

**KNOWLEDGE, ATTITUDE AND PRACTICE ON FOOD SAFETY
AND HYGIENE AMONG STREET FOOD VENDORS IN
KOTA BHARU, KELANTAN**

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**KNOWLEDGE, ATTITUDE AND PRACTICE ON FOOD SAFETY
AND HYGIENE AMONG STREET FOOD VENDORS IN
KOTA BHARU, KELANTAN**

By

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Dissertation submitted in partial fulfilment of the requirements for the
degree of Bachelor of Health Science (Honours)
(Environmental and Occupational Health)

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CERTIFICATE

This is to certify that the dissertation entitled knowledge, attitude and practice on food safety and hygiene among street food vendors in Kota Bharu, Kelantan is the bona fide record of research work done by Ms Nur Syazana Binti Mohd Musa during the period from September 2017 to June 2018 under my supervision. I have read this dissertation and that in my opinion it confirms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation to be submitted in partial fulfilment for the degree of Bachelor of Health Sciences (Honours) (Environmental and Occupational Health)

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DECLARATION

I hereby declare that this dissertation is the result of my own investigations, except where otherwise stated and duly acknowledged. I also declare that it has not been previously or concurrently submitted as a whole for any other degrees at Universiti Sains Malaysia or other institutions. I grant Universiti Sains Malaysia the right to use the dissertation for teaching, research and promotional purposes.

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LIST OF ABBREVIATIONS

AGE	Acute Gastroenterities
CDC	Centres for Disease Control and Prevention
DBKL	Dewan Bandaraya Kuala Lumpur
HACCP	Hazard Analysis and Critical Control Point
HIV	Human Immunodeficiency Virus
HUS	Hospital Umum Sarawak
IBM SPSS	Statistical Package for the Social Sciences
JEPeM	Jawatankuasa Etika Penyelidikan Manusia
JMP	Joint Monitoring Program
KAP	Knowledge, Attitude Practice
KLH	Kuala Lumpur Hospital
MOH	Ministry Of Health
MPKB	Majlis Perbandaran Kota Bharu
NIDDKD	National Institutes of Diabetes and Digestive and Kidney Disease
PSA	Pengetahuan, Sikap, Amalan
UNICEF	United Nations Children's Fund
USM	Universiti Sains Malaysia
WHO	World Organisation Health

**PENGETAHUAN, SIKAP DAN AMALAN TERHADAP KESELAMATAN DAN
KEBERSIHAN MAKANAN DALAM KALANGAN PENIAGA MAKANAN
JALANAN DI KOTA BHARU, KELANTAN**

ABSTRAK

Makanan jalanan telah menjadi lebih popular di negara-negara membangun termasuklah Malaysia. Walaubagaimanapun, penggunaan makanan jalanan telah dikaitkan dengan risiko penyakit bawaan makanan yang lebih tinggi. Kajian ini dijalankan untuk mengetahui tahap PSA mengenai keselamatan dan kebersihan makanan dalam kalangan penjual makanan jalanan di Kota Bharu, Kelantan. Ini kerana peniaga makanan jalanan sentiasa mempunyai akses air yang tidak mencukupi untuk membersihkan tangan atau peralatan semasa mengendalikan makanan. Kajian rentas keratan ini melibatkan 246 responden yang merupakan pengendali makanan utama di gerai penjaja yang berdaftar di MPKB dengan menjawab satu set soal selidik. Para peserta dipilih menggunakan kaedah pensampelan konvenien berdasarkan senarai populasi peniaga makanan jalanan. Keputusan menunjukkan semua responden memperolehi peratusan pengetahuan yang tinggi (93.68 ± 10.99), sikap (91.19 ± 8.89) dan amalan (91.19 ± 8.89). Terdapat perbezaan yang signifikan antara tahap pendidikan dan latihan pengendalian makanan dengan KAP ($p=0.01$). Selain itu, terdapat hubungan positif antara pengetahuan dengan sikap, sikap dengan amalan dan pengetahuan dengan amalan ($p=0.01$). Manakala, tiada hubungan yang signifikan antara pengalaman kerja ($p>0.05$) dengan tahap PSA. Kesimpulannya, orang dewasa tua menganggap bahawa apa yang mereka lakukan sepanjang hidup mereka adalah betul dan sesuai. Semua matlamat kajian telah tercapai walaupun penyelidik menghadapi kesukaran dalam mendekati responden disebabkan oleh had masa bermula dari waktu perniagaan hingga akhir proses penutupan gerai.

**KNOWLEDGE, ATTITUDE AND PRACTICE ON FOOD SAFETY AND
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KELANTAN**

ABSTRACT

Street foods have become more popular in developing countries including Malaysia. However, street food consumption has correlated to higher risks of food-borne diseases. This study was conducted to investigate the KAP level regarding food safety and hygiene among street food vendors in Kota Bharu, Kelantan. This is because street vendors regularly have inadequate access of running water for cleaning hands or equipment while handling the foods. This cross-sectional study involved 246 of respondents who were the main food handlers at the cart or food stand that being registered by MPKB by answering a set of questionnaires. The participants were being selected by convenience sampling method based on the list of street food vendors' populations. According to results, all of respondents obtained a high mean percentage of knowledge (93.68 ± 10.99), attitude (91.19 ± 8.89) and practice (91.19 ± 8.89). Moreover, significant difference was found between education level and food handling training with KAP ($p=0.01$). Besides, there is a positive correlation between knowledge with attitude, attitude with practice and knowledge with practice ($p=0.01$). With regards to the street vendors, there is no significant relationship between working experience ($p>0.05$) with KAP levels. In conclusion, elderly adults considering that what they did over the years was correct and applicable. Although the study has achieved its aims, the researcher had difficulties to approach the respondents due to time limit starting from business hours to end of wrapping up of the cart.

CHAPTER 1 INTRODUCTION

1.1 Study Background

Food is basically work as a centre to satisfy hunger and biological needs. It is likewise important to sustain our life in order to do works such as house chores, study, working and exercising. Food now can be rejoice in either at home or outside. With the mushrooming of street hawkers, restaurants or other food stalls, individuals will most presumably look for the place to fulfil hunger after tired of working and did not have time to prepare the meals at home (Faridah, Chemah & Rosmaliza, 2016). Moreover, many of Malaysians prioritize more about the food taste instead of the safety of the food especially at street food vendors. In Malaysia, home to 30.3 million people (The World Bank, 2017), food is likely to be sold anywhere with insufficient consideration being paid to the food hygiene (Premarathne, New & Ubong, 2017).

Throughout the years, food poisoning cases in Malaysia have been reported to be rapidly increase as it reflects the true food safety situations and at the same time elevating the foodborne illness (Ubong, New & Thung, 2017). This is because increasing in individuals' numbers eating out have begun the emergence of food borne illness due to unhygienic preparation (Faridah *et al.*, 2016). According to Public Health Specialist, providing food in an unsafe and inadequate manner at food premises also cause unsafe food that can cause illness such as food poisoning, typhoid, hepatitis A, cholera and dysentery (Nik Rosmawati, 2016). Apart from diarrhoea, serious complications also can be triggered by food-borne illnesses like kidney and liver failure, brain and neural disorders, reactive arthritis, cancer and even death.

Over 100 countries have been reported using “the five keys to food safer” as an international reference sources. It being was recognized as a standard way of producing and maintaining safe food (Campbell & Penelope, 2011). They are keep clean, separate raw and cooked, cook thoroughly, keep food at safe temperatures and use safe water and raw materials. Foodborne illnesses are typically infectious or lethal in nature and caused by bacteria, viruses, parasites or chemical substances entering the body through contaminated food or water Many types of bacteria can cause foodborne illness such as *Salmonella* that can be present on egg shells or inside the eggs and *Shigella*, a bacterium spread from individual to individual (NIDDKD, 2014).

These microbes are available in the stools of individuals who were infected. In the event that individuals who were infected did not wash their hands completely in the wake of utilizing the restroom, they can contaminate the food that they handle or prepare (NIDDKD, 2014). In addition, a few microorganisms, for example the *Bacillus cereus*, *Clostridium perfringens*, *Shiga-toxin* producing *Escherichia coli* O157 and *Shigella spp.* generate toxins that are heat liable, guaranteeing the survivability of the toxins all through the food processing (Premarathne *et al.*, 2017).

Street food vendors in low and middle-income countries are at even greater disadvantages than restaurant food workers because they regularly have inadequate or no access of running water for cleaning hands or equipment, for hand washing before commencing food preparation or after defaecation (Mellisa & Robins, 2011).

1.2 Problem Statement

Street foods provide essential diet to numerous individuals in the developing world. It also plays an important role in developing communities as they provide the employments of millions of the urban poor. However, street foods have turned out to become one of the most typical risks associated with the increase in outbreaks of food-borne illnesses in developing countries in recent years. There have been a few reported cases of food poisoning outbreaks related to street foods (Ngoc, Tran & Samapundo, 2014).

In Malaysia, food and water borne disease such as cholera, dysentery, typhoid and Hepatitis A were reported low ranging from 1.56 to 0.14 cases per 100,000 populations in year 2010. In contrast, food poisoning is on the rise as evident by the incident rate of 36.17 in 2009 and 44.18 in 2010 per 100,000 populations (MOH, 2010). About 842 000 people in low- and middle-income countries die as a result of deficient water, sanitation, and hygiene each year, representing 58% of total diarrhoeal deaths. Poor sanitation is believed to be the fundamental driver in some 280 000 of these deaths. Cleaner water, better sanitation, and hygiene could prevent the deaths of 361 000 youngsters under 5 years each year (WHO, 2017).

It is proved that street food vending has become an important public health problem and an extraordinary worry to everyone. This is due to the widespread of foodborne disease coming from various food vendors sellers who do not have a satisfactory understanding of the essential food safety-wellbeing issues. Unsanitary handling of the handlers has been ordinarily observed to be the wellspring of the contamination (Dawson & Canet, 1991).

The Centres of Disease Control and Prevention (CDC) United State of America found that main factors contributing to food borne disease outbreaks were because of unhygienic of food handlers. CDC of United State of America assessed that there are 48 million illnesses, 128,000 hospitalizations and 3,000 deaths yearly due to food borne illness in the US (Sharifa, Netty & Sangaran, 2013). In England and Wales, food borne disease brought about an expected of 1.3 million cases, 21,000 hospitalizations and 500 deaths annually (Adak, Long, O'Brien, 2002). Meanwhile, in Australia, around 5.4 million cases, 15,000 hospitalizations and 120 deaths were reported every year (Kirk, Mckay & Hall, 2008).

Whereby food is prepared or sold at public places, the handlers of the vendor are responsible in serving safe food for the profit of their customer. About 50% of the food borne illnesses was caused by poor food preparation practices, where food was stored for more than 4 hours at room temperature, cooking raw materials over the previous day and unsafe food storage. Other than that, it also occurs from unhealthy food preparation, wounds, always touching the face and not washing hands correctly that become a carrier of bacteria and effect foodborne illness (Nik Rosmawati, 2016).

Food can become contaminated at any point of production and distribution, and the primary responsibility lies with food producers. However, a vast extent of foodborne ailment occurrences is caused by foods improperly prepared or mishandled at home, in food services or markets. Not all food handlers and purchasers comprehend the parts they should play, for example embracing basic hygienic practices when purchasing, selling and preparing food to secure their health and community. Urbanization and changes in consumer habits, including travel, have expanded the quantity of individuals purchasing and eating food prepared out in the open spots.

Globalization has activated developing of buyer's interest for a more extensive assortment of foods, bringing in an increasingly complex and longer global food chain. These difficulties put greater responsibility on food producers and handlers to guarantee food safety (WHO, 2015). Kelantan Health Department director, Dr Ahmad Razin Ahmad Maher said that from January to the end of June 2015, there were 328 cases that have been detected in the state. He said again the outbreak of typhoid fever that causes consumers to be exposed to food poisoning is not only detected in the Ramadan bazaar but everywhere in the state were happened (Sinar Harian, 2015).

1.3 Research Question

- I. What is the score level of knowledge, attitude and practice on food safety and hygiene among street food handlers?

1.4 Objectives

1.1.1 General Objectives

The main purpose of this study was to determine the score level of knowledge, attitude, and practice regarding food safety and hygiene among street food vendors in Kota Bharu, Kelantan.

1.1.2 Specific Objectives

- (a) To determine the association between socioeconomic background (educational level & working experience) and the score level of KAP among street food vendors.
- (b) To determine the association between food handling training with the score level of KAP among street food vendors.
- (c) To determine the association between knowledge and attitude.
- (d) To determine the association between attitude and practice.
- (e) To determine the association between knowledge and practice.

1.5 Hypothesis

Hypothesis 1

Null Hypothesis: There is no association between socioeconomic background (educational level & working experience) and the score level of KAP among street food vendors.

Alternative Hypothesis: There is an association between socioeconomic background (educational level & working experience) and the score level of KAP among street food vendors.

Hypothesis 2

Null Hypothesis: There is no association between food handling training with the score level of KAP among street food vendors.

Alternative Hypothesis: There is an association between food handling training with the score level of KAP among street food vendors.

Hypothesis 3

Null Hypothesis: There is no association between knowledge and attitude.

Alternative Hypothesis: There is an association between knowledge and attitude.

Hypothesis 4

Null Hypothesis: There is no association between attitude and practice.

Alternative Hypothesis: There is an association between attitude and practice.

Hypothesis 5

Null Hypothesis: There is no association between knowledge and practice.

Alternative Hypothesis: There is an association between knowledge and practice.

1.6 Significance of Study

The aim of this research was to assess the score level of knowledge, attitudes and practices related to the food safety and hygiene among street food vendors because this aspect is very critical factor towards the food contaminations occurred. We can see that typhoid fever is one of the biggest outbreak happened towards consumers if food handlers did not take care of their personal hygiene and good practices during preparation of the meals. So, by knowing the level of KAP towards safety and hygiene of the food handlers, the local authorities can get a clearer idea of statistics and plan further training, campaign or program to educate vendors on proper food safety and hygiene.

1.7 Conceptual Framework

Figure 1.0 below shows the conceptual framework used to outline the approach for the research on the KAP regarding food safety and hygiene among street food vendors in Kota Bharu, Kelantan. Sociodemographic factors such as young age (18-29) are most likely to take part in risky food handling behaviour (Roseman & Deale, 2008). Moreover, socioeconomic factors also affect food handling behaviour especially individuals with higher education (Shiferaw, 2000). Food handling training assists to enhance overall food operators' practice on food safety. Training is urgently important to any system of food hygiene as training, instruction and proper supervision increase the potential of the food handlers (Rahman, Mizanur & Taha, 2012).

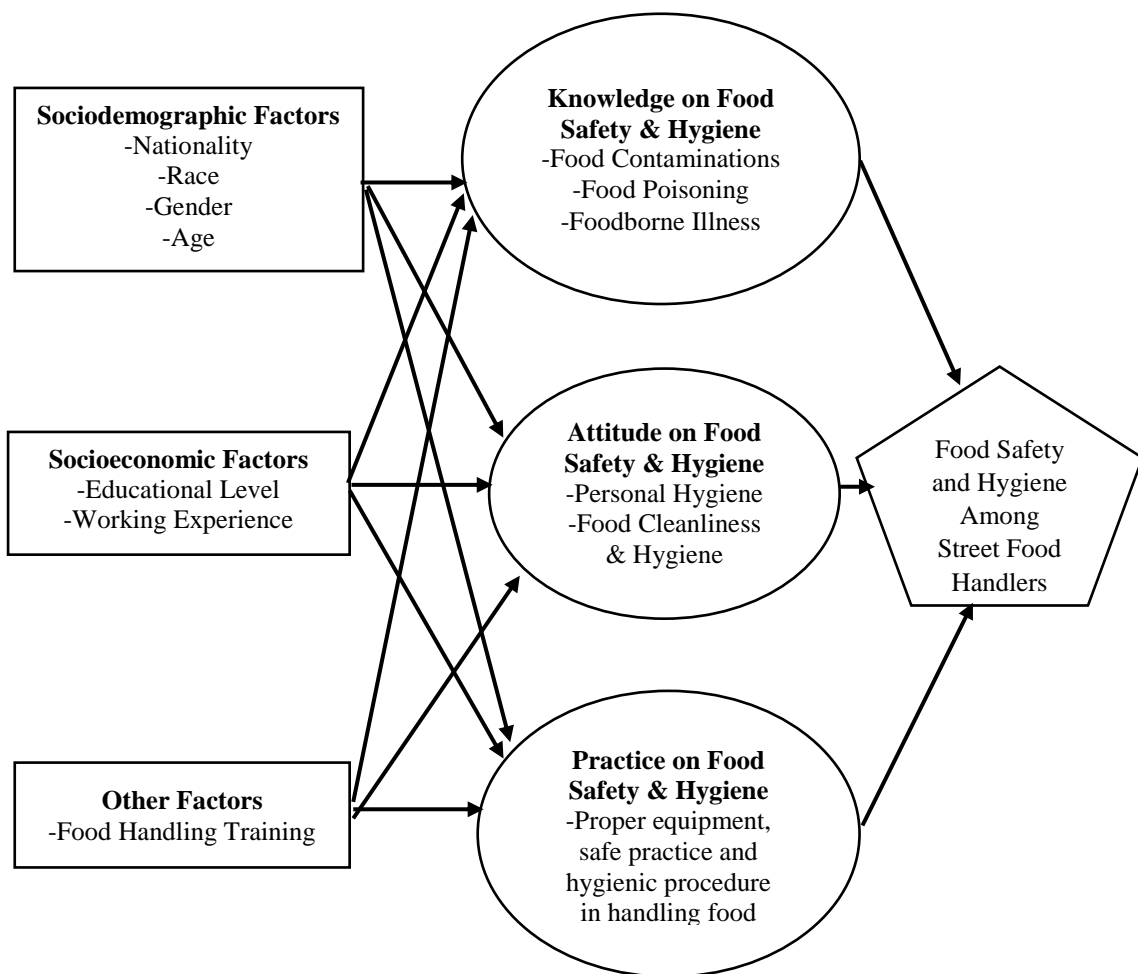


Figure 1 Conceptual Framework of KAP regarding food safety and hygiene

CHAPTER 2: LITERATURE REVIEW

2.1 Foodborne Illness

Foodborne disease includes a wide range of illness and a growing public health problem worldwide. They are the result of ingestion of foodstuffs contaminated with microorganism like viruses, fungi, parasites and bacteria (WHO, 2018). Most commonly, pathogenic bacteria like *Salmonella Typhi*, *Escherichia coli*, *Staphylococcus aureus*, *Vibrio cholera*, *Campylobacter jejuni*, and *Listeria monocytogenes* are the major causes of this outbreak and it usually occurs because of toxin secretion of the microorganisms in the intestinal tract of the infected individual (Abdul Mutalib, Syafinaz & Sakai, 2015).

Foodborne bacteria have been appeared to cause significant morbidity worldwide. They can likewise adjust to new environment and worry to make another strain of bacteria which is more powerful and effective. Future research should focus on how to prevent or lessen the situation. This is because foodborne bacteria will also evolve and making vaccine or antibiotic might complete a little help as it were (Abdul Mutalib *et al.*, 2015).

Foodborne microorganisms can be transmitted at different phases of food preparation. These include contamination at the farm, for instance milk is contaminated with animal faeces, or the animals are as of now been contaminated by pathogenic microorganisms. Transmission can also occur during slaughtering where meat come into contact with animal intestine, skin or fur and finally in the kitchen during food preparation because of inappropriate handling (European Food Safety Authority, 2018).

The most trivial source of contamination is food handlers. This is because they were spreading microorganisms by the means of faecal-oral route or skin lesions, as well as unclean kitchen utensils or kitchen counters (Linscott, 2011).

Hygienic level of a restaurant or a stall will reflect the quality of food they produce. So, the premises with poor sterile condition reported to be the contributor to the foodborne disease outbreak. In Malaysia, these kinds of outbreak are not strange at all due to the hot and humid climate of this country that is suitable for the microorganisms to grow (Syafinaz, Sakai & Shirai, 2015).

The symptoms of food poisoning may range from mild to severe depends on the types of bacteria taken. Certain individual only experienced mild illnesses while the other individuals might develop severe illness requiring hospitalization or even death. The most common symptoms are stomach cramps, nausea, vomiting, fever and diarrhoea (CDC, 2018).

Furthermore, street food vendors have been found to have escalating faecal contamination of food, water and cooking utensils as compared to restaurant workers. They also have limited or no access to running water for them to do a proper hygiene activity. According to Who, Pei, Thong (2016), majority (94.3%) of respondents in Peninsular Malaysia had basic knowledge regarding the importance of hand washing after coughing or sneezing, whereas most of respondents (67.6%) disagreed that in order to combat bacteria before touching the food, we must first sufficiently clean our hands by using running water.

A study in Kelantan shows the risk of typhoid fever among those who buy food from stalls, eat non-heated wrappers, eat at night markets and eat uncooked food. It also found that those who had dirty stoves with little use of soap had high risk of typhoid fever. This is because, food handlers are required to attend particular courses on food handling and if new food handlers without the experience work in the food service establishment, they may cause foodborne illness because of mishandling and inadequacy of knowledge (Abdul Mutalib *et al.*, 2015).

Due to fast pace of living nowadays, it was a necessity for individuals to consume ready to eat or prepared food. In Malaysia, most people were limited in time preparing meals for themselves and it has increased the demand for food consumption from various food service establishments and it has also becoming a trend for most of Malaysian to eat out rather at home (Ali & Abdullah, 2012).

Sometimes prices with lowest deal are what consumers give prioritization at when they purchased the food instead of the hygiene level of the food premises. This will convince food handlers that as long as the price for their meal is cheap, they do not have to concern about food safety (Abdul Mutalib *et al.*, 2015).

2.2 Diarrheal Disease

A food handler or street food vendor infected with a foodborne or waterborne pathogen has an outstanding impact on transferring of diarrheal disease compared to individual who does not handle food as their profession. A study in Asia has demonstrated that rotavirus contributes 43% to 60% of the diarrheal admissions in Vietnam, 32.9% in Taiwan and 24 to 55% in Malaysia (Yap *et al.* 1992, Lee *et al.* 2003 & Hung *et al.* 2006).

Most episodes of diarrhoea will last a few days to a week. Infectious organisms that cause diarrhoea is transmitted from germs that generally grabbed through contact with contaminated surfaces, consumption of polluted water or improperly cooked foods. Disease normally is passed through direct human-to-human transmission, or human-to-environment-to-human transmission of pathogens that have amplified in the environment (The Star, 2012).

Diarrhoea is also a typical side effect of food intolerance, despite the fact that it can be accompanied by different symptoms, such as vomiting, skin rashes and wheezing. The most well-known cause of acute diarrhoea is viral gastroenteritis, which is irritation of the digestive organs and intestines, caused by an infection called rotavirus. Dysentery is one of the infection that leads to severe diarrhoea that consist of mucus and/or blood in the faeces, vomiting blood or in some serious cases resulting death if no treatment is given (Abdul Mutalib *et al.*, 2015). As indicated by a recent nationwide survey, this virus was the main cause of severe diarrhoea, resulting in more than 2,686 cases of acute gastroenteritis (AGE) in Malaysian children (The Star, 2012).

According to Hung (2006), a total of 3317 patients were admitted for diarrhoea during the study period. They were patients from Kuala Lumpur Hospital (KLH) 2353 (70.9%) and from Hospital Umum Sarawak (HUS) 964 (29.1%). Among respondents who had children below the age of 10, 89.6% of Vietnamese respondents and 98.8% of Malaysian respondents reported that their children had experienced an episode of gastroenteritis (Azmi & Reginald, 2015). Definition of gastroenteritis is inflammation of the lining membrane of the stomach and the intestines characterized especially by nausea, vomiting, diarrhoea, and cramps (Merriam-Webster, 2018).

Studies in Asia have shown that rotavirus contributes 43% to 60% of the diarrheal admissions in Vietnam, 32.9% in Taiwan and 24 to 55% in Malaysia (Cheah, 2011). In conclusion, diarrheal disease has been shown to cause significant mortality towards individuals. Thus, hygienic and safe food preparation should be emphasized to reduce the transmission of bacteria towards the food handlers.

2.3 Routes of transmission for Infectious causes of Diarrhoea.

Diarrhoeal infections are among the main sources of morbidity and mortality in youngsters in developing countries (Boschi, Velebit & Shibuya, 2008). Inadequate of safe water, basic sanitation and cleanliness may represent as much as 88% of the disease burden due to diarrhoea (Oloruntoba, Elizabeth & Folarin, 2014). Majority of people do not have access to a hygienic toilet, large amounts of faecal waste are discharged into the environment without sufficient treatment this is likely to have greater impacts on infectious disease burden and quality of life (Hutton, Haller & Bartram 2007).

The vast majority of these infections are spread only by means of the faecal-oral route. At the point when faecal material is exposed to oxygen, fermentation acids can be breathed, and *E. coli* numbers escalate. *E. coli* can survive for long periods of defaecation time, however subsequent proliferation is reliant on its ability to re-enter the gastrointestinal tract via contaminated water and food (Russel, 2001). The barrier in preventing the faeces of infected person is by toilet barrier. This barrier can be done by flushing the faeces away and not let it expose openly in environment.

Next, faeces can be contaminated to finger, flies, field and fluid or water. The finger can be the hand of food handlers and flies came interacted with food when no appropriate storage of food and no proper wastes disposal will polluted the ground water and when there is no proper toilet, the field are the symbolic for the defecation done in open space or at the ground. All these will really prompt to contaminate the food and when the host ingested the food, the food borne disease will happen (Sharifa *et al.*, 2013).

Sanitation aims to hinder contamination of the environment by excreta and in this manner, to avoid transmission of pathogens that begin in defaecation of an infected person (Brown, Cairncross & Ensink, 2013). Organised audits of the effect of sanitation

on well-being have estimated a mean reduction of 32–36% in diarrhoea (Waddington, Snilstveit & White, 2009). More prominent volumes of water accessible to a family tend to bring about better hygiene, including increased hand washing (Brown *et al.*, 2013). Hand washing with soap can interfere the transmission of faecal-oral microbes in the domestic environment. In numerous settings, both country and urban, populaces may approach adequate amounts of water however that water might be risky for utilization because of microbial or chemical contamination. Enhancing water quality at the purpose of utilization can protect youngsters from waterborne infection (Brown *et al.*, 2013).

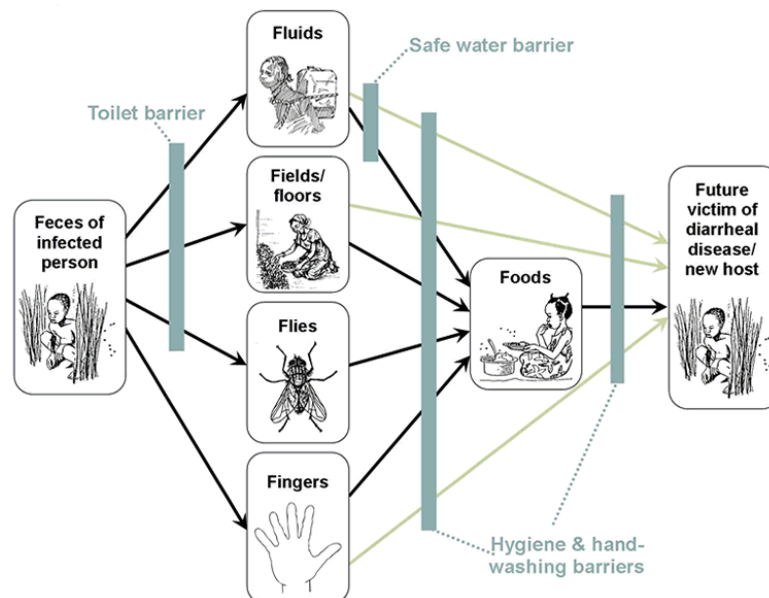


Figure 2.1 Routes of transmission for infectious causes of Diarrhoea

Based on Figure 2.1, faeces can contaminate fluids (water), fields (crops) / floors, flies and fingers (hands). A barrier that inhibits the transmission of pathogens is a primary barrier (toilet barrier). An extensive variety of advances and strategies exists to accomplish this, which include sophisticated and high-cost techniques like waterborne sewage systems and simple low-cost methods like the cat method, which includes the digging of a hole and covering faeces with soil after defecation (Brown *et al.*, 2013).

The WHO/UNICEF Joint Monitoring Programme (JMP) allocates the following as ‘improved’ sanitation that is more possibly to be hygienic: a connection to a sewerage system, septic tanks, pour-flush toilets, enhanced pit restrooms and pit lavatories with a concrete slab. A septic tank is normally located underground, far from the house or toilet. A flush/pour flush refers to a system that flushes excreta to an opening in the ground or leaching pit (protected, covered). A pit lavatory with slab is a dry pit lavatory that uses a hole in the ground to gather the excreta and a squatting slab that being easy to clean and raised above the surrounding ground level to restrain surface water from entering the pit (World Health Organization United Nations Children's Fund, 2006).

Overall, improved sanitation is a primary barrier that inhibits transmission of pathogens while secondary barriers consist of water quality improvement, properly cleaning procedure and screens to keep flies away from food. The direction of faeces to fingers, and fingers to fluids, food, and directly to new host are the transmission that we are concerned. Thus, by developing correct hand washing protects the individual whose hands are being properly washed. The hand hygiene of food handlers is a particular important due to numbers of individuals that are affected daily by their hand hygiene (Mellisa *et al.*, 2011).

2.4 *Salmonella Typhi* (Typhoid Fever)

Typhoid fever is a life-threatening disease that is obtained by ingestion of food or water contaminated with faeces. Deficient hygiene after defecation may spread *Salmonella Typhi* to community food or water supplies. It is a gram-negative bacillus that causes this enteric fever, Figure 2.2. The initial symptoms consist of headache, loss of appetite, joint pain, fever, and sore throat, as well as diarrhoea in children and constipation in adults. It can be stopped and cured by using antibiotics such as Chloramphenicol, cotrimoxazole and amoxicillin (Melissa *et al.*, 2012).



Figure 2.2 *Salmonella Typhi* Bacteria

The death rate of the case is high up to 10 - 20% if the patient does not receive the appropriate treatment but with antibiotic treatment the case death rate can be reduced to less than 1% (MOH, 2017). Individuals with this illness carry bacteria in their bloodstream and intestinal tract. After the person is recovered from this fever, he still being called carrier because he continues to carry the bacteria. Both patients and carriers shed *Salmonella Typhi* in their faeces (CDC, 2014).

By eating food or drinking beverages that have been handled by an individual who is shedding *Salmonella Typhi* or even when the sewage has been contaminated with *Salmonella Typhi* bacteria that gets into the water, we are tending to get the typhoid fever if the actions above are done. Hence, typhoid fever is typically occurring in areas of the world where handwashing is less successive and water is probably to be contaminated with sewage (Larry M. Bush, 2016).

Salmonella Typhi is commonly found in the faeces and barely the urine of infected person. Improper hand washing can lead to contamination of food and water with *S.Typhi*. Water supplies also can be contaminated if personnel faeces are not handled and treated properly. In endemic areas where sanitary measures are generally deficient, *S. Typhi* is transported more periodically by water than by food. In developed countries, transmission is primarily by food that has been infected during preparation by healthy carriers. Flies may disseminate the organism from faeces to food (Larry M. Bush, 2016). It is endemic in developing countries due to poor sanitation and hygiene, poverty, congestion and unsafe water supply. In Malaysia, the states in East Malaysia and the East Coast of the Peninsular are endemic to typhoid diseases (MOH, 2017).

Each year incidence rates of typhoid in Kelantan demonstrate a baseline endemicity of 20 to 30 cases per 100,000 populations (Rahman *et al.*, 1991). All patients of the previous research were Malays (representative of Kelantan population) and half of them used well water at home. Eating out is quite familiar in Kelantan and there is no strict control over scattered food stalls (Malik & Malik, 2001). That is why clean supply of water from the street food vendors is important in preventing foodborne disease and disease outbreak.

Moreover, it is compulsory for the food handlers to get typhoid injection in the event of handling or preparing foods in order to prevent typhoid fever. This is because typhoid can kill up to 30% of people who get it. There are two types of vaccination in order to combat with typhoid fever which is inactivated (killed) vaccine by gotten a shot or the other is a live, attenuated (weakened) vaccine which is taken orally (by mouth) (CDC, 2012). In Malaysia, the typhoid vaccination cards will be issued that valid for a period of 3 years from the date of injection (DBKL, 2018).

2.5 Knowledge, Attitude, Practice on Food Safety and Hygiene

The relationship between knowledge, attitude and practice is frequently explained through the KAP model (Simelane, 2005). Knowledge is characterized as “a complex procedure of remembering, relating, or judging a thought or abstract phenomenon (intellectual abilities)” (Ngoc *et al.*, 2014). Knowledge requires through learning processes and these may be formal or informal instruction, personal experience and experiential sharing. Knowledge of the street food vendors crucially impact on food safety (Muinde & Kuri, 2005).

In addition to this is the actuality that street food vendors are regularly unlicensed, untrained in food hygiene and sanitation and work under crude unsanitary conditions (Muinde *et al.*, 2005). It has been traditionally expected that knowledge is undoubtedly translated into behaviour (Glanz, Lewis & Rimer, 2002). However, behaviour change theorists and experiences in the HIV field, have determined that knowledge alone does not convert into appropriate behaviour modification (Glanz *et al.*, 2002).

According to the WHO, street food vendors in most developing countries should be knowledgeable as they are currently insufficiently organized and aware to embrace the responsibility of their own preparation (Campbell *et al.*, 2011). For example,

hepatitis A virus can be introduced by unwashed hands of food handlers who are themselves infected. Therefore, appropriate personal hygiene as well as sanitary handling practices in the food processing area is fundamental components of any prevention programmes for food safety.

Food vendors ought to be satisfactorily educated on the part of food in disease transmission as well as on rules of personal hygiene and approved practices in preparing street food (Campbell *et al.*, 2011). Assessments of the effectiveness of formal food hygiene education courses in the United Kingdom, United States, Saudi Arabia and Romania prior to 1994, have determined increased knowledge levels of course participants, and improvements in the relationship between food industry and enforcement personnel due to a resultant common understanding.

However, despite the elevated knowledge, evidence of consequential enhanced food handling behaviour was not clearly demonstrable (Rennie, 1994). An effective strategy for diminishing food-borne illness and economic losses that are related with food- borne diseases can be done by proper education of food handlers and consumers. Galgamuwa (2016) revealed that majority of food handlers had good knowledge of transmission and symptoms of food borne ailment and most of them believed that self-hygiene can prevents food borne disease.

Besides knowledge, attitude is also a crucial factor that ensures a minimization trend of foodborne diseases (Nee & Sani, 2011). Griffith (2005) indicated that improved knowledge will lead to behavioural changes involving better practices, and also suggested that other aspects, including staff attitudes, can constrain the improvements of practices among staff.

However, Choudoury et al. (2011) reported that education had no significant impact on knowledge and attitude of vendors in Guwahati, Assam, India to food safety practices. Attitude involves evaluative concepts collaborated with the way community think, feel and behave. It comprehends a cognitive, emotional and a behavioural component indicating what you know, how you feel and what you do (Keller, 1998).

It has also been hypothesized that attitudes may determine one's intention to perform a given behaviour or practice (Rutter & Quine, 2003). They are thus corresponded with behaviour, for example if a person has a positive attitude towards appropriate handwashing, they are more likely to wash their hands (Simelane, 2005).

The attitude of consumers also has a big important impact on food safety issues, which are subject matter of interest to food producers and handlers, public authorities and health educators. Findings reveals that consumer attitudes towards food safety in general differ according to demographic and socio-economic factors such as gender, age, educational level and economic status (Ngoc *et al.*, 2014).

However, based on health related studies, it has been supported that knowledge is not main factor that impacts treatment seeking practice and in order to change behaviour, health programmes need to address a number of issues including socio-cultural, environmental, economic and structural factors (Launiala, 2009).

Food handling practices was an important role in ensuring food safety throughout the food production chain (WHO, 1989). In particular, food vendors who have poor handling practices or ignored hygienic practices may escalate the risk of pathogens coming into contact with foods. Convenience and financial factors were the main reasons why most vendors were not executing their knowledge of safety practices (Benny & Badrie, 2007).

In addition, studies in Trinidad, West Indies, reported that most of the vending sites observed did not have pipe borne water, 97.5% did not have drain to channel waste water and toilet facilities. That is why most of them did not conduct a safe and hygienic hand practices although they know the benefits (Benny *et al.*, 2007).

Safe practices in food hygiene, as well as causes associated factors to food-borne illness, basic safety of food-handling principles such as cross-contamination, and the principles of the Hazard Analysis and Critical Control Points (HACCP) should be focused in consumers' education (Ngoc *et al.*, 2014). In particular, previous studies in some developing countries have displayed the inadequacy of clean (potable) water at street vending sites resulting in hand washing often being done in buckets of water (without soap) (Bryan *et al.*, 1988 & Ekanem, 1998).

Several authors like Toh & Birchenough (2000), and Subratty *et al.* (2004) reported that education and training enhanced handlers' knowledge and attitude to food safety practices. Most researchers agree that intervention in food safety by contributing knowledge to food handlers with the expectation those workers will translate this knowledge into practice (Green, 2007). The majority of studies support knowledge as an essential to safe food handling practices (Daniels, Daniels & Gilmet, 2001)

There is limited information on the effectiveness of training conducted on street food vendors because many of the studies have been conducted on the formal sector based on the literature reviewed by Campbell (2011). It is therefore very important to explore the level of KAP among street food vendors in order to allow for a better understanding of these variables in street food vendors in relation to food safety and hygiene.

CHAPTER 3 METHODOLOGY

3.1 Study Design

This descriptive, cross-sectional study used an adapted questionnaire from Mohd Firdaus, (2015) in his research entitled “Food court hygiene assessment and food safety knowledge, attitudes and practices of food handlers in Putrajaya”. The questionnaire was used to determine the score level of knowledge, attitude and practice of food safety and hygiene among street food vendors in Kota Bharu, Kelantan.

3.2 Study Location

The selected location was Kota Bharu. It is the capital of the state of Kelantan. The city is situated in the east coast of Peninsular Malaysia, close to the southern Thai border (Figure 3.1). Majority of the street food vendors in Kota Bharu have limited or no access to water when compared to restaurants. Thus, most of the handlers practiced poor personal hygiene including food handling methods.



Figure 3.1 Maps of Kota Bharu, Kelantan

3.3 Study Period

The whole research began since early September 2017 till June 2018.

3.4 Sampling Size Calculation

The sample size calculation used in this study was “single proportion” formula.

$$n = \left[\frac{Z}{\Delta} \right]^2 p (1-p)$$

n = sample size

Z = 1.96 for $\alpha = 0.05$ (one tail)

Δ = precision, 0.05

p = anticipated population proportion, 0.84

Therefore, based on previous study conducted by Mohd Firdaus *et al.* (2015), the prevalence of food handlers' knowledge was 0.841.

$$n = \left[\frac{1.96}{0.05} \right]^2 \times 0.841 (1 - 0.841)$$

$$n = 205 \text{ of food handlers}$$

After considering 20% of non-response rate,

$$205 \times 20\% = 41$$

$$205 + 41 = 246$$

$$n = 246 \text{ of food handlers}$$