Assessment of food handler's compliance to personal hygiene practices regulation in selected food premises {P3 Categories} in Nibong Tebal, Penang

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Bachelor of Science with Honours
(Resource Biotechnology)

Assessment of food handler's compliance to personal hygiene practices regulation in selected food premises {P3 Categories} in Nibong Tebal, Penang

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A thesis submitted in partial fulfilment of the Requirement of the Degree Bachelor of Science with Honours
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ABSTRACT

Food safety is critical in terms of health since a considerable number of individuals consume food outside of their homes. Millions of people acquired food borne illnesses due to eating contaminated foods from food outlets and restaurants. Therefore, the purpose of this study is to assess food handler's compliance to personal hygiene practices in food outlets and restaurants at Nibong Tebal, Penang by following the Food Hygiene Regulations 2009. The data is collected using an observation checklist and quantitative analysis through survey. This study involves approximately n= 300 food handlers throughout this study. Data analysis included descriptive statistics such as percentages, frequencies and mean sampling. The results shows an overall mean percentage of 70.4 % indicating a fair knowledge on food safety and food handling practices. Hence, education on food safety and hygiene habits is critical to preventing illness outbreaks and spreading to consumers.

Keywords: Assessment, food handlers, personal hygiene, food safety

ABSTRAK

Keselamatan makanan adalah penting dari segi kesihatan kerana sebilangan besar individu mengambil makanan di luar rumah mereka. Berjuta-juta orang dijangkiti penyakit bawaan makanan kerana makan makanan tercemar dari kedai makanan dan restoran. Oleh itu, tujuan kajian ini adalah untuk menilai pematuhan pengendali makanan terhadap amalan kebersihan diri di kedai makanan dan restoran di Nibong Tebal, Pulau Pinang dengan mematuhi Peraturan Kebersihan Makanan 2009. Data dikumpul menggunakan senarai semak pemerhatian dan analisis kuantitatif melalui tinjauan. Kajian ini melibatkan lebih kurang n= 300 pengendali makanan sepanjang kajian ini. Analisis data termasuk statistik deskriptif seperti peratusan, frekuensi dan persampelan min. Keputusan menunjukkan purata peratusan keseluruhan sebanyak 70.4 % menunjukkan pengetahuan yang saksama tentang keselamatan makanan dan amalan pengendalian makanan. Oleh itu, pendidikan tentang tabiat keselamatan dan kebersihan makanan adalah penting untuk mencegah wabak penyakit dan merebak kepada pengguna.

Kata kunci: Penilaian, pengendali makanan, kebersihan diri, keselamatan makanan

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WHO - World Health Organization

SOP - Standard Operating Procedures

GMP - Good Manufacturing Practices

GHP - Good Hygienic Practices

SSOP - Sanitation Standard Operating Procedures

HACCP - Hazard Analysis Critical Control Points

CCP - Critical Control Point

CHAPTER 1: INTRODUCTION

Foodborne diseases are the main cause of mortality and morbidity globally, affecting up to 30% of the population in affluent nations each year. The food service business in Malaysia has grown increasingly desirable, particularly among urban residents, as a result of a shift in lifestyle from home cooking to "dining out". This has demonstrated the significance of good food safety and cleanliness in the control of such ailments (Woh et al., 2016).

A good food hygiene is essential in the safety of food from the start until consuming. Therefore, it is a contributing factor to determine whether the food produced is safe to be consumed or not. However, in certain cases, food safety is overlooked which leads to the outbreak of food borne illnesses such as diarrhoea, vomiting and other illness. Mishandling of food and a lack of sanitation can make it easier for foodborne infections to propagate from farm to fork. Health maintenance, personal hygiene and the food safety knowledge of the food handlers is vital because it can increase the possibility of food contamination.

The World Health Organization (WHO) revealed in 2015 that diarrhoea is the most prevalent ailment caused by contaminated food. Statistics shows around 230 thousand people face deaths every year and 550 million people fall ill due to this illness (WHO, 2015). Hence, in recent years, public awareness has been raised worldwide. Foodborne disease has several causes including a lack of food safety awareness, personal hygiene, cross-contamination and improper food preparation (Aziz & Dahan, 2013). It is suggested food handlers with adequate knowledge of proper food handling practices can aid in minimizing the rate of food related cases as they were in direct contact with food (Son et al., 2015).

In addition, they play a major role in minimizing food borne illness from occurring during production and distribution. This is because there is a possibility of cross-contamination of raw and processed food and in risk of becoming asymptomatic carriers of harmful food organisms such as Norovirus, *Salmonella* and *E.coli.* There is a link between management attitudes toward training, levels of food hygiene awareness, and food handling standard guidelines Therefore, food hygiene training is an important section in the hazard analysis critical control point (HACCP) (Murwira et al., 2015).

All food handlers are compulsory to follow the Food Act 1983 established by the Malaysian government by attending and completing the food handling course. Furthermore, they also need to undergo a typhoid vaccination to prevent this disease as it is endemic in Malaysia. Several studies have demonstrated that food handlers should conduct proper food handling, education, and training as part of their profession to reduce the prevalence of food-borne infections. (Abdul-Mutalib et al., 2012).

Therefore, the aim of the study was to assess the food safety knowledge, attitude, and practices among food handlers through a quantitative method. The study has differentiated demographics based on their level of knowledge of food safety practices and also discover frequent areas of weakness. The findings were able give to insights regarding the knowledge of personal hygiene and safety practices needed to learn by food handlers. The data extracted can be used in planning further measures in increasing food safety in Malaysia (Lee et al., 2017).

1.1 Objectives

The objectives of this study are:

a) To evaluate food handler's adherence to personal hygiene standards in food outlets and restaurants.

b) To determine the level of hygienic practices among food handlers in food outlets and restaurants.

CHAPTER 2: LITERATURE REVIEW

2.1 Food premises

All food facilities must be registered with the Malaysian Ministry of Health, according to the Food Hygiene Regulations 2009. Food premises are defined as locations where food is prepared, preserved, packaged, stored, transported, distributed or sold. There are four categories to be specified: P1, P2, P3 and P4 categories. Each category indicates the scope of business activities to be issued in the certification prior to the registration of food premise.

P1 category signifies food premises that are involved in the manufacturing of food while P2 category includes food premises in catering of food. In this study, P3 category was chosen which indicates food premises that has processed, stored or served for sale such food outlets and restaurants. Finally, the P4 category includes food establishments such as cars that sell ready-made meals (Ministry of Health Malaysia, n.d.).

2.2 Food safety

It is essential to anyone involved in the food services industry to ensure food safety. General food handling mistakes such as inadequate cooking, heating of food from unsafe sources or cooling food inappropriately and can contribute to food poisoning. Several studies supported the importance for training and education of food handlers in public hygiene on certain topics. For instance, microbiological food threats, refrigerator temperature ranges, cross contamination and personal hygiene. They need to be acquainted with the hazards and control regarding food in catering operations (Aziz & Dahan, 2013).

There are four major areas that pose challenges to food safety: microbiological safety, chemical safety, environmental hygiene and personal hygiene. Firstly, food is biological by nature and has the ability to promote the breeding of microorganisms that are leading causes of foodborne sickness. Viruses are accountable for the majority of foodborne diseases, but bacterial species are also at fault for hospitalizations and deaths. The illnesses range from mild gastroenteritis to neurology and renal syndromes caused by the toxin of said disease-causing bacteria. Bacterial infections in food are the main factors of serious and deadly foodborne illnesses. More than 90% of food-poisoning illnesses are caused by *Staphylococcus aureus, Salmonella, Clostridium, Listeria, Vibrio* and *E. coli.*

Chemical safety is particularly important in food safety since certain foods include non-food grade chemicals like colourants and preservatives, along with pollutants like pesticide residues. Some meal samples revealed higher concentrations of heavy metals such as lead, cadmium, arsenic, mercury, and copper than any others, indicating utensil leaching and poor food hygiene. In terms of environmental hygiene, insufficient recycling and waste disposal equipment and facilities contribute to the formation of decaying and contaminated food. This boosts the insect and bug population, leading to an increased risk of food damage. Inadequate hygienic requirements in food processing and preparation areas contribute to inadequate food storage and distribution, including the sale of tainted food. Finally, food handlers' and low personal hygiene standards harm personal and public health. Frequent hand washing and adequate washing facilities can aid in the prevention of many foodborne diseases (Fung, Wang & Menon, 2018).

2.3 Food contamination

Contamination is described as the presence of undesirable elements during preparation and transportation, such as dust and particles. It is probable that it will occur during food production, shipping, heating, and packaging. Contaminants are identified through biological, physical and chemical hazards as shown in Table 1. (The University of Rhode Island, n.d.).

Table 1. The types of hazards. Adapted from *Food safety hazards*, by The University of Rhode Island, n.d.. https://web.uri.edu/foodsafety/food-safety-hazards/

	Type of hazards		
	Biological	Physical	Chemical
Definitions	Microbes that can do harm by infecting others	Items that can cause harm due to poor handling practices	Chemicals with the potential to cause damage through intoxication
Examples	*Escherichia coli* *Bacillus cereus* *C. botulinum*	Glass Metals Stones	Mycotoxins Aflatoxins Pesticides

2.4 Food handling practices

There are various methods in ensuring food safety and cleanliness which are good manufacturing practices (GMP), good hygiene practices (GHP), sanitation standard operation procedures (SSOP) and hazard analysis of critical control points (HACCP).

GMP is a system that ensures products such as food, drugs and medical equipment to be produced according to quality standards. It is implemented to minimize the risks of contamination once it is produced and control the rate of food borne diseases. They provide a strong platform for any food safety system. It is a basic condition that will ensure the ingredients, products and packaging materials to be in a safe condition and is stored in an ideal environment. There are two components to apply GMP which are written programs and implementation. Written programs such as standard operating procedures and policies should be written for easy maintenance in following the standards listed in this program. The upper management directs implementation by performing activities and monitoring workers. GHP is a set of requirements to reduce food contamination before provided for consumption. They comprise a list of measures, one of which are personal cleanliness and staff training. Food hygiene training is a must to ensure safety practices are used and maintained while preparing food (Kamboj et al., 2020).

SSOP are written procedures including a detailed description of the activities needed to do in order to prevent contamination. They are written steps for cleaning and sanitizing to avoid altering the products generated. SSOPs are mostly found in meat and poultry processing plants. Facilities are to have these written procedures and is a necessity to be shown to the government when requested. They are to require GMP but also have an adequate record keeping when an SSOP is followed to prove

that the sanitation crew did the work. Most corporations fail to follow this approach since there are no records showing they did. As a result, there is high chance of food products to get contaminated by the time it reaches to the consumers. Therefore, it is important to follow the master sanitation schedule that directs on which areas of the facility and equipment are to be cleaned in terms of frequency and SSOPs (Kamboj et al., 2020).

HACCP is a set of systematic actions used to manage food production in order to assure food safety. It is based on control practices that is needed to be taken when there is a risk of health hazards occurring. GMP and SSOP are required protocols for HACCP operation in food businesses. There are seven principles of HACCP to be followed based on WHO and are as shown below.

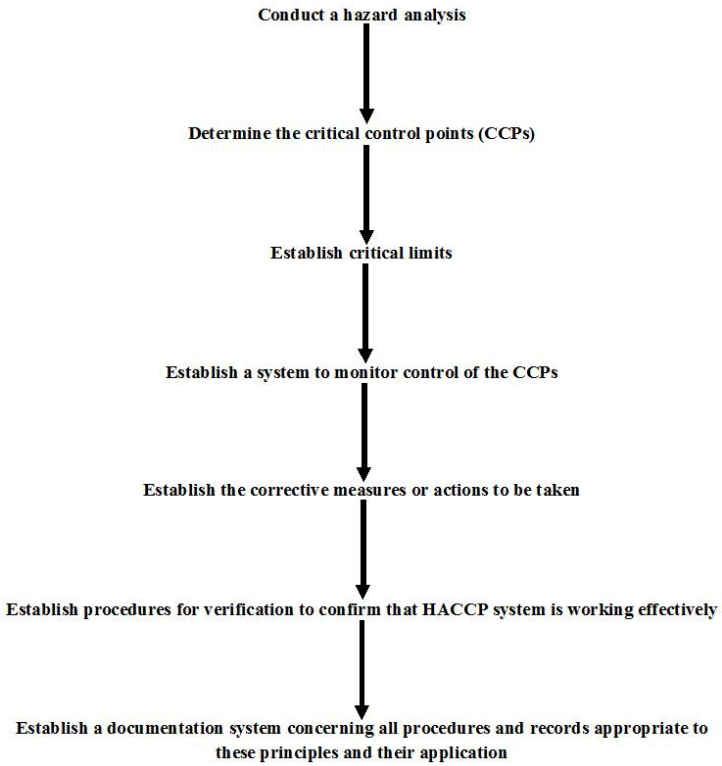

Figure 1. The steps of hazard analysis and critical control points. Adapted from *Hazard analysis and critical control points*, by Microbiology class, 2020. https://microbiologyclass.com/hazard-analysis-critical-control-point-haccp/

There are a total of seven principles in the the HACCP concept. Firstly, conduct a hazard analysis. It is necessary to identify and check the risks with each step in any processing system. Next, determine the critical control points (CCP) which is a step that allows to apply control to avoid or eliminate possible risk hazards in food safety. The third principle is to establish critical limits which helps to differentiate between acceptable and unacceptable parameters. The fourth component, creating a monitoring system, is followed by a planned observation at a CCP. Furthermore, it is vital to establish corrective measures and procedures to verify the effectiveness of the HACCP system. Lastly, documentation with all procedures and records is established when these principles are applied (Kamboj et al., 2020).

CHAPTER 3: MATERIALS AND METHODS

3.1 Sampling Plan

The University of Malaysia Sarawak provided ethical approval and respondents were requested to give consent verbally. A quantitative and cross-sectional via a questionnaire was taken to observe the food handlers and their adherence to the regulations of personal hygiene practices in premises such as fast food outlets and restaurants at Nibong Tebal, Penang. During this study, the probability random sampling method was carried out with a total of n=300 food handlers. The purpose of using the questionnaire is to assess the frequency of food safety and observing personal hygiene among food handlers using an observation checklist.

3.2 Questionnaire Collection

The data obtained from this assessment of the particular food handler based on few aspects was collected. The questionnaire includes the social socio-demographic characteristics of food handlers such as age distribution, sex distribution, level of education and food safety training attended. Analysis were done adhering to the regulations of the Food Hygiene Regulation 2009. The collected data was evaluated using descriptive statistics including frequencies and percentages.

3.3 Study Plan

A cross sectional study is the design plan used throughout this study. It is also known as an observational research that analyzes a data of variables collected from a population at a single point in time. An observation checklist comprised of food handler's assessment of different aspects such as their attire, personal hygiene and standard operating procedures due to Covid-19 was used to evaluate the food handlers. The assessment was

done from October 2021 to February 2022. The data collected were coded using Microsoft Excel and analyzed using SPSS, a statistics software platform of version 26.

CHAPTER 4: RESULTS

The research was carried out using a questionnaire that was based on socio demographic characteristics and an observational checklist. A total of 300 respondents was involved in this study. The data were computed using Microsoft Excel and analyzed through the SPSS software version 26.

4.1 Socio demographic charateristics

There are a total of five aspects in the questionnaire: age, gender, level of education, food safety training and anti-typhoid vaccination. The socio demographic characteristics are tabulated below in Table 2.

Table 2. Socio demographic characteristics studied among food handlers (n=300)

Parameter	Frequency (n)	Percentage (%)
Age (years)		
< 18	17	5.7
19-25	89	29.7
26-35	134	44.7
> 36	60	20.0
Gender		
Male	174	58.0
Female	126	42.0
Level of education		
Primary	2	0.7
Secondary	191	63.7

Tertiary	107	35.7
Food safety training		
Yes	272	90.7
No	28	9.3
Anti-typhoid vaccination		
Yes	206	68.7
No	94	31.3

Based on Table 2, it is determined that food handlers with the age range of 26-35 has the highest percentage about 44.7% compared to the other ages. About 29.7% belongs to ages between 19-25 while 20.0 % and 5.7% are among food handlers that are more than 36 years old and less than 18 years old respectively.

Most of the food handlers were male about 58% while only 42% are female. There are three stages of education studied: primary, secondary, and tertiary. More than half (63.7%) of them have completed their secondary education while the second highest is tertiary education with 35.7%. The least level of education among food handlers is primary which accounts about 7%.

The table also displays whether food handlers have attended food safety training and it can be seen that most of them (90.7%) have attended while around 9.3 % have not attended the training. Lastly, it is shown that 68.7% have taken the anti-typhoid vaccination while only 31.3 % have not taken the vaccination.