

# CHAPTER 1

## INTRODUCTION

### 1.1 Introduction

This chapter is an introductory note to the whole research effort. It begins with the background of the study, followed by the research problems, theoretical and conceptual framework, research questions and research objectives. Research implications on theoretical knowledge and study limitation will be outlined later.

### 1.2 Background of study

People nowadays are working at a fast pace whereby they are rushing into every job they do and this includes eating. In order to cope with time and work demands, people especially in developing countries tend to choose food that is already prepared instead of making home-cooked meals (Jahan, 2011). Even though the world economy is experiencing fluctuation, the increasing price of basic commodities such as rice, cooking oil and wheat is not a driving factor for people to continue buying food outside rather than cooking at home. The prices of goods such as oils, rice and wheat have risen sharply in recent years. In addition, lack of time to prepare food at home also makes it convenient for people to eat away from home. This happened because their time is fully fitted to do their work. Most of the people that purchase meals from outside stated that they do not have time to cook (Jahan, 2011).

Approximately, 64% of Malaysians will eat away from home for at least one meal per day and the remaining 36% who eat at home, 12.5% have at least one meal that comes from outside (The Star, 2014). The high frequency of Malaysians eating outside is resulted from rapid modernization and urbanization that subsequently changed the eating patterns and lifestyle (The Star, 2014). This is contradictory to Japan and India whereby two thirds of the country's population prepared their own meals or eat at home. In addition, the preferences of having eating out have become a common habit as compared to home prepared food consumption (Bevis, 2012).

The increasing trend of people eating out or known as frequenting culture to restaurants can lead to hygiene and safety issues of food handling and preparation (Zarina & Faisal, 2012). These include food handler personal hygiene and time and temperature abuse during storage and serving (Wahida et al., 2017). As such, the number of foodborne illnesses or informally referred to as food poisoning is increasing and causes a public concern especially when mortality due to the illness was reported. Globally, it is estimated that 48 million people fall sick with 128, 000 are hospitalized and 3000 died of food poisoning (CDC, 2018). In addition, one - third of these incidences occur among children younger than 5 years and are associated to diarrheal diseases, that are resulted from food contaminated with pathogens such as norovirus, pathogenic *Escherichia coli*, and *Salmonella spp.* (WHO, 2019). Moreover, foodborne disease has caused 33 million loss of healthy lives of which it affects low – and middle – income countries (LMICs are defined as countries having a Gross National Income per capita of \$1025 or less for low income and between \$1026 to \$12,375 for middle income (World Bank, 2021). Moreover, regulation of food production, handling, and processing is commonly less stringent in these

countries, and consumers have restricted access to resources needed to safely handle food at home, such as clean water and adequate food storage (WHO, 2015), that may lead to poorer health consequences (Wagstaff, 2002).

Consumers play important roles in food safety. This can be reflected by how they choose the food, handle and prepare the food after obtaining it and by how they affect the supply chain. It is an obligation for Muslims to ensure not only the nutrition of the food but also its purity. Moreover, acquiring wholesomeness of the foods that are halal, safe for human consumption and contain high nutritional value is considered the way of worshipping Allah when it is done accordingly. These have been mentioned in Al – Quran:

"O messengers, eat from the good foods and work righteousness. Indeed, I, of what you do, am Knowing" (Al – Quran. Al – Mu'minun 23: 51).

"O mankind, eat from whatever is on earth [that is] lawful and good and do not follow the footsteps of Satan. Indeed, he is to you a clear enemy" (Al – Quran. Al – Baqarah 2:168).

With this respect, the consumers' roles are influenced by their knowledge, attitudes and drivers, and that result in behaviors and actions. Most consumers have some knowledge of the safe food handling (Groth, 1999). Nonetheless, many have a poor knowledge on proper preparation and cook foods to minimize risk of foodborne illness that include proper handwashing, food preparing to reduce cross-contamination, and cooking and storing foods at the correct temperature (Kunadu et al., 2016; Lando et al., 2016). The risk can be exasperated by the sources of food consumers bought from, which are often from the street vendors or even from homemade food via the online platforms, where compliance to food safety standard is often neglected at the point of purchase (Grace, 2015). For instance, in May 2020, 99 cases of food poisoning with one mortality was reported in Malaysia due to

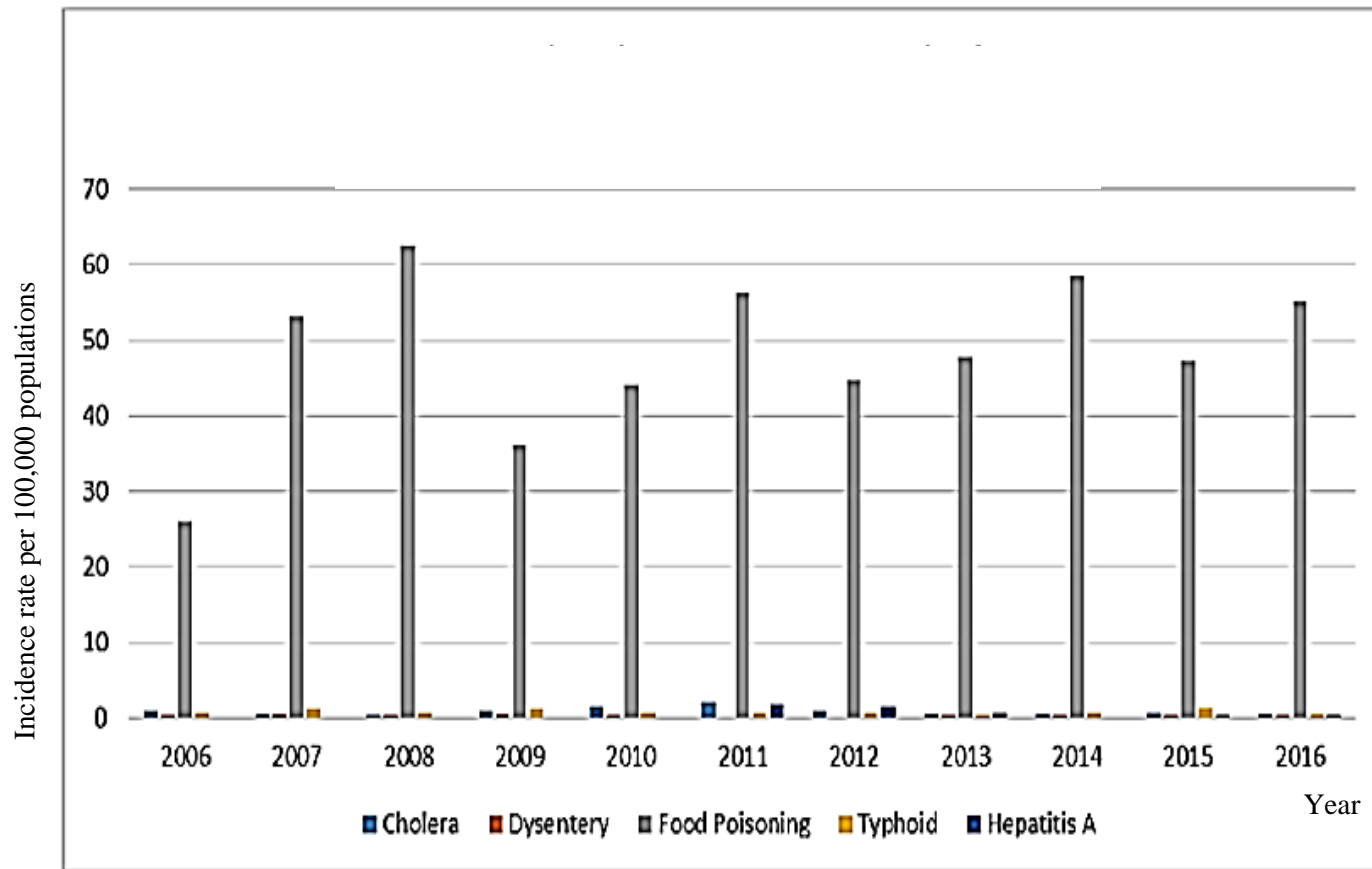
the consumption of *puding buih* which was bought over an online seller who claimed to produce homemade food (Malaysia Ministry of Health (MOH), 2020a). Thus, reducing risk across the food chain, from the point of production to distribution and preparation and consumption, is required to reduce the risk of poor food safety impact (Allard, 2002).

### **1.2.1 Foodborne disease in Malaysia**

The Malaysian Ministry of Health surveillance reported that notified food and water borne diseases were cholera, dysentery, food poisoning, Hepatitis A and typhoid (Ministry of Health (MOH), 2017). Food poisoning remains a significant trend disease related to gastrointestinal disease throughout the years and as such, prioritization of preventive measure should be emphasized on food poisoning as to compare to other food and waterborne diseases (Figure 1)(MOH, 2017). The incidence rate of the food poisoning per 100,000 population was 42.25 with 0.01 mortality rate in 2017 and it was the highest morbidity among other food and water borne diseases (MOH, 2017).

Being alarmed with the trend, a few risk factors that contributed to the morbidity has been identified which include poor personal hygiene of food handlers, lack of clean and safe water as well as insanitary environment (Meftahuddin, 2002). Majority of the time, food handlers are recognized as the worldwide vehicle of food contamination through fecal – oral route and skin lesions (Linscott, 2011). On top of that, the flourishing of food service establishments especially the 24 – hour restaurants may contribute to the food poisoning outbreaks and this occurs when the importance of food handling hygiene and sanitation is neglected (Zarina & Faisal, 2012).

In Malaysia, half of the food poisoning cases were reported due to insanitary handling procedures. Such mishandling procedures include preparation of food in advance, inappropriate way of cooling and insufficient temperature of cooking and reheating (Soon et al., 2011). All these malpractices of food handling permit the growth of pathogens due to failure of killing pathogen or assisting them to be dormant before reaching suitable temperature to multiply. Thus, manipulation of the temperature and sanitation of kitchen environment are the key factors to reduce the risk of tainted food served to the consumers (Aung & Chang, 2014). Having noted the key element of food safety, several preventive measures targeting food handlers are being developed and implemented. This will be further elaborated in the next paragraph.



**Figure 1.1:** Diseases related to gastro – intestinal infection (Source: MOH, 2017).

### **1.2.2 Training and education as preventive measure**

Most of the food handling training is targeted to food handlers as they are the potential vehicle to contaminate food from cross-contamination of raw food to cooked food, inadequately temperature of cooking and storing food products (Aung & Chang, 2014). The Ministry of Health Malaysia has launched the Food Handler's Training Programme in 1996 as assurance of sanitary food practices during food preparation and handling and food purchase (Jinap et al., 2003). As of October, 2018, there were 300 Food Handler's Training Institutes accredited by the Ministry of Health (MOH, 2020 a). The Food Handler's Training has been made mandatory for all food handlers under Food Hygiene Regulations (2009). In the training modules, the food handlers are taught general principles of food hygiene that include sanitation of food handling and preparation, personal and environmental cleanliness, correct storage temperatures and identification of perishables and imperishable foods. They are also inculcated with the awareness of how their actions can result in food contamination (Tirmizi et al., 2018).

The efficacy of Food Handler Training programme has been documented in several local studies. Recent study among food handlers in university canteen within Kuala Lumpur has shown a positive score on food safety knowledge (Lee et al., 2017). This was supported by Norrakiah and Siow (2014) whereby the authors observed good knowledge on food safety among food handlers in university canteen who undergone the training. Similar results were found among the food handlers in Kuala Pilah, a good score in food safety knowledge as well as food safety practice (Abdul Mutalib et al., 2012).

Apart from training the food handlers on food safety, the Malaysian government has placed emphasis in producing well – trained public health professionals in epidemiology and disease surveillance through the Epidemiology Intelligence Programme (EIP). EIP is a modified programme from Epidemic Intelligence Service of Centre for Disease Control and Prevention, the United States. EIP was initiated in 2002 as a mandate from the cabinet to strengthen disease control following the Nipah Encephalitis outbreak in 1999 (Harpal, 2009). As such, this programme aims to produce practitioners that are able to develop competencies in rapid response disease surveillance and subsequently be deployed to assist other countries during disease outbreak and disaster relief (Harpal, 2009). The EIP has observed a successful impact in terms of delivering information on infectious disease outbreaks timely and efficiently to the stakeholders. This is necessary for the stakeholders to develop capabilities to detect, assess, notify and respond to public health threats (Aurysia et al., 2018).

Malaysia also implements food premise grading system, evaluated by the local authorities in order to develop awareness among the public to look for a clean food premise and the food premise owner to maintain the premise and food sanitation. The grades may vary from each district, but in general there are three grades: Grade A, B and C (Malaysia Ministry of Housing and Local Government, 2014). The grade A premise marks range is 86 -100%, indicating a very clean premise and the following inspection will be conducted in two years time or earlier if there is a complaint. Grade B (71-85%) is issued to clean premise and subsequent inspection will be conducted in yearly bases or earlier if there is a complaint lodged from public. On the other hand, a grade C (51-70%) is identified as a 'less clean' premise with follow-up inspection in 6 months. Finally, an unclean food

premise (with marks less than 50%) will be immediately instructed to close down its operation within two weeks for cleaning activities. This premise will be then inspected to ensure its competency to conduct business again (Malaysia Ministry of Housing and Local Government, 2014).

The grading system of the premise assist the public in deciding a clean and hygienic food premise as unacceptable food hygiene level indicate the risk of contracting foodborne illness (Abdul Mutalib et al., 2012). However, there are probabilities that food poisoning still occur in a clean and well-known restaurant (Alsop, 2013). On the other hand, there are members of the public who are not aware of the meaning of the grading system and their perception on the premise grade to their health outcomes. This trend can be observed where many Malaysians frequenting food premise despite their poor grading on cleanliness (Zarina & Faisal, 2012). Hence, both food handlers and the public should play an important role in ensuring the food prepared is clean and safe to consume.

In addition to the food premise grading, the Food Quality Division together with Nutrition division, Ministry of Health has developed a new recognition for food premises called BeSS (*Bersih, Selamat dan Sihat*). This recognition is an enhancement monitoring programme that incorporates the components of food safety and nutrition (MOH, 2016). The BeSS programme intends to assist the food premise owners by providing them with technical guidance on food safety and healthy food preparation. In contrast with food premise grading, the BeSS recognition is applicable to all type of food premises and outlets including kiosks, institution canteens, bakeries, food stalls, hotel restaurants and food courts (MOH, 2016). Recognition will be given to food outlets or premises that achieve marks  $\geq 86$ . For those who fail to achieve the recommended mark, they are instructed to

take corrective action within six – month duration. Monitoring exercise from the MOH will be conducted once in three years (MOH, 2016).

The researcher performed search on food safety education intervention conducted on Malaysian consumer, but none of the finding reported on this. Most food poisoning prevention programmes are targeted at food handlers (Abdul Mutalib et al., 2012; Abdullah Sani & Siow, 2014; Nik Rosmawati et al., 2016; Lee et al., 2017). In developed countries, few consumers-oriented food safety programmes were reported, and its efficacy measured. Young et al. (2015) in their meta-analysis work on effectiveness of food safety education intervention among consumers found that most of the Randomized Controlled Trial (RCT) interventions indicated positive intervention effect for behavior and knowledge outcomes. Nevertheless, the authors highlighted that most of the studies included in their analysis were uncontrolled before-and-after; which may lead to high study heterogeneity (Young et al., 2015). The analysis also reveals the importance of developing interventions based on relevant behavior change theories in order to underpin effective education intervention (Milton & Mullan, 2010; Young et al., 2015).

Although there are a few programmes were developed by the government to tackle the food poisoning issue, the incidence remains significant each year (CDC, 2018). One of the issues identified is the reporting system on foodborne disease which occurs too late after the incidence has occurred (Soon et al., 2011). As such, the updated incidence may not be captured and necessary action such as risk assessment to mitigate the problem may take place late (Soon et al., 2011). In addition, under – reporting of the food poisoning cases among the public may also contribute to the large variance of food poisoning

incidences (MOH, 2017; MOH, 2018). All of these gaps will be further discussed in the next section.

### **1.3 Statement of problem**

In this subsection, a few issues pertaining to food poisoning prevention will be elaborated and this includes gaps in food poisoning surveillance in Malaysia and consumers' behavior towards food safety.

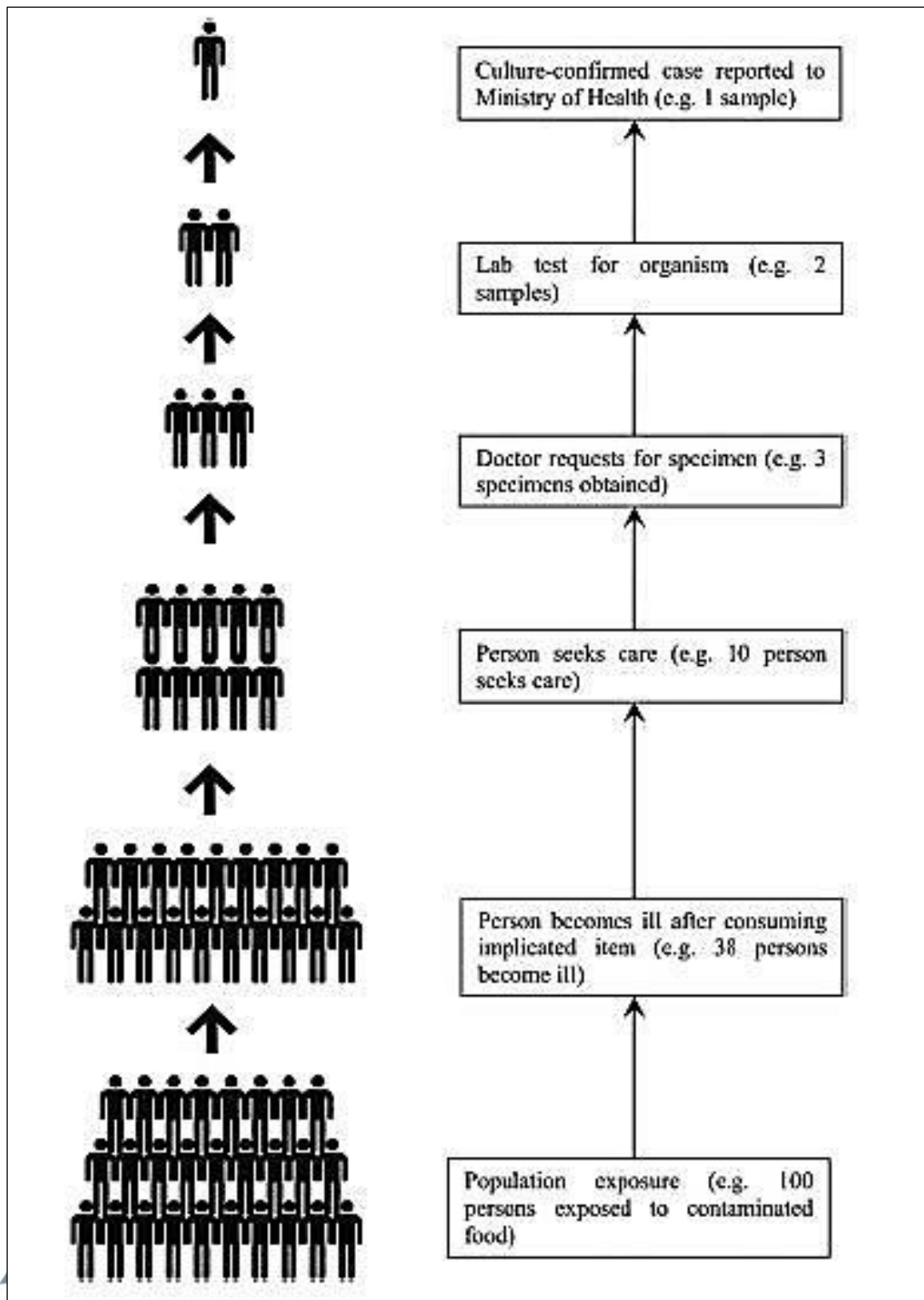
#### **1.3.1 Food poisoning surveillance in Malaysia**

Under reporting and undiagnosed food poisoning cases have become a major issue in foodborne illness surveillance in developing countries. In order for a foodborne infection case to be lodged officially, a complex chain of events must occur first and a break at any point of the chain may result in a case not being reported (Soon et al., 2011). To explain this, one should understand the reasons for limited information or published data and why it takes so long to report. First, a complete data from large, federated countries with a number of levels of governance are difficult to gather for example: local/regional/county or state/provincial/ federal; added up with limited resources to conduct full trace back investigations (Soon et al., 2011). This issue is further compounded by the shorter life of implicated foods that may be thrown away or consumed during the epidemiology and environmental trace back.

In some food poisoning cases, not all the victims seek treatment in healthcare facilities (Wahida et al., 2017). This may be due to many of the individuals considering diarrhea as a temporary inconvenience rather than symptom of disease, hence may not seek

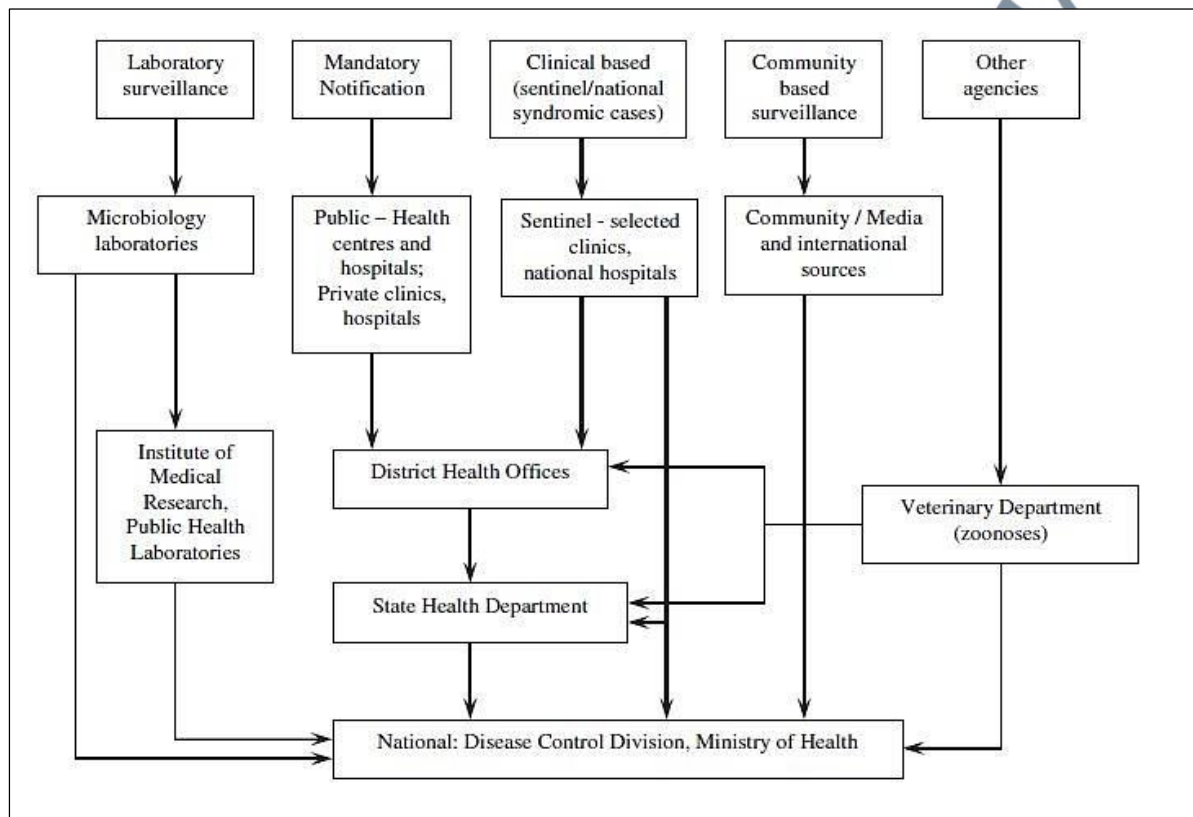
for a proper treatment (Wahida et al, 2017; Soon et al., 2011). In addition, for the case to be confirmed, the health practitioner must instruct a stool culture in order for the laboratory to identify the etiologic agent before reporting the positive result to the local health office (Soon et al., 2011) (Figure 1.2). Given such limitations, it is estimated that the actual number of food poisoning cases can be substantially greater than the number of cases reported (Voetsch et al., 2004). Other limitations include difficulties in identifying specific cases to a specific food pathogen source as various pathogens can be transmitted by food or non – food vehicles. Once the food is identified as a common source of outbreak, a detailed review of its production flows may reveal where the contamination may likely to be originated. This information is crucial for the risk assessor, to identify possible hazards, thus develop mitigation strategies (Braden & Tauxe, 2006).

The current Malaysian foodborne illness surveillance data is gathered through physician – based surveillance and outbreak investigations. The notifications of the foodborne diseases are received from the government health facilities that consist of hospitals, outpatient departments, and private health facilities through electronic reporting system known as Communicable Diseases Control Information System (CDCIS) (MOH, 2004). This system is monitored by Communicable Diseases Surveillance Section, Diseases Control Division, Ministry of Health Malaysia (See Figure 1.3). Under the Prevention and Control of Infectious Diseases Act 1988 (Act 342), five foodborne and waterborne illnesses are mandatory to be notified: cholera, typhoid/paratyphoid fevers, viral Hepatitis A, food poisoning and dysentery.



Source: Voetsch et al. (2004); Braden and Tauxe (2006)

Figure 1.2: Surveillance pyramid.



Source: Thong (2006)

**Figure 1.3:** Communicable diseases surveillance in Malaysia.

### 1.3.2 Consumer's food safety behavior and its association to knowledge, attitude and risk perceptions.

Previous studies demonstrated that most of the outbreak of food poisoning were resulted from low knowledge of food safety measure during food handling that include improper cooking, cross-contamination, contaminated ingredients and improper storage (Al-Sakkaf, 2013; Ruby et al., 2019a; Wu et al., 2018). Despite the importance of knowledge to individual's food preventive behavior, approximately 50% of the studies

among food handlers reported that the knowledge does not necessarily translate into practice (Ruby et al., 2019a; Zanin et al., 2017). This can be reflected from a recent food poisoning outbreak in November 2021 that involved 152 students in a boarding school after consumed the food in the canteen (Bernama,2021). Thus, in most cases, the responsibility of food safety assurance is not only under the scope of the food manufacturer or food handler but also the consumers.

Individual's food preventive behaviors are also resulted from attitude of which attitude together with knowledge may increase the probability of consumers' performing food safety protective (Soon et al., 2020). Nonetheless, low attitude of food safety protective behavior were demonstrated to pay less attention to aspects such as food quality, food safety even food integrity when buying food (Mihalache et al., 2021). This was supported by Wahida et al. (2017) that consumers' attitude on preference of choosing food premise despite of their insanitary environment may put them into the risk of food poisoning (Abdul Mutalib et al., 2015).

Apart from attitude, consumer's risk perceptions also contribute to the low engagement to food poisoning preventive behavior. For instance, individual's who perceived themselves as less susceptible to get food poisoning may adopt risky food poisoning behavior (Wahida et al., 2017; Sharifa Ezat et al., 2013). In addition, consumers with optimism bias were observed to have poor food choices (Evans et al., 2020). Consumers made minimum effort on food choices where most decision was based on heuristics that associated with consumers' expertise, product cost and experience with the product (Tiozzo et al., 2018; Siegrist & Suttlerlin, 2014). This was coupled with low level perception on benefit and risk of food on consumers' health and well – being that contribute

to less attention to knowledge related to benefits and risks when there are no immediate tangible effects of food choice and consumption (Ueland et al., 2012).

The discussion clearly indicates that Malaysia is committed towards ensuring the safety and cleanliness of food for the community via several food poisoning preventive initiatives. Nonetheless, most of the initiatives were more targeted on food vendors. Indeed, a workforce that involves the food handlers, food distributors and the government agencies may be insufficient to tackle this issue if the community is less empowered in terms of notifying the authorities on food mishandling and choosing clean and safe food. (Wahida et al., 2017; Soon et al., 2011). Studies have demonstrated that consumer's knowledge, attitude and risk perceptions can shape food poisoning preventive behavior (Bearth et al., 2014; Ruby et al., 2019a; Soon et al., 2020; Sayuti et al., 2020; Kuo & Weng, 2021). Thus, community empowerment and engagement should be emphasized when designing a prevention programme specifically for food safety (Bamgboje-Ayodelez et al., 2015). In addition, WHO advised that the food safety objectives are to be set at the stage of consumption, rather than at the point of purchase with consumers as the final link in the food chain to ensure the safety of the food consumed and avoid food poisoning (Milton & Mullan, 2010). Hence, to ensure the success of food poisoning prevention intervention, an insight into the consumer's psychosocial elements should be taken into consideration (Munro et al., 2007). Bamgboje-Ayodelez et al. (2015) suggested that different individuals adopted new beliefs with different degrees of ease or difficulty, and thus behavioral modification occur at different rates among different groups of consumers. Odeyemi et al. (2019) on the other hand argued that the misinterpretation of the food poisoning symptoms is one of the reasons the negligence of consumers in seeking for treatment. Thus, a good

knowledge and practices of food safety play significant roles in preventing food poisoning outbreak (Odeyemi et al., 2019; Ruby et al., 2019a).

#### **1.4 Study aim**

This study aims to develop a comprehensive food poisoning prevention module for buying or eating outside food, namely ‘See, Select, Tell’ that is tailored to Malaysian consumers. In order to achieve this aim, this module adhered to Design and Development Research (DDR). DDR is defined as ‘the systematic study of design, development and evaluation processes with the aim of establishing empirical basis for creation of instructional and non-instructional products and tools and new or enhanced models that govern their development’ (Richey & Klein, 2007). Using DDR approach, a module development will undergo three phases. It starts with Need Analysis (Phase 1), followed by Module Design and Development (Phase 2) and finally Implementation and Evaluation (Phase 3).

#### **1.5 Research questions**

Research questions are constructed based on the three phases involved in DDR:

##### **a) Phase 1: Need analysis**

- (i) What is the need for food poisoning prevention module among the consumers?
- (ii) What is the food poisoning knowledge level of consumers who consume food away from home?

- (iii) What is the attitude level of consumers who consume food away from home?
- (iv) What is the level of food poisoning preventive behavior of consumers who consume food away from home?
- (v) What are the risk perceptions of consumers towards food poisoning and its prevention?
- (vi) Is there any significant association between food poisoning prevention knowledge and attitude?
- (vii) Is there any significant association between food poisoning prevention knowledge and preventive behavior?
- (viii) Is there any relationship association between food poisoning prevention attitude and preventive behavior?
- (ix) Is there any significant relationship between food poisoning prevention risk perceptions and preventive behavior?

**b) Phase 2: Design and Development**

- (i) What is the suitable design of food poisoning prevention educational module for the use of consumers?
- (ii) What are the appropriate module objectives for the food poisoning prevention educational module according to the experts' view?
- (iii) What are the suitable delivery methods for the food poisoning prevention module according to experts' view?
- (iv) What are the applicable educational resources for food poisoning prevention module according to experts' view?

- (v) What are the suitable content evaluation methods of the module according to the experts' view?

**c) Phase 3: Implementation and evaluation**

- (i) Is there any significant difference in terms of food poisoning prevention knowledge scores before and after the module implementation?
- (ii) Is there any significant difference in terms of attitudes scores towards food poisoning prevention before and after the module implementation?
- (iii) Is there any significant difference in terms of risk perceptions towards food poisoning prevention scores before and after the module implementation?
- (iv) What are the consumers' feedbacks on the usability of 'See, Select, Tell' food poisoning prevention module?

**1.6 Objectives of study**

**1.6.1 General objective**

The general objective for this research is to develop a food poisoning prevention module for consumers who consume food away from home. The development of the module involved three phases, namely: Need Analysis; Design and Development; and Implementation and Evaluation.

### 1.6.2 Specific objectives

In order to achieve the research objectives, a few specific objectives were formulated according to the DDR phases:

#### a) Phase 1: Need Analysis

- (i) To identify the need for a food poisoning prevention module for consumers who consume food away from home.
- (ii) To determine the knowledge level of food poisoning prevention among the consumers who consume food away from home.
- (iii) To determine the food poisoning prevention attitude level of consumers who consume food away from home.
- (iv) To determine the level of food poisoning preventive behavior of the consumers who consume food away from home.
- (v) To identify the risk perceptions towards food poisoning and its prevention of the consumers who consume food away from home.
- (vi) To determine the significant relationship between food poisoning prevention knowledge and attitude.
- (vii) To determine the significant relationship between food poisoning prevention knowledge and preventive behavior.
- (viii) To determine the significant relationship between food poisoning prevention attitude and preventive behavior.
- (ix) To determine the significant relationship between food poisoning prevention risk perceptions and preventive behavior.

**b) Phase 2: Design and Development**

- (i) To identify the suitable design of food poisoning prevention educational module for consumers.
- (ii) To outline the appropriate module objectives for the food poisoning prevention educational module according to the experts' view.
- (iii) To determine the suitable delivery methods for the food poisoning prevention module according to experts' view.
- (iv) To identify the applicable learning resources for food poisoning prevention module according to experts' view.
- (v) To determine the suitable content evaluation methods of the module according to the experts' view.

**c) Phase 3: Implementation and Evaluation**

- (i) To identify the significant difference of food poisoning prevention knowledge scores before and after module implementation.
- (ii) To determine the significant difference of food poisoning prevention attitude scores before and after module implementation.
- (iii) To determine the significant difference of food poisoning prevention risk perception scores before and after module implementation.
- (iv) To ascertain the consumer's feedback on the usability of 'See, Select, Tell' educational module.

### 1.6.3 Research hypotheses

Hypotheses are specific and testable proposition or predictive statements about the possible outcome of a study based on a particular population, such as presumed differences between groups on a particular variable or relationships between variables (Creswell & Creswell, 2018). For this purpose, hypotheses were constructed based on null hypotheses due to the fact that the outcome cannot be predicted precisely by the researcher. With this respect, research hypotheses involved research questions vi – ix in Phase 1 and research questions i – iii in Phase 3.

- H<sub>01</sub> : There is no significant relationship between food poisoning prevention knowledge and attitude.
- H<sub>02</sub> : There is no significant relationship between food poisoning prevention knowledge and preventive behavior
- H<sub>03</sub> : There is no significant relationship between food poisoning prevention attitude and preventive behavior.
- H<sub>04</sub> : There is no significant relationship between food poisoning prevention risk perceptions and preventive behavior.
- H<sub>05</sub> : There is no significant difference in food poisoning prevention knowledge scores before and after module implementation.
- H<sub>06</sub> : There is no significant difference in food poisoning prevention attitude scores before and after module implementation.
- H<sub>07</sub> : There is no significant difference in food poisoning prevention risk perceptions before and after module implementation.

## **1.7 The significance of the study**

### **1.7.1 Theoretical significance**

In view of theoretical significance, this study reduces the gap of understanding consumer behaviors on food poisoning prevention. Although there are a few guidelines for food poisoning prevention outlined by government and practitioners, their effectiveness have not been investigated. This study assists in addressing the theoretically based validated research in this area. Very little health promotion in Malaysia was developed based on health promotion model; hence the practicality and effectiveness may be questioned. By determining which health belief constructs that may influence a person's decision behaviors in preventing food poisoning; a proper health education can be developed and strengthened.

### **1.7.2 Practical significance**

There is also practical significance for practitioners in the field of community health promotion. The importance of identifying perceived susceptibility, perceived severity and barriers may give some hint to the community health practitioner on designing an effective content for food safety educational programme. Furthermore, when consumers are aware of the likelihood of threats (perceived susceptibility), they can make conscious decision to perform appropriate preventive measures (Ng et al., 2009). Thus, it is suggested that awareness programme on food poisoning prevention should focus on educating consumers about the possibility and consequences of food poisoning in order for them to their roles and responsibilities in protecting themselves from the disease (Ng et al., 2009).

## **1.8 Scope of study**

This study is confined among consumers in Ampang Jaya, Tampin and Kuala Pilah areas. Consumers were selected from those aged 18 years old and above who eat or buy outside cooked food at least one to three times in a month. This age range is known to be the most frequenting consumers in restaurants or food premises (Astuti & Hanan, 2017) whilst eating outside frequency of once to three times a month is the most frequent eating outside habit among young adults reported in previous study (Chin & Nasir, 2010).

The study was conducted in three phases namely Phase 1: Need Analysis that involved information gathering on consumer's sociodemographic profile, knowledge, attitude and preventive behavior (KAP) on food poisoning as well as risk perception towards food poisoning prevention. Information gathered on this will be used to develop a module focusing on preventing food poisoning in the next phase (Phase 2). For this purpose, a module was design, developed and validated by the experts. The usability of the module was evaluated in Phase 3 of which the efficacy of the module was ascertained via pre and post experimental study and feedback from the consumers.

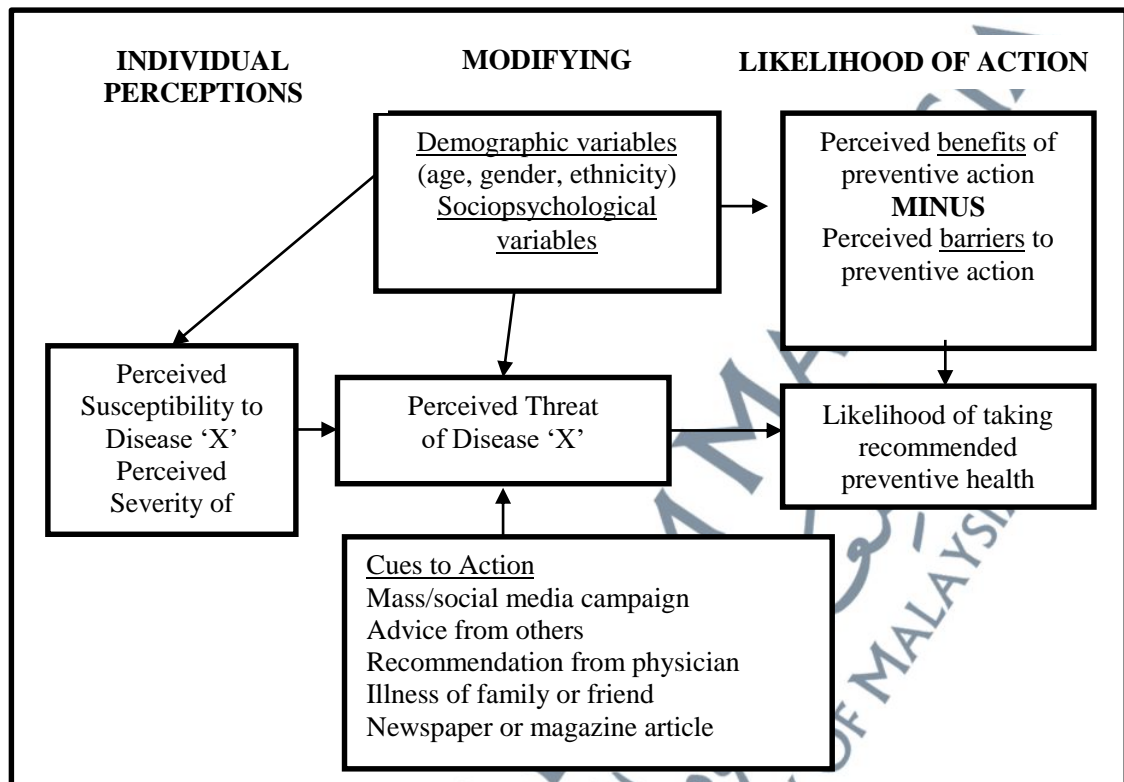
## **1.9 Research theoretical/conceptual framework**

In the research theoretical framework, the researcher described the fundamental theories or model used to form the base of this research. These theories later were integrated to form a conceptual framework that served as a basis in the development of a module.

### 1.9.1 Need theories

McKillip (1987) defined needs as value judgments of which a target group's problems can be solved. Needs analysis, involving the identification and evaluation of needs, is a tool for decision making in the human services and education. Decisions can be varied, including resource allocation, grant funding, and planning. In other words, needs assessment is a process of evaluating the problems and solutions identified for a target population. In this process, it emphasizes the importance and relevance of the problems and solutions.

For this purpose, Health Belief Model was employed as a fundamental theory in Phase 1. Health Belief Model (HBM) was constructed based on various perceptions and motivations of an individual who is more likely to change their behavior and adhere to the regime or treatment (Pushpalata & Chandrika, 2017; Metta, 2016). The components include: (i) risk of contracting the disease (perceived susceptibility); (ii) the unfavourable outcome from the disease (perceived severity); (iii) proposed health behavior to be both effective and practical (perceived benefit); (iv) minimal barriers to adopt the behavior (perceived barriers); (v) having ability to apply and practice specific behavior proposed (perceived self – efficacy); and (vi) possessing cues to motivate their action which can be internal cue (discomfort, past experience) or external cue (mass media campaign, relative advice) (cues to action). The HBM emphasizes that high perceived threat, low barriers and high perceived benefits to action increase the likelihood of engaging to the recommended behavior. The theoretical framework is as illustrated in Figure 1.4.



Source: Rosenstock et al. (1974)

**Figure 1.4:** Health Belief Model.

Although HBM may provide individual internal factors that drive towards performing food safety behaviors, it is limited by the fact that it does not include environmental factors which may have impact on consumer behavior. For instance, consumer's selection on food premises was influenced by the hygiene factor which include the premise itself, food handler personal hygiene and food serving (Ungku Fatimah et al., 2011). Ungku Fatimah et al. (2011) finding was supported by others (Aksoydan, 2007; Liu & Jang, 2009) where these studies demonstrate the influence of food service cleanliness in

consumer's dining place selection. Based on this premise, the environmental factor will be included into the theoretical framework.

Despite being criticized for its general assumptions of individual's perceived susceptibility and perceived severity related to illness, HBM has been adapted and successfully applied in informing and explaining spectrum of behaviors related to health outcomes (Metta, 2016). Therefore, this model is used in this study in aiding the understanding of the decision – making processes and food poisoning preventive behavior at individual level. To address some of the HBM criticism, the proposed study will apply different components of model separately, rather than as one whole in order to evaluate individuals' own risk assessment, decision – making process and food safety behaviors. Risk perceptions will be evaluated by assessing individual's perceived susceptibility and perceived severity of food poisoning. In addition, an individual's decision – making process will be ascertained through exploring attitudes, perceived barriers and perceived benefit of adopting certain food poisoning preventive behaviors.

In addition to person's social cognitive elements in implementing food poisoning preventive behavior, information on individual's knowledge, attitude, preventive behavior (KAP) pertaining to food safety behaviors need to be considered as this information appeared scant among local consumers. KAP is an important element in minimizing the risk of contracting food poisoning (Ruby et al., 2019a). With this respect, the element of knowledge, attitude and preventive behavior towards food poisoning prevention will be further elaborated in the next paragraph.

### **1.9.2 Knowledge, attitude and preventive behavior of food poisoning prevention**

Information on knowledge, attitude and practice of food safety serves as the foundation to develop efficient food safety intervention. It also identifies knowledge gaps, individual's attitude and behavioral pattern that may facilitate understanding as well as problems or barriers for food poisoning control efforts (Odeyemi et al., 2019; Ruby et al., 2019a). The search on KAP related food safety yield more results on food handlers (Abdul Mutalib et al., 2012; Abdullah Sani & Siow, 2014; Nik Rosmawati et al., 2016; Lee et al., 2017 ) and college students (Mc Arthur et al., 2006; Sharif & Al-Malki, 2010). Previous study reported the outbreak of foodborne illness as a result of poor knowledge in food handling (Al-Sakkaf, 2013; Sharifa Ezat et al., 2013). As such, few studies support the consumer's knowledge on food safety as a priority preventive measure in minimizing the risk of getting food poisoning (Odeyemi et al., 2019; Ruby et al., 2019a).

Attitude on the other hand resembles individual's belief on certain food safety behaviors that may pose low risk of food poisoning (Odeyemi et al., 2019; Sharif & Al-Malki, 2010). Odeyemi et al. (2019) in their finding observed that most consumers did not believe that the cooked food which was left at room temperature for a longer time increase the likelihood of getting contaminated. Similarly, Sharif and Al-Malki (2010) demonstrated negative attitude among college students on perceiving food is safe if covered. Such finding reflect that attitude plays important role in preventing a person to conduct a risky practices. This further explained that food safety practices are dependent on knowledge and attitude. It is demonstrated that food safety practices were more satisfactory among those with good knowledge and attitude (Abdul Mutalib et al., 2012; Abdullah Sani & Siow, 2014; Nik Rosmawati et al., 2016; Lee et al., 2017). Having noted

the effect of knowledge and attitude towards a person's food safety behavior, this study incorporate knowledge attitude, and other related factors into the theoretical framework.

The theoretical framework in Figure 1.5 incorporates personal and environmental factors which this concept suggest that consumer's food poisoning preventive behaviors is directly connected to their personal attributes and environmental factors (Al-Sakkaf, 2013).

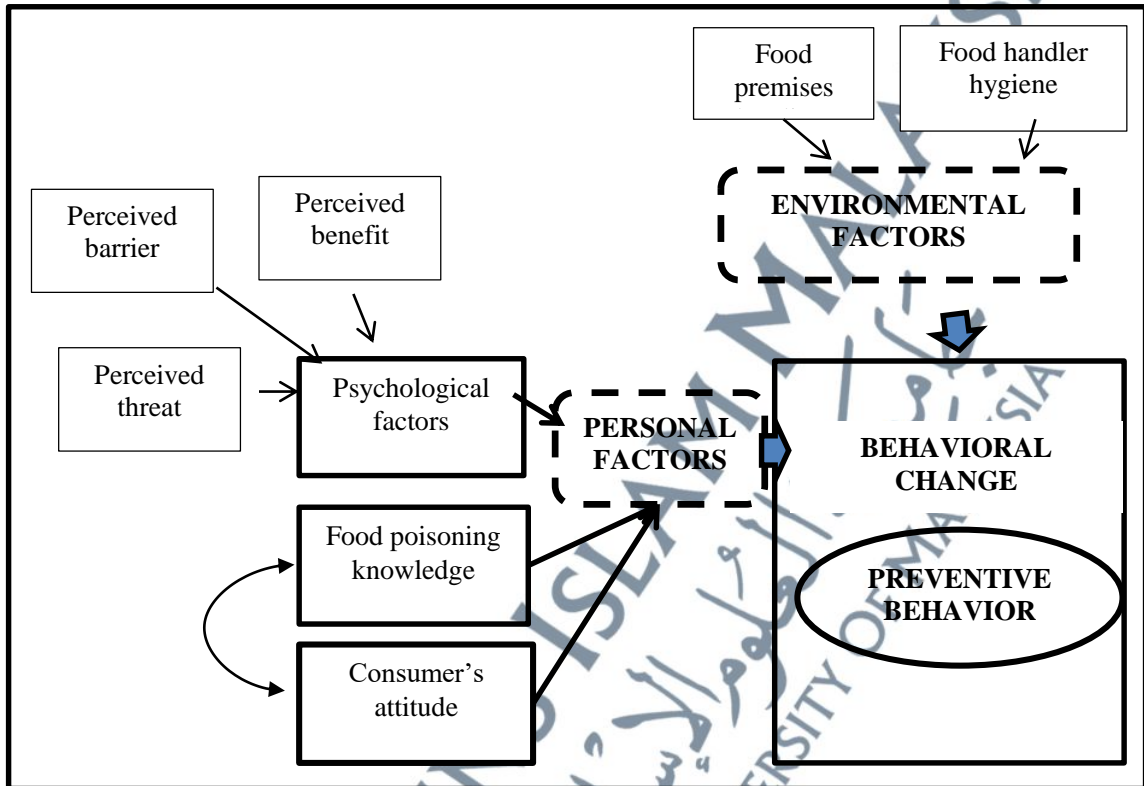
Personal factors are considered as the influence of consumer behavior and can be categorized into psychological, food poisoning knowledge and attitude. Psychological factors are further elaborated into consumer's perceptions derived from Health Belief Model and attitude towards food poisoning prevention. Perceived threat (combination of one's susceptibility and severity perceptions), perceived barriers and perceived benefit are consolidated into the framework as suggested by previous findings that significantly predict one's food safety behavior (Hanson et al., 2015; Hanson, 2002; Schafer et al., 1993).

Consumer's knowledge on the other hand is as an exposure to information sources and information acquired (Al-Sakkaf, 2013). Ruby et al. (2019a) pointed out that consumer's knowledge is correlated with current food safety practices. The author also suggested that consumers who frequently prepared food at home were more likely to have better knowledge on food safety due to the daily routine that helped them construct their self – efficacy towards preparing and selecting safe food (Ruby et al., 2019a). It is also postulated that consumers whom possessed a good level of knowledge on food safety will not conducting risky behaviors such as eating raw or partially cooked food and are volunteer more to improve their knowledge (Luo et al., 2019; Whiley et al., 2017). Food safety knowledge in addition is demonstrated to influence consumer's attitude. For

instance, Abdul Mutalib et al. (2012) showed that food handlers with good knowledge had led to good attitude in good hygiene practices. Similarly, attitude is exhibited to be correlated with individual 's knowledge in which both can influence each other at the same time (Lim et al., 2016). Attitude refers to the amount of effort consumers put in order to conduct food safety handling behavior (Soon et al., 2020; Ruby et al., 2019b). Ruby et al. (2019b) describes the combination of attitude and personal importance on food safety will enhance individual's behavioral intention.

The second main factor that affects an individual's food safety behavior is the environmental factor. Ungku Fatimah et al. (2011) demonstrated that foodservice environment play important roles on consumer dining place selection. In this context, the author had underpinned two significant constructs under this domain, they were food premise cleanliness and food handler personal hygiene (Ungku Fatimah et al., 2011). As such, these two factors are included into the framework in order to assess consumer's food safety behavior towards selecting clean and hygienic food establishments.

These two factors namely personal factors and environmental factors served as the schema that contribute individuals' knowledge and shape one's perception or opinions on food poisoning prevention that consequently develop their response actions on food poisoning preventive practice. All these processes in turn will update the preventive behavior through their life experiences accumulated over time (Figure 1.5).

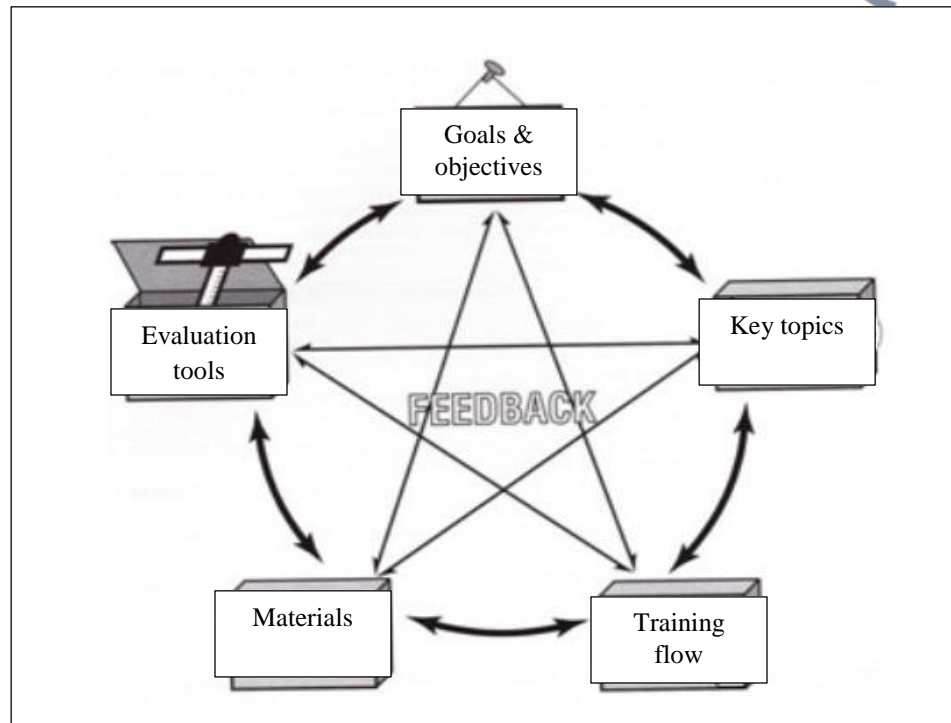


**Figure 1.5:** Theoretical framework for need analysis incorporates Health Belief Model (HBM) and personal influences on food poisoning preventive behavior (Al-Sakkaf, 2013).

### 1.9.3 Sequential and Iterative Model (SIM): Designing and developing effective training

In Design and Development phase (Phase 2), the researcher adopts Sequential and Iterative Model (SIM model). This model was developed by Milano and Ullius (1998) that served as basis of developing an educational or a training module. This model outlines five components that are required in designing and developing an effective

module: (i) aim and objective; (ii) key topics; (iii) training flow; (iv) training materials and (v) training evaluation. Figure 1.6 illustrates the SIM model.



Source: Milano and Ullius (1998)

**Figure 1.6:** The Sequential Iterative Model for training design.

Milano and Ullius (1994) also outlined a few other criteria of effective training as follows:

- i. The training conducted should be objective – oriented.
- ii. The training should be focused on the application of the trained elements.
- iii. The training conducted should be well suited to the adult learning style.
- iv. The training should be balanced and suit diverse participants.

- v. The training should be able to reduce the teacher/ educator –centered.
- vi. The training should also have an evaluation process in order to identify the achievement of the training given.

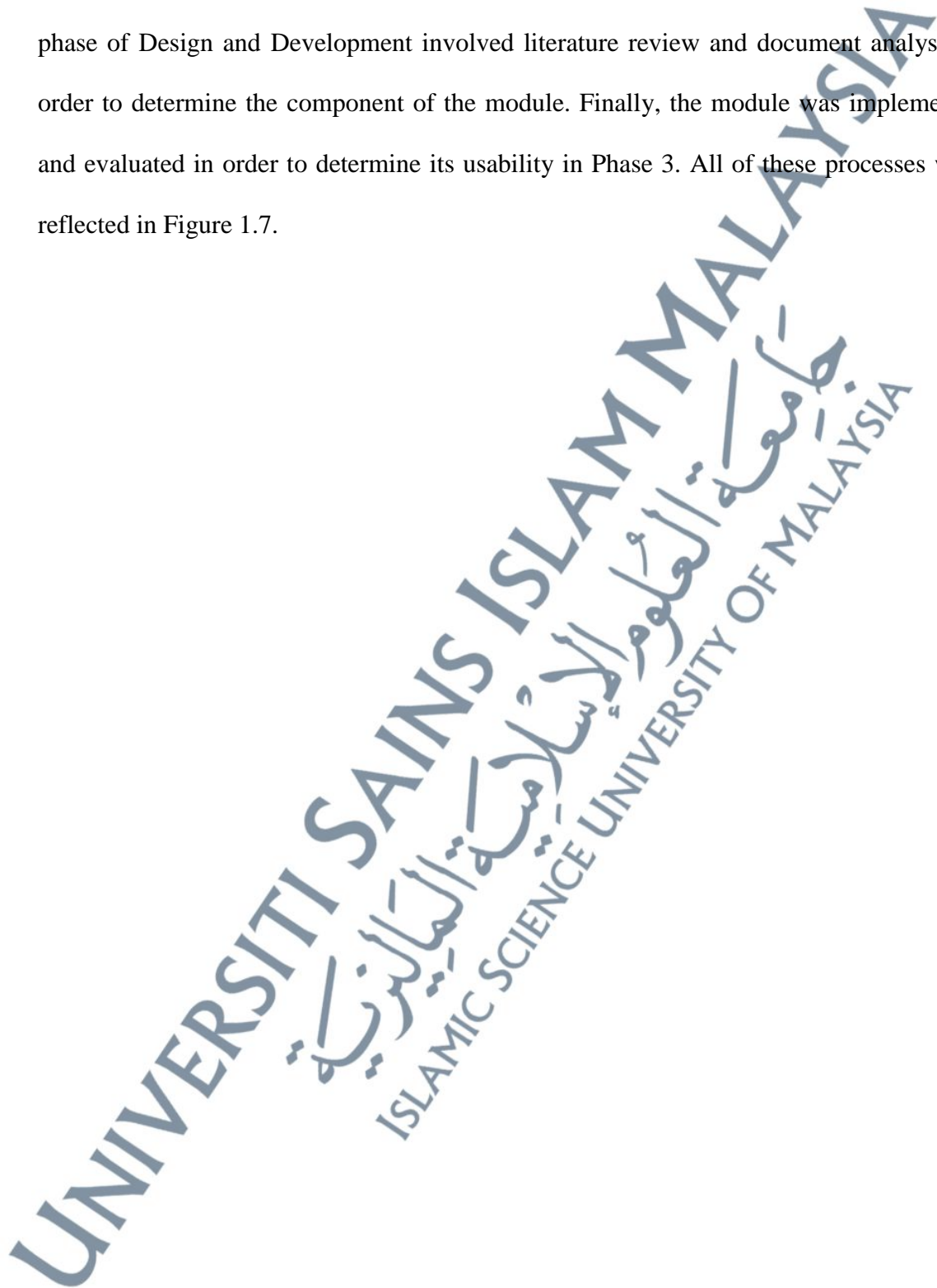
#### **1.9.4 Conceptual framework**

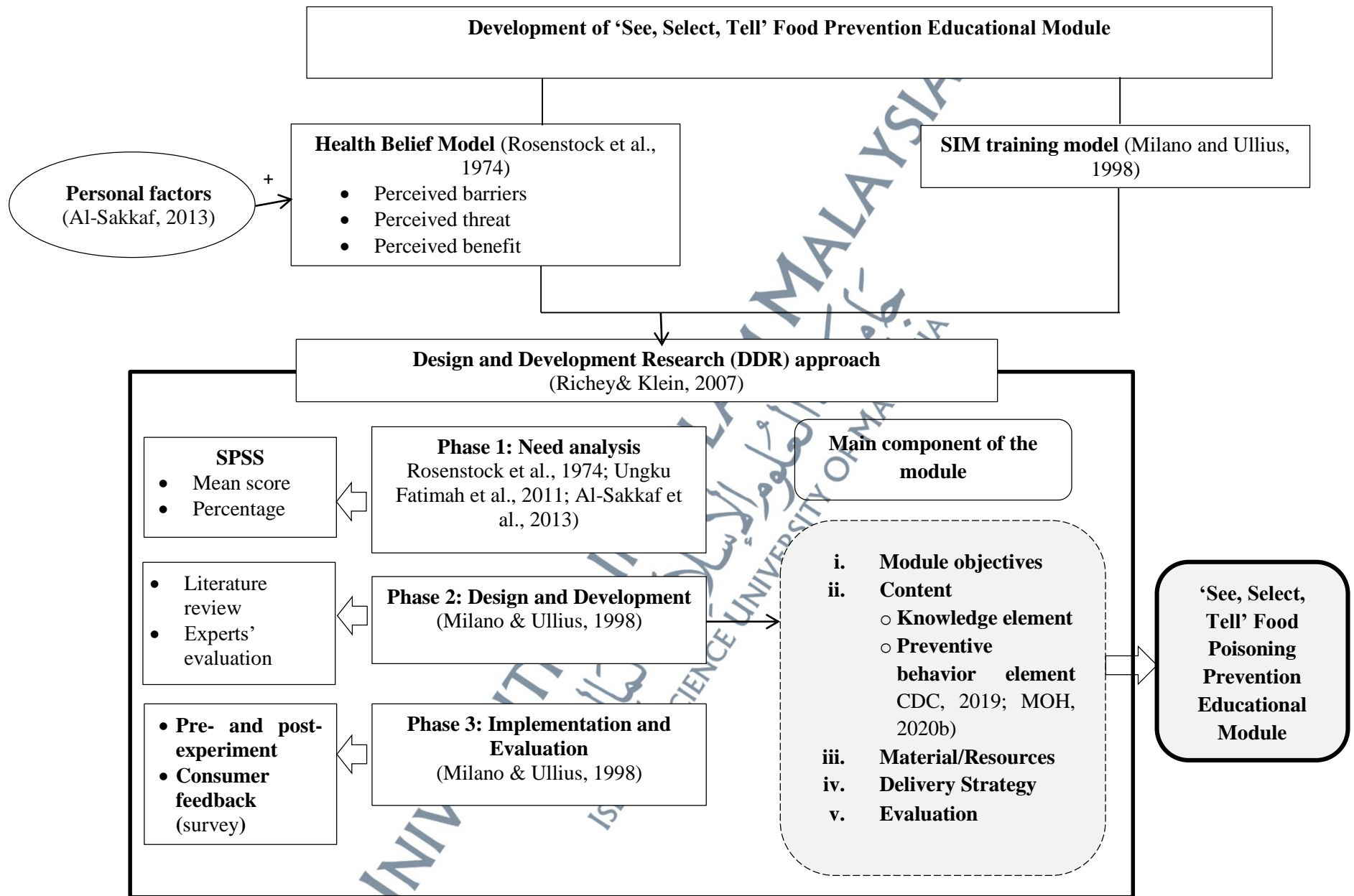
This research aims to develop ‘See, Select, Tell’ module; a food poisoning prevention educational module targeting the Malaysian consumers. The development of this module comprised of module objectives that are based on the desired outcome, module content that focused on shaping one’s behavior and value, learning material that assist the learning and training process, delivery strategies of the module content that involve effective teaching and learning approach that can be applied as well as content evaluation that requires strategy of assessment on the consumers once they have gone through the training module.

With this respect, a conceptual framework was constructed, consisting of all theories and models used as the basis for this research, together with the process of the module development (Refer to Figure 1.7). Health Belief Model (HBM) (Rosenstock et al., 1974) with reinforcement of consumer’s personal factors (Al-Sakkaf, 2013) serves as the fundamental theory in developing a food poisoning prevention module that is able to change consumer’s preventive behavior. The SIM model on the other hand is the supportive model that produces the main elements of the module. The module was developed based on Design and Development Research (DDR) approach.

The module development went into three phases whereby the first phase is the Need Analysis that incorporate the element of personal factors (Rosenstock et al., 1994; Al-

Sakkaf et al., 2013) and environmental factors (Ungku Fatimah et al., 2009). The second phase of Design and Development involved literature review and document analysis in order to determine the component of the module. Finally, the module was implemented and evaluated in order to determine its usability in Phase 3. All of these processes were reflected in Figure 1.7.





**Figure 1.7:** Conceptual framework of 'See, Select, Tell' module development.

### 1.10 Operational definitions of variables

Sidek and Jamaludin (2005) explained that the research variables should be defined operationally. Hence, this section will define all related variables based on conceptual and operational definitions. Variables that involved in this research were: sociodemographic, knowledge, attitude, preventive behavior and risk perceptions pertaining to food poisoning. For this purpose, a two – column table was illustrated to differentiate between conceptual and operational definitions (Table 1.1).

**Table 1.1:** Conceptual and operational definitions

<b>Variable</b>	<b>Conceptual definition</b>	<b>Operational definition</b>
a) Age	Age (in years) on the last birthday.	Covers the adult age from 18 years old and above on the last birthday.
b) Gender	Gender refers to the characteristics of women, men, girls and boys that are socially constructed. (WHO, 2022).	Male or Female as stated in identification card.
c) Ethnicity	A large group of people who have the same national, racial or cultural origins (Cambridge Dictionary, 2023).	Major ethnics in Malaysia such as Malay, Chinese, Indian with addition of other ethnicity (example: <i>Melanau, Bidayuh, Penan</i> , etc.)

**Table 1.1:** (continued)

Variable	Conceptual definition	Operational definition
d) Marital status	Lawful recognition of the relationship or agreement between a man and woman, to be husband and wife.	<p>According to DOSM (2020), the following marital status are defined:</p> <ul style="list-style-type: none"> <li>i. Single – refers to person who never married.</li> <li>ii. Married: refers to persons who were currently married at the time of enumeration. This includes those married by law, or religious rites, or was living together by mutual agreement.</li> <li>iii. Widowed: refers to those whose marriages were terminated due to the death of the spouses and were not remarried at the time of enumeration.</li> <li>iv. Divorced: refers to those who marriages were terminated through divorce by law or religious arrangement or separated for a long duration without any possibility reconciliation.</li> <li>v. Separated: refers to those who are married but not living together and have the possibility of temporary separation and reconciliation later.</li> </ul>
e) Educational background	Refers to the highest level of education that an individual has successfully completed.	<p>Education attainment include the following as defined by DOSM (2020):</p> <ul style="list-style-type: none"> <li>i. Informal: refers to persons who never attended school or any educational institutions that provide formal education.</li> <li>ii. Primary: refers to those highest level of education attained is from Standard 1 to 6 or equivalent.</li> <li>iii. Secondary : refers to those highest level of education attained is from Form 1 to 5 , General Certificate Education (GCE), O level or equivalent. This includes basic skill programmes in specific trades and technical skills institutions whereby the training period is at least six months, example GIATMARA programmes.</li> </ul>

**Table 1.1:** (continued)

<b>Variable</b>	<b>Conceptual definition</b>	<b>Operational definition</b>
f) Educational background	Refers to the highest level of education that an individual has successfully completed.	<ul style="list-style-type: none"> <li>v. STPM/certificates/ foundation : Refers to those whose highest educational attainment is from <i>Sijil Tinggi Pelajaran Malaysia</i> (STPM), certificate (usually technical skills) or foundation/matriculation (preparatory before university)</li> <li>vi. Tertiary: refers to those whose highest level of education is obtained from colleges/ polytechnics or universities. These include Bachelor degree, Master degree and PhD.</li> </ul>
g) Job sectors	A broad group of occupations and industries that related by what they do.	<p>It is classified into four groups that is :</p> <ul style="list-style-type: none"> <li>i. Self – employed</li> <li>ii. Government servant</li> <li>iii. Private sector employee</li> <li>iv. Unemployed</li> </ul>
h) Consumer	A person who acquires or uses goods or services of a kind ordinarily acquired for personal, domestic or household purpose, use or consumption (Consumer Protection Act, 1999).	A person who consumed or bought food away from home at least one to three times in a month (Chin & Mohd Nasir, 2010). Consumers were recruited in Ampang Jaya, Tampin and Kuala Pilah areas

**Table 1.1:** (continued)

<b>Variable</b>	<b>Conceptual definition</b>	<b>Operational definition</b>
i) Knowledge	Exposure to information or resources and personal effort in obtaining information (Al-Sakkaf, 2015; McIntosh et al., 1994).	Consumer's existing intellectual understanding on food poisoning. Consumer's knowledge is measured on food poisoning etiologic agents, high - risk foods, signs and symptoms, complications and prevention aspects using structured questions. Items were measured on three responses that were: 'Yes', 'No', 'Unsure'.
j) Attitude	Preferential ways of behaving in specific circumstances in order to endure a system belief and ideas (Joshi et al., 2015).	Attitude is a combination of cognitive (thinking), affective (feeling) and behavior (action) that subsequently lead to belief system. The consumer attitude is measured on 5 point-Likert scale (1: Strongly Disagree; 2: Disagree; 3: Neither Agree, nor Disagree; 4: Agree; 5: Strongly Agree).
k) Preventive behavior	A customary way of operation or practice (Cambridge Dictionary, 2019).	Consumer's habits or practice on food poisoning prevention. Responses for preventive behavior are evaluated based on frequency of: Never, Seldom, Sometimes and Always.
l) Food poisoning risk perceptions	Refers to consumer's perceptions regarding personal risk of food poisoning, self-control on food poisoning and responsibility of food safety (Evans et al., 2020).	Refers to consumer's perception on the likelihood of contracting food poisoning, as well as barriers and benefits of performing food safety preventive behavior. It is measured using a structured questionnaire adapted from Ng et al. (2009), Haapala and Probart (2010), Hanson et al. (2015), and Gupta et al. (2018) on a 5 - point Likert scale ranging from 'Strongly Disagree' to 'Strongly Agree'.

**Table 1.1:** (continued)

<b>Variable</b>	<b>Conceptual definition</b>	<b>Operational definition</b>
m) Module development	Module is a package of teaching and learning or a bulk self-learning which is complete with teaching – learning components such as objectives, media and learning activities, evaluation activities, guided with systematic instructions in order to ensure each of the learning unit can be mastered effectively by the users (Sidek & Jamaludin, 2005).	This study aims to develop an educational module for Malaysian consumer who bought outside food. The development processes are adhered to Design and Development Research approach that went through three phases. Phase 1 is Need Analysis in which information on consumer's knowledge, attitude, preventive practice and health perceptions were ascertained. Phase 2 is Design and Development stage that utilizes literature analysis and expert validation in order to determine the critical elements to be included in the module. The final Phase 3 is the Implementation and Evaluation of the module effectiveness and usability were assessed through the pre-and post-experimental study and consumer's feedback on the module conducted.
n) Food poisoning prevention education	Education is defined as a process of acquiring knowledge or learning (Cambridge Dictionary, 2019).	Food poisoning prevention education is a learning program through a module learning package related to food poisoning knowledge and appropriate food poisoning preventive behaviors. This module was delivered to the intended consumer in order to increase food poisoning knowledge, food safety practices and health seeking behaviors.

### 1.11 Conclusions

In summary, Chapter 1 elaborated on the research background followed by identification of the problem statements. This subsequently brings to the development of research questions and objectives. Related theory and supporting model used in this study was discussed and a conceptual framework was constructed. This chapter also outlined the significance of research to both knowledge and practical, as well as emphasizes on the research scope and limitation; and finally described the operational definitions.

