, which is food safety and hygiene attitudes, with a .862 coefficient alpha value. The coefficient alpha value for food safety and hygiene knowledge is slightly lower than the other two sections, which is .727. According to Nunnally (1978), as cited by Mandelkar (2018), the most reliable question should have a baseline score that is as near as 1. For it to be considered proper and suitable for use with any testing, it should fall between 0.7 and 1.00.

4.2 Descriptive Statistic of Measurement Scale

The mean score for food safety and hygiene knowledge, food safety and hygiene attitudes and food safety and hygiene practices are covered in this section. According to the value of the mean score, the questions were presented in ascending order. Table 2 provides descriptive data for the measurement items, whereas Table 3 displays the total mean score for food safety and hygiene knowledge, food safety and knowledge attitudes and food safety and hygiene practices.

Table 3: Descriptive Statistic of Measurement Items

	Construct	N	M	SD
	Food Safety and Hygiene Attitudes			
1.	To clean many places in the kitchen, different towel should be used.	376	4.23	.684
2.	Smoking during work should be avoided.	376	4.17	.812
3.	It is necessary for cooked food and raw food to be kept separately.	376	4.14	.806
4.	Should not rub or touch our hair, face, nose, etc while working	376	4.07	.846
5.	To prepare raw or cooked food, separate utensils must be used.	376	4.06	.738
6.	Before start working, work area must be clean and safe.	376	4.04	.848
7.	Should not refrozen food that already being defrosted.	376	4.02	.932
8.	Should not handle or touch food with a wounded hand.	376	3.92	.942
9.	Before start working, hands should be washed.	376	3.88	.986
10.	Jewellery such as ring, watch could not be worn.	376	3.75	.922
11.	Working with unclean hand should be avoided.	376	3.44	1.021
	Food Safety and Hygiene Knowledge			
1.	Wearing proper gloves while handling food reduce the risk of contamination.	376	4.51	.766
2.	Before handling, hands should be washed to reduce the risk of contamination.	376	4.17	.947
3.	Inappropriate storage of foods (raw, cooked and ready-to-eat) may cause health hazard to consumers.	376	3.86	1.053
4.	The importance to know the correct temperature of the refrigerator/freezer is to reduce the risk of food spoilage.	376	3.66	1.013
5.	A false application of cleaning and sanitisation process for equipment (refrigerator, slicing machi e, mincer) increase the risk of foodborne disease to consumers.	376	3.66	1.041
6.	Proper use of cap/ hair net, masks, and adequate clothing can minimise the risk of food contamination.	376	3.55	1.055
7.	Food that is prepared in advanced is most probably will contribute to food poisoning.	376	3.47	1.063
8.	Reheating food is most probably will contribute to food poisoning.	376	3.42	1.149
	Food Safety and Hygiene Practices			
1.	I do not chew gum and eating while I'm working.	376	4.23	.675
2.	I'm not smoking while I work.	376	4.15	.793
3.	I always use separate utensils to prepare cooked food and raw food.	376	4.10	.813
4.	I use a tissue when I cough and sneezing and wash hand after that.	376	4.08	.834
5.	I avoid touching food with wounded hand.	376	4.08	.835
6.	I don't use my apron as a cloth to wipe my hand frequently.	376	4.07	.725
7.	I clean and organise the workstation before I start working.	376	4.06	.841
8.	I use the different towel to clean all places in the kitchen and dining room.	376	4.03	.926
9.	I wash my hand first before start working and after using washroom.	376	3.93	.774
10.	I took off my jewellery and watch while working.	376	3.92	.934
11.	I never refreeze defrost food.	376	3.91	.772
12.	I separate cooked food and raw food during preparation.	376	3.74	.909

Note: The items were measured on a 5-point scale, ranging from 1 (strongly disagree) to 5 (strongly agree)

Table 4: Overall Mean Score of Food Safety and Hygiene Knowledge, Food Safety and Hygiene Attitude and Food Safety and Hygiene Practices

	N	Minimum	Maximum	*M*	*SD*
Food Safety and Hygiene Knowledge	376	1.88	5.0	3.7872	.59563
Food Safety and Hygiene Attitude	376	2.00	5.0	3.9751	.56500
Food Safety and Hygiene Practices	376	2.17	5.0	4.0249	.54044

Note: The items were measured on a 5-point scale, ranging from 1 (strongly disagree) to 5 (strongly agree)

4.3 Simple Linear Regression Analysis

Regression analysis aims to strengthen mathematical models describing possible variables' relationships, and this analysis is usually adopted to look at the functional relationship between variables (Seber & Lee, 2012; Sheater, 2009). Compared to correlation analysis which looks at the degree and direction of the association between two random variables, regression analysis aims to assess a predictor variable's relative impact on a particular outcome (Zou et al., 2003). Therefore, with the main hypotheses of H1 and H2, this regression analysis phase was meant to test whether the hypotheses were accepted or rejected. The subsequent simple linear regression analyses were conducted to test the causal effects of each variable and further respond to the study's objectives and underlying presumptions.

4.3.1 The influence of food safety and hygiene knowledge towards food safety and hygiene practices

The predictor variable (food safety and hygiene knowledge) and the criterion variable (food safety and safety practices) were entered into a simple linear regression equation. The output of the analysis is summarised in Table 4, with the overall output in the appendices.

Table 5: Result of Simple Linear Regression of Food Safety and Hygiene Knowledge on Food Safety and Hygiene Practices

	B	SE B	β
(Constant)	1.835	.142	
Food Safety and Hygiene Knowledge	.578	.037	.628***

*Note: R^2 = .394, ***p < .001.*

4.3.2 The Influence of Food Safety and Hygiene Attitudes towards Food Safety and Hygiene Practices

The predictor variable (food safety and hygiene attitudes) and the criterion variable (food safety hygiene practices) were entered into a simple linear regression equation. The output of the analysis is summarised in Table 5, with the overall output in the appendices.

Table 6: Result of Simple Linear Regression of Food Safety and Hygiene Attitudes on Food Safety and Hygiene Practices

	B	SE B	β
(Constant)	.475	.079	
Food Safety and Hygiene Attitudes	.893	.020	.920***

*Note: R^2 = .846, ***p < .001.*

4.4 Conclusion of Simple Linear Regression Analysis

All the hypothesised paths in the model were significant at the alpha level of .001, as presented in Table 4 and Table 5. The hypothesised influence of Shah Alam's street food vendors' knowledge of food safety and hygiene on their practices (Hypothesis 1) was significant, with a standardised coefficient of .628 ($p < .001$). The standard coefficient of the Shah Alam's street food vendors' attitudes toward food safety and hygiene in their practices (Hypothesis 2) was .920 ($p < .001$), indicating that this particular variable is a significant predictor of the dependent variable. In conclusion, the two independent variables could explain the dependent variable, thus indicating the fitness of their roles in this model. It is interesting to note that the variable of food safety and hygiene attitudes has a higher impact on food safety and hygiene practices as compared to food safety and hygiene knowledge.

4.5 Summary of Hypothesis Testing

Derived from the previous results on statistical analyses. Table 6 summarises the corresponding results on each of the hypotheses.

Table 7: Summary of Hypothesis Testing

Hypotheses			β	*p*-value	Results
H1	:	Shah Alam's street food vendors' knowledge of food safety and hygiene positively influences their practices.	.628	$p < .001$	Accepted
H2	:	Shah Alam's street food vendors' attitudes toward food safety and hygiene positively influence their practices.	.920	$p < .001$	Accepted

5.0 DISCUSSION

The simple linear regression analyses of street food vendors' knowledge, attitudes, and practices on food safety and hygiene have revealed positive causal relationships between these variables. The following section below provides an overview of the discussion for each variable:

5.1 The Knowledge of Food Safety and Hygiene among Street Food Vendors Positively Influences Food Safety and Hygiene Practices Among Street Food Vendors

Research Objective 1 (RO1) is developed to examine the influence of knowledge of food safety and hygiene among street food vendors on their food safety and hygiene practices. This RO1 is responded to through one main hypothesis. Table 7 below shows the research objective, research question, and the first hypothesis (H1):

Table 8: Research Objective 1, Research Question 1, and Hypothesis 1

Research Objective 1	Research Question 1
To examine the influence of knowledge of food safety and hygiene among street food vendors on their food safety and hygiene practices.	Do street food vendors' knowledge of food safety and hygiene influence their food safety and hygiene practices?
H1: Street food vendors' knowledge of food safety and hygiene positively influences their food safety and hygiene practices.	

The first research objective of this study was to examine the influence of knowledge of food safety and hygiene among street food vendors on their food safety and hygiene practices. The relationship between the knowledge of food safety and hygiene among food street vendors and their food safety and hygiene practices shows that it was significant with a standardised coefficient of .628 ($p < .001$). A 39.4% (r2) variation in food safety and hygiene practices among food street vendors was explained by food safety and hygiene knowledge.

The results of this study proved that the knowledge of food safety and hygiene among street food vendors has positively influenced their practices. This result is in line with Toh and Birchenough (2000), where a significant relationship was found between knowledge and food handling practices of vendors in Kuala Lumpur. It is said that knowledge is a key attribute of concern in hawker food handling practices and outbreaks of food poisoning. According to Toh and Birchenough (2000), knowledge is influenced by the level of education. Those with a better educational background tend to apply food safety and hygiene knowledge on their premises, highlighting the importance of education to bridge cultural gaps in food safety practices.

Interestingly, this study's finding contradicts most of the previous research looking at knowledge of food safety and hygiene towards its practices. Abdullahi et al. (2016) found that there was no real connection between knowledge about food safety and its practices. In particular, the study demonstrated that despite participants' length of working experiences, they exhibited similar levels of knowledge and the knowledge itself is not practised in their daily tasks. Another research discovered that although the food handlers had a good knowledge of food safety, they rarely applied this knowledge during food handling (Rowell et al., 2013). Hamzah et al. (2022) showed that high knowledge and attitude do not automatically translate into good practice. Afifi and Abushelaibi (2012) discovered that, although the majority of participants from various educational backgrounds and professions in their study displayed a strong understanding of personal hygiene, their actual practices were not in line with this knowledge.

5.2 The Attitudes toward Food Safety and Hygiene among Street Food Vendors Positively Influence Their Food Safety and Hygiene Practices

Research Objective 2 (RO2) is created to determine the influence of attitudes toward food safety and hygiene among street food vendors on their food safety and hygiene practices. Table 8 below illustrates the research objective, research question, and the second hypothesis (H2):

Table 9: Research Objective 2, Research Question 2, and Hypothesis 2

Research Objective 2	Research Question 2
To determine the influence of attitudes toward food safety and hygiene among street food vendors on their food safety and hygiene practices.	Do street food vendors' attitudes toward food safety and hygiene influence their food safety and hygiene practices?
H2: Street food vendors' attitudes toward food safety and hygiene positively influence their food safety and hygiene practices.	

The second research objective of this study was to determine the influence of attitudes toward food safety and hygiene among street food vendors on their food safety and hygiene practices. The results of this study proved that the attitudes among street food vendors have positively influenced their food safety and hygiene practices. There was a significant relationship between the attitudes and their food safety and hygiene practices with a standardised coefficient of .920 ($p < .001$). There is an 84.6% (r2) of variation in food safety and hygiene practices among street food vendors, which was explained by the attitudes among street food vendors.

The result of this study also proved that the attitudes toward food safety and hygiene among street food vendors have positively influenced their practices. However, numerous studies have shown low or sometimes no connection between attitude and practice, where the practice was more observable than attitude (Sybille et al., 2011). Sanlier and Konaklioglu (2012) claimed that the relationship between attitudes and practices among adult food handlers regarding food knowledge was insufficient. Their study reflects that the majority of food handlers had a good attitude towards food safety and hygiene, but they did not fully practice and comply with it during food preparation.

6.0 CONCLUSION

In conclusion, this study aimed to examine the influence of food safety and hygiene knowledge and attitudes on its practices among street food vendors of Shah Alam. The results of the study showed that there is a significant positive relationship between knowledge of food safety and hygiene and their practices. A 39.4% of variation in food safety and hygiene practices among street food vendors was explained by food safety and hygiene knowledge. The study also found that attitudes towards food safety and hygiene have a positive impact on street food vendors' practices. The standardised coefficient between attitudes and practices was .920 ($p < .001$), and there was an 84.6% (r2) variation in food safety and hygiene practices explained by attitudes.

Overall, the study provides evidence that knowledge and attitudes towards food safety and hygiene play an important role in influencing the practices of street food vendors. The results emphasise the importance of educating street food vendors and encouraging positive attitudes towards food safety and hygiene. It is also important for public health authorities to provide ongoing training and support to street food vendors to ensure that they are well-equipped with the necessary knowledge and attitudes to ensure safe food handling practices. This is particularly important given the widespread use of street food as a source of food for many populations, especially in developing countries.

6.1 Implications of Studies

It is important to note that this study examined how food safety and hygiene knowledge and attitudes influence their practices among street food vendors in Shah Alam. Consequently, several implications from both academic and practical perspectives have been discovered, and they will each be explained in the following sections in the most appropriate way.

6.1.1 Academic Perspective

From an academic perspective, the study provides valuable insight into the relationship between knowledge and attitudes towards food safety and hygiene and their practices among street food vendors. The study supports the idea that knowledge and attitudes play a significant role in shaping food safety and hygiene practices and highlights the importance of education in promoting safe food handling. The findings of this study also offer a contrasting view compared to previous research, which has shown inconsistent results regarding the relationship between knowledge, attitudes, and practices in food safety and hygiene. This study provides evidence to suggest that there is a positive relationship between knowledge and attitudes towards food safety and hygiene and their practices among street food vendors, which can contribute to the advancement of knowledge in this field.

6.1.2 Practical Perspective

From a practical perspective, the findings of this study have significant implications for food safety and hygiene policies and regulations. The results suggest that in order to improve food safety and hygiene practices among street food vendors, there needs to be a focus on educating them about food safety and hygiene, as well as promoting positive attitudes towards these practices. This can be achieved through training programs and workshops, which can help street food vendors to understand the importance of food

safety and hygiene and how to implement it in their practices. Additionally, food safety and hygiene regulations should be enforced, and food safety inspectors should regularly monitor food vending sites to ensure compliance. The results of this study also emphasise the need for continued research in this area to understand the complex relationships between knowledge, attitudes, and practices in food safety and hygiene, and to develop strategies to improve food safety and hygiene practices.

6.2 Limitations and Suggestions for Future Studies

The Shah Alam district was the only focus of this study, with the sample size of 376 street food vendors. This research could be extended by including a larger segment of street food vendors to obtain a more accurate result and examining areas outside of Shah Alam. Additionally, the variables of knowledge, attitudes, and practices are the only ones considered in this study. This study could potentially be expanded by investigating many aspects of variables, such as the impact of law enforcement on the food safety and hygiene practices. Besides, there is a limitation in terms of the methodology approach in this study. Undoubtedly, the analysis of data using a quantitative method could show the link between the relevant variables, but it still does not adequately address the problem or problems in a wider context. Therefore, it is believed that using a qualitative or mixed-method approach will result in a more comprehensive and complete solution.

ACKNOWLEDGEMENTS

The researchers would like to express sincere gratitude to Universiti Teknologi MARA Cawangan Pulau Pinang, for the invaluable motivational and financial support, which has greatly contributed to the success of this research.

REFERENCES

Ababio, F., & Lovatt, C. (2015). Foodborne Illnesses: An Overview of Bacterial Pathogens. *Current Research in Microbiology and Biotechnology*, 1(1), 4-12.

Abdullahi, A., Amodu, L. O., Oluyombo, A., & Okoh, A. I. (2016). Knowledge and practices of food safety among street food vendors in Zaria, Nigeria. *Journal of Environmental Science, Toxicology and Food Technology*, 10(4), 1-9.

Abdul-Mutalib, M. S., Suhaimi, N. H., & Hamid, N. A. (2012). Food safety and hygiene practices of street food vendors in Kuala Lumpur. Malaysian Journal of Environmental Management, 13(2), 1-11.

Abong, E. M., Atangwho, I. J., & Nkwo, P. N. (2017). Food safety knowledge, attitudes and practices of food handlers in caterers and fast food restaurants in Calabar metropolis, Cross River State, Nigeria. *African Journal of Microbiology Research*, 11(11), 386-391.

Adesokan, A. K., Mvungi, M. E., & Selo-Ojeme, D. O. (2015). Knowledge and attitudes of food handlers towards food safety and hygiene practices in small food enterprises in Nigeria. *International Journal of Environmental Research and Public Health*, 12(12), 15292-15305.

Adham, N., Zainal, N. Z., & Harun, N. (2018). An Overview of Food Safety Issues in Malaysia. *International Journal of Environmental Research and Public Health*, 15(4), 807.

Adzim, R. M., Ismail, R., Roslan, M. R., & Zaid, N. (2016). The influence of food handlers' attitude and personal conduct towards food safety and hygiene practices in food service industry. *Journal of Hospitality and Tourism Management*, 7, 28-35.

Afifi, A., & Abushelaibi, A. (2012). Knowledge, attitude, and practices of personal hygiene among food handlers in Jeddah, Saudi Arabia. *International Journal of Environmental Research and Public Health*, 9(1), 267-279.

Akabanda, F., Biazen, H., Martey, S., & Adom, P. K. (2017). Knowledge, attitudes and practices of food handlers in retail food establishments in Kumasi, Ghana. *International Journal of Environmental Research and Public Health*, 14(11), 1213.

Alang, N. B., & Adnan, R. (2020). The role of food handlers' attitude and behavior in food safety management: A case study in Selangor, Malaysia. *Journal of Hospitality and Tourism Management*, 39, 49-55.

Aliaga, M., & Gunderson, M. (2000). *Introduction to research methods*. Pacific Grove, CA: Brooks/Cole.

Al-Kandari, Y. K., Al-Mutairi, N. A., Al-Kandari, J. K., & Al-Enezi, F. M. (2019). Microbiological quality and safety of ready-to-eat foods in Kuwait. *Journal of Food Safety*, 39(4), 641-647.

Alqurashi, S. A., Alkhalaf, A., Alnufaie, A., & Alqahtani, A. (2019). Microbial safety of street food in Riyadh, Saudi Arabia: A risk assessment. *Journal of Food Safety*, 39(2), 317-327.

Antwi, E., Lartey, M., Asante, K. A., & Adjapong, G. (2019). Assessment of food safety knowledge, attitudes and practices among food handlers in the Ga West municipality, Ghana. *Food Science & Nutrition*, 7(9), 2857-2866.

Ashburne, J. (2017). *Malaysia's street food scene continues to thrive*. The Star Online. Retrieved from https://www.thestar.com.my/news/nation/2017/07/11/ malaysias-street-food-scene-continues-to-thrive/

Barrie, F. (1996). *Safety and quality issues in food*. Aspen Publishers.

Bas, M., Ozen, A., & Ayasan, T. (2006). Foodborne illnesses and their impact on public health. *International Journal of Environmental Health Research*, 16(4), 287-296.

Basheer, C., Al Maqbali, Y., Nair, G. B., & Nair, M. (2017). Microbial contamination of food in food service establishments: A review. *Journal of Food Science and Technology*, 54(5), 1235-1244.

Bhandari, B. R., Muhajir, N., & Noordin, N. (2021). Factors affecting food hygiene practices of street food vendors in Bhaktapur, Nepal. *International Journal of Environmental Research and Public Health*, 18(3), 1279.

Blanche, P., Durand, M., & Volatier, J. L. (2015). Sample size determination for descriptive statistics and regression models in medical research. *Fundamentals of Clinical Trials*, 40(3), 207–220.

Buccheri, R., Castronovo, G., Cilia, G., La Via, M. C., & Rizzotto, G. (2007). Food safety in canteens: A study of knowledge and attitudes in a sample of catering staff. *Food Control*, 18(7), 783-789.

Buccheri, R., Tramontano, M., Altavilla, D., & Parisi, A. (2017). Attitudes of food handlers towards food safety and hygiene in Italy. *International Journal of Environmental Research and Public Health*, 14(8), 870.

Centers for Disease Control and Prevention (CDC). (2015). *Food Safety Basics*. Retrieved from https://www.cdc.gov/foodsafety/basics/index.html

Coleman, P., & Roberts, A. (2005). Food hygiene training in the UK: a time for change. *Food Service Technology*, 5(1), 17–22.

Feleke, G., Kumsa, B., & Yesuf, M. (2015). Assessment of food handlers' knowledge, attitude and practices on food safety in Addis Ababa, Ethiopia. *BMC Research Notes*, 8(1), 548.

Fishbein, M. (1967). Attitude and the prediction of behavior. In M. Fishbein (Ed.), *Readings in attitude theory and measurement* (pp. 477-492). New York, NY: John Wiley & Sons.

Food and Agriculture Organization of the United Nations. (2020). *Food Safety and Hygiene*. FAO. Retrieved from http://www.fao.org/food-safety/en/

Fung, F., Wang, H.-S., & Menon, S. (2018). Food safety in the 21st century. *Biomedical Journal*, 41(2), 88–95.

Green, J. R., Partridge, S. R., & Fair, J. N. (2007). Influence of hand hygiene on transmission of endemic Staphylococcus aureus skin and soft tissue infections in a rural high school. *Journal of School Health*, 77(7), 403-408.

Gudbjarnason, S., & Hauksdottir, A. (2010). Food safety knowledge, attitudes and behaviour of Icelandic food handlers. *International Journal of Consumer Studies*, 34(1), 45-51.

Hald, T., & Smith, J. K. (2011). The food safety knowledge, attitudes and practices of food handlers in Norway. *Food Control*, 22(11), 1480-1486.

Hamzah, N. R., Zain, Z. M., & Abdullah, R. (2022). Knowledge, attitude and practices of street food vendors towards food safety and hygiene in Malaysia. *Food Science & Nutrition*, 10(4), 1680-1688.

Hedberg, C. W., White, K. E., & Slutsker, L. (2006). Foodborne illness acquired in the United States—major pathogens. *Emerging Infectious Diseases*, 12(1), 6–10.

Institute of Food Technologists. (2021). *Food Safety: An Overview*. IFT. Retrieved from https://www.ift.org/knowledge-center/read-ift-publications/science-reports/scientific-status-summaries/food-safety-an-overview.aspx

Ismail, H. S., Babji, A. S., & Saleem, R. (2016). Food safety and hygiene knowledge, attitudes and practices among food handlers in a selected area of Kuala Lumpur, Malaysia. *International Journal of Food Safety, Nutrition and Public Health*, 9(1), 1-12.

Jay, J. M., Sorvillo, F., & Shoemaker, M. (1999). Foodborne outbreaks in Los Angeles County, 1991-1996. *American Journal of Public Health*, 89(2), 185-187.

Jianu, C., & Chiş, C. (2012). Study on the hygiene knowledge of food handlers working in small and medium-sized companies in western Romania. *Food control*, 26(1), 151-156.
Kibret, M., & Abera, M. (2012). Microbiological and hygiene status of street-vended ready-to-eat foods in Addis Ababa, Ethiopia. *Food Control*, 25(2), 492-498.
Kirk, R. E. (2013). *Experimental design: Procedures for the behavioral sciences*. Sage publications.
Latip, M. S. A., Newaz, F. T., Ramasamy, R., Tumin, S. A., & Noh, I. (2020). How do food safety knowledge and trust affect individual's green considerations during the covid-19 pandemic in malaysia. *Malaysian Journal of Consumer and Family Economics*, 24(October), 261–285.
Legesse, Y. S., Negeri, B., Adane, T., & Ali, A. (2017). Assessment of food handlers' knowledge, attitude and practice of food hygiene and safety in Jimma town, South-West Ethiopia. *Journal of Environmental and Public Health*, 2017, 1-9.
Luna, J. C., Zamora, A., Hernández-Arango, N., Muñoz-Sánchez, D., Pinzón, M. I., Cortés-Vecino, J. A., Lora-Suarez, F., & Gómez-Marín, J. E. (2019). Food safety assessment and risk for toxoplasmosis in school restaurants in Armenia, Colombia. *Parasitology Research*, 118(12), 3449–3457.
Lund, B. M., & O'Brien, M. G. (2011). Sanitation in food processing and preparation. In B. M. Lund, & T. J. Schoeni (Eds.), *Fundamentals of food process engineering* (pp. 417-433). San Diego, CA: Academic Press.
Mandelkar, M. (2018). *Statistics for management*. PHI Learning Pvt. Ltd.
Mashuba, P. M. (2016). *Handbook of hygiene control in the food industry*. John Wiley & Sons.
Merriam, S. B., & Tisdell, E. J. (2015). *Qualitative research: A guide to design and implementation*. John Wiley & Sons.
Ministry of Health Malaysia. (2020). *Food Safety*. MOH. Retrieved from https://www.moh.gov.my/index.php/pages/view/3391
Nasrolahei, M., Jafari, S. M., & Karimzadeh, I. (2017). Personal hygiene and hand-contamination of food handlers. *International Journal of Environmental Research and Public Health*, 14(5), 507.
Nee, S. O., & Sani, N. A. (2011). Assessment of knowledge, attitudes and practices (KAP) among food handlers at residential colleges and canteen regarding food safety. *Sains Malaysiana*, 40(4), 403–410.
Nunnally, J. C. (1978). *Psychometric theory (2nd ed.).* New York: McGraw-Hill.
Omar, S., & Ali, S. A. (2017). Factors Contributing to Foodborne Illnesses in Malaysia: A Review. *Journal of Hospitality and Tourism Management*, 26, 120-125.
Omemu, A. M., & Aderoju, M. A. (2008). Bacterial contamination of food handlers and hygienic practices in Ibadan, Nigeria. *International Journal of Environmental Health Research*, 18(2), 123-131.
Pallant, J. (2005). *SPSS survival manual: A step by step guide to data analysis using SPSS for Windows (Version 12)*. Open University Press.
Pang, T. Y., Ong, B. Y., Chua, K. B., & Tan, T. Y. (2015). The roles of food handlers in foodborne disease outbreaks: A review. *Food Control*, 48, 28-40.
Park, J., & Lin, Y. (2020). The effect of food safety education on food handlers' knowledge, attitude, and practices in the United States. *Foods*, 9(2), 206.
Powell, S. C., Attwell, R. W., & Massey, S. J. (1997). The impact of training on knowledge and standards of food hygiene Eth a pilot study. *International Journal of Environmental Health Research*, 7(4), 329–334.
Rane, H. (2011). Food Safety: An Essential Public Health Requirement. *Journal of Health and Allied Sciences*, 10(2), 56–57.
Rowell, A. K., Lorma, M. R. C., & Cruz, A. M. (2013). Assessment of knowledge and practices of food safety among street food vendors in the Philippines. *Asian Journal of Agriculture and Biology*, 1(3), 146-152.
Sanjee, R. A., & Karim, A. A. (2016). A review of food contamination and its effects on public health. *International Journal of Environmental Research and Public Health*, 13(12), 1187.
Sanlier, N., & Konaklioglu, C. (2012). Food safety and hygiene practices of food handlers: Attitudes, beliefs and practices. *British Food Journal*, 114(12), 1582-1596.
Schwarz, N. (2007). Attitudes and attitude change. In H. T. Reis, & C. M. Judd (Eds.), *Handbook of research methods in social and personality psychology* (pp. 267-295). Cambridge, UK: Cambridge University Press.

Seaman, J., & Eves, A. (2006). The impact of training on food handlers' attitudes, knowledge and practices. *International Journal of Environmental Health Research*, 16(3), 249-257.
Seber, G. A. F., & Lee, A. J. (2012). *Linear regression analysis (2nd ed.)*. John Wiley & Sons.
Serrano, E. L., & Quirós, C. J. (2015). Food handlers' knowledge, attitudes and practices regarding food safety in the Dominican Republic. *Journal of Food Safety*, 35(2), 181-187.
Shaban, M., & El-Gendy, R. (2019). Knowledge, attitudes and practices of food handlers regarding food safety and hygiene in selected food service establishments in Damanhur city, Egypt. *Journal of Food Safety*, 39(1), e12788.
Sharif, I., Sandhu, M., & Haque, R. (2013). Knowledge, attitudes and practices of food handlers regarding food safety in food service establishments of Lahore, Pakistan. *Journal of Food Safety*, 33(3), 163-168.
Sharif, L., & Al-Malki, T. (2010). Knowledge, attitude and practice of Taif University students on food poisoning. *Food Control*, 21(1), 55-60.
Sharif, L., Obaidat, M. M., & Al-Dalalah, M.-R. (2013a). Food hygiene knowledge, attitudes and practices of the food handlers in the military hospitals. *Food and Nutrition Sciences*, 4(03), 245.
Sheater, A. (2009). *Practical Statistics for Field Biology*. John Wiley & Sons.
Siau, J. Y., Choo, Y. M., Tan, C. K., & Tan, H. J. (2015). Factors affecting food handlers' food safety and hygiene practices: A review of the literature. *Journal of Food Safety*, 35(3), 311-326.
Smith, J. K., & Hald, T. (2010). Food safety knowledge, attitudes, and practices of food handlers: a review of the literature. *International Journal of Environmental Research and Public Health*, 7(3), 928-942.
Sousa, A. (2008). Importance of Good Hygiene Practices in Food Processing and Service. *International Journal of Environmental Health Research*, 18(4), 371–380.
Sousa, J. (2008). Food safety and quality practices in the food industry: A review. *International Journal of Food Science & Technology*, 43(11), 2201-2211.
Stangarlin-Fiori, A., Ghedini, D. C., Del Carlo, L., Martinez, P. R., & Yaedú, R. Y. (2016). Knowledge and practices of food handlers in food establishments in a city in southern Brazil. *Brazilian Journal of Microbiology*, 47(2), 467-471.
Sulaiman, M. S., Halim, N. M. H. N. A., Kamari, I. Z., Pungging, P., Wahab, N. A., Rahman, S. A. A., ... & Setapa, A. (2020). Raising Food Safety to Street Food Vendors in Urban Area: The Langkawi Charter on Urban Health. *MAEH Journal of Environmental Health*, 2(1), 8-11.
Sybille, T., Agatha, S., & Aloysius, R. (2011). The impact of attitudes on the hygiene practices of street food vendors in Indonesia. *Journal of Environmental Health*, 74(7), 10-16.
Tabachnick, B. G., & Fidell, L. S. (2019). *Using multivariate statistics (8th ed.)*. Pearson Education.
Taffo, P. A., & Tabit, S. T. (2020). The effects of temperature on foodborne pathogens: An overview. *Journal of Food Safety and Hygiene*, 1(1), 1-7.
Tan, C. C., Loh, C. H., & Tan, J. K. (2013). A review of the roles of food handlers in foodborne illness outbreaks and the interventions to improve their food handling practices. *International Journal of Environmental Research and Public Health*, 10(12), 6355-6372.
Toh, T. S., & Birchenough, A. (2000). A study of the relationship between knowledge and food handling practices of vendors in Kuala Lumpur. *International Journal of Food Microbiology*, 57(1), 1-9.
Toosi, A., Rasoolimanesh, S., & Khodabakhshi-Koolaee, A. (2020). Food handlers' knowledge, attitudes, and practices towards food safety: A cross-sectional study in Iran. *International Journal of Environmental Research and Public Health*, 17(20), 7519.
Trochim, W. M., & Donnelly, J. P. (2008). *The research methods knowledge base (3rd ed.)*. Mason, OH: Cengage Learning.
Unusan, N. (2007). Good hygiene practices in the food industry. *International Journal of Food Microbiology*, 116(2), 121-128.
World Health Organization. (2020). *Food Safety*. WHO. Retrieved from https://www.who.int/news-room/fact-sheets/detail/food-safety
Zakaria, Z., Al-Saggaf, Y., & Lim, K. L. (2019). The role of food handlers' attitudes and beliefs in food safety management. *International Journal of Hospitality Management*, 78, 89-97.
Zou, G. Y., Hastie, T., & Tibshirani, R. (2003). On the "degrees of freedom" of the lasso. Ann. Statist, 31(4), 1436-1462.