YANGON UNIVERSITY OF ECONOMICS

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A STUDY ON KNOWLEDGE, ATTITUDE, PRACTICE ON FOOD SAFETY IN MYANMAR [CASE STUDY – THINGANGYUN TOWNSHIP]

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ABSTRACT

The purpose of this study was to find out the consumer's knowledge of proper food hygiene, and sanitation, to identify the attitudes of the household towards food safety, and to assess the hygiene practices of households across all stages of food handling. To achieve these objectives, a quantitative, descriptive method was used. A survey was conducted on 202 respondents chosen by using a simple random sampling method from Thingangyun Township, Yangon. It was found that the majority did not concern about unwell cooked food, foods not approved by FDA, and street food. Moreover, food consumers did not aware much that unsafe food could cause hepatitis and cancer. In addition, food consumers did not aware much about cross-contamination. Most of the people supposed severe diseases could contract from pests in the home, however, some food consumers were reluctant to do pests control activities because they supposed it was time-consuming and cost a lot to do so. The majority believed handwashing can prevent foodborne illnesses, however, practices of washing hands after sneezing and coughing, before and after food preparation, and after touching animals were low.

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LIST OF ABBREVIATIONS

BSE	Bovine Spongiform Encephalopathy
CDC	Centers for Disease and Prevention
CDCs	City Development Committees
E coli	Escherichia Coli
ECHE	Enterohaemorrhagic Escherichia Coli
FDA	Food and Drug Administration
FQCL	Food Quality Control Laboratory
GBS	Guillain-Barre Syndrome
GI	Gastrointestinal
GMP	Good Manufacturing Practice
HACCP	Hazard Analysis and Critical Control Point
IBS	Irritable Bowel Syndrome
INGO	International Non-Governmental Organization
MCU	Myanmar Consumer Union
MFDBA	Myanmar Food and Drug Board of Authority
MSTRD	Myanmar Scientific and Technological Research Department
NGO	Non-Governmental Organization
NHC	National Health Committee
PCBs	Polychlorinated Biphenyls
POPs	Persistent Organic Pollutants
ReA	Reactive Arthritis
SDGs	Sustainable Development Goals
UNCGP	United Nations Guidelines on Consumer Protection
USAIDS	United States Agency for International Development
USDA	United States Department of Agriculture
vCJD	Variant Creutzfeldt-Jackob Disease
WHO	World Health Organization

CHAPTER 1
INTRODUCTION

1.1 Rationale of the Study

For all living things, foods are the essential constituents for their existence, yet they may convey a threat and affect human health in some circumstances. Anyone who cares about eating healthy and staying alive cares much about having safe food because the consequences of food borne illness can sometimes be lethal. Moreover, safe food is a basic human right and in modern society disease prevention and improvement of human health is of principal prominence, not only for governments and industries but also for consumers themselves. Food-borne diseases indicated the ailments linked to unsafe food consumption, and they may result from hazardous organisms.

Globally, food-borne diseases result from contaminated and unsafe food, creates an enormous social and economic burden on communities and their health systems. According to WHO, food-borne diseases cause death and suffering even in the richest countries of the world and is a main hindrance to global development efforts. Harmful bacteria, viruses, parasites or chemical substances encloses with contaminated food and unsafe food are origin of more than 200 diseases – ranging from diarrhea to cancers. An estimated 600 million – almost 1 in 10 people in the world – fall ill after eating contaminated food and 420,000 die every year, resulting in the loss of 33 million healthy life years. Children under 5 years of age carry 40% of the foodborne disease burden, with 125,000 deaths every year. The most common subsequent illness resulting from the contaminated food consumption is diarrhea, and it is the culprit of 550 million people to fall ill and 230,000 deaths every year. Food security, food safety, and nutrition are undistinguishably related. Unsafe food particularly affects infants, young children, elderly and the sick, and it generates a vicious cycle of diseases and malnutrition. Food borne diseases delay socioeconomic development by straining health care systems and spoiling national economies, tourism and trade. (WHO, 2017)

People are able to go to school, work hard and be supportive in promoting the country's economy more productively only when they are well and strong by eating nutritious and safe food. Hence, failure to invest in food safety will jeopardize the achievement of Sustainable Development Goals (SDGs) since at least six (goals numbers 1, 2, 3, 4, 8, & 12) out of the seventeen SDGS are directly affected by food-borne diseases i.e ending poverty in all its forms everywhere, achieving food security ending hunger, and improving nutrition and promoting sustainable agriculture, promoting well-being and ensuring healthy lives for all at all ages, ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for all, promoting sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all, and lastly, ensuring sustainable consumption and production patterns (Onyango, 2016).

In public health, food safety is one of the most significant areas and it involves a wide range of procedures from food handling and storing to food preparing and consumption. Unsafe food is a source of several potential food hazards. Many foods are brought into the home every day and are frequently contaminated with naturally occurring pathogenic micro-organisms. Such pathogens cannot be detected organoleptically (seen, smelled or tasted), but those are root cause of diseases including death, so food safety is realized as critical issue of world health. Foodborne diseases are accepted as an important public health problem, with the domestic kitchen believed to be a starting point for many cases. Foodborne pathogens are brought into the home kitchen together with a variety of raw foods and, consumers need to implement key food handling practices during home food preparation based on the principles of effective temperature control and prevention of cross contamination to diminish the opportunity of foodborne illness. In the food chain, consumers are the main final linkage to assure safe food consumption. During food preparation at home, multiple food safety responsibilities are necessary and failure to undertake personal accountability for food safety at home may occur increased possible unsafe food-handling behaviors and consequential risks of illness. Moreover, fail to associate the home as a potential place to get foodborne illnesses may be a serious impediment for implementation of safe food-handling behaviors. Research about consumer food safety is required to ascertain how food is handled in the home kitchen, determine what is known about food safety and why some safe food handling practices are implemented and others are not (Redmond & Griffith, 2010).

In many of reported cases, improper heating of food, such as undercooking, reheating, or inappropriate food cooking account for 44% and inadequate preparation and improper cooking practices, such as those involving cross-contamination, inadequate processing, poor hygiene and the re-use of leftovers, are responsible for causing 14% of such food borne illnesses. Food safety is one of the most ignored areas of policy especially in low-income countries, and is also a significant challenge for most of the developing countries as it can affect not only public health and their social well-being but also the numerous sectors of the country including tourism, economy and development. Myanmar has also already encountered several food safeties challenges where necessary actions need to be addressed straightaway. According to the Economist Intelligence Unit's Global Food Security Index 2017, among 113 countries globally, Myanmar stands 71st for food quality and safety. Majority of the Myanmar population did not access safe and hygienic food products. Moreover, lack of knowledge and awareness of food safety among the wider public is one of the many obstacles for Myanmar to overcome. Food safety has not only crushed on the social well-being of Myanmar's citizens, it also impacts on tourism, the economy and the development of the country. Therefore, this thesis is conducted aiming to study the knowledge, attitude, and practice of food consumers in Myanmar.

1.2 Objectives of the Study

The objectives of the study are as follow:

(1) To find out consumer's knowledge of proper food hygiene and sanitation and to identify the attitudes of household towards food safety.

(2) To assess the hygiene practices of households across all stages of food handling.

1.3 Method of Study

Method of study is descriptive method by using primary and secondary data. The targeted sample size is 195 while margin of error was taken 7 percent with 95 percent confidence level. The survey was conducted by using well-structured questionnaires including questions about characteristics of the respondents, accessing knowledge, attitude, and practice of food safety, to collect primary data from a random sample of food consumers from Thingangyun Township, Yangon. In addition, the secondary data used in this study are collected from books, journals articles, and relevant topics from internet.

1.4 Scope and Limitations of the Study

This study only covers food safety of home preparation by end-users. This study is limited to cover about food safety during production, procession, distribution, selling and buying in market, restaurant preparation and restaurant consumers.

1.5 Organization of the Study

This thesis consists of five chapters. This Chapter 1 is introductory chapter including rationale, objectives, scope and limitations of study, Chapter 2 gives Literature Review including importance of food safety and hygiene, food contamination and major foodborne illnesses, and causes, basic steps for handling food safely, practice contributing to foodborne illness, home as high risk location for foodborne illness, and review on previous studies, Chapter 3 then focuses on Food Safety Program and Legislations in Myanmar including about Food and Drug Administration Myanmar, food safety control system in Myanmar, national food law, national policies for consumer protection and consumer education and information programme. Chapter 4 presents Survey Analysis containing survey profile and design, and analysis of survey findings on knowledge, attitude and practice about Food Safety of food consumers by using descriptive method. This thesis concludes with Chapter 5 where summary of findings and recommendations are given.

CHAPTER 2
LITERATURE REVIEW

2.1 Importance of Food Safety and Food Hygiene

Food is any edible substance that is consumed to provide strength to the body, food supports the body to grow, provides the body with the needed energy to carry out daily activities and it maintains the body in good condition. It can be supposed that food can be hygienic and non-hygienic, safe and unsafe for consumption. Food can be very delicious and flavorful and at the same time can be hazardous to human health if not properly prepared, kept or eaten, however, no human can certainly stay alive without eating food and many humans' health have been destroyed and risked due to eating harmful foods, and this leads us to what is known as food safety and hygiene. Food safety is not just about eating freshly made food outside your home and has broad meaning, but something you could do more often at home and outside. Food safety has concerned a lot with eating clean and fresh food, handling food and maintaining personal hygiene on a daily basis and this cut across to food handlers, businesses (food businesses) as both the food handlers and food business dealers have the responsibility of ensuring that foods are kept healthy and void of contamination. However, kitchen hygiene is a critical role in keeping food safe for consumption.

To prevent cross contamination and spread of bacteria causing food poisoning, food hygiene is an essential practice that involves proper preparation, washing, cooking, storing and preservation of food. Microorganisms enter into food which is favorable environment for them to settle, and they can easily contaminate foods as soon as they enter; these can be present in form of yeast, molds and bacteria in food. Foods like fruits, jams, cabbage, meat, jellies etc. are easily contaminated, however, separating between raw foods and ready to eat foods is an important aspect of food hygiene to avoid cross contamination (JotScroll, 2017).

There are many important terms of food safety, and some are mentioned below.

Cleaning: "The removal of soil, food residue, dirt, grease or other objectionable matters from surfaces of plates, spoons, cutleries, utensils etc." (Otu & Suleiman, 2014).

Contaminant: "Any biological or chemical agent, foreign matter, or other substances not intentionally added to food which may compromise food safety or suitability" (Otu & Suleiman, 2014).

Contamination: "The introduction or occurrence of a contaminant in food or food environment" (Otu & Suleiman, 2014).

Cross-contamination: "The transfer of harmful micro-organisms from one item of food to another by means of a nonfood-contact surface (human hands, utensils equipment), or directly from a raw food to a cooked one" (Kahindi, 2016).

Food handling: "The act of taking, holding or managing food with the hands" (Wandolo, 2016).

Food safety: "Assurance that food will not cause harm to the consumer when it is prepared and/or eaten according to its intended use" (Otu & Suleiman, 2014).

Food: "Any substance intended for use or for sale in whole or in part for human consumption, including ice and water" (Kahindi, 2016).

Foodborne illness: "an infection or irritation of the gastrointestinal (GI) tract caused by food or beverages that contain harmful bacteria, parasites, viruses, or chemicals. Common foodborne illness symptoms include vomiting, diarrhea, abdominal pain, fever, and chills" (Food Handler Training Course, 2016).

Personal hygiene: "Maintenance of personal cleanliness from head to toe by food handling personnel" (Wandolo, 2016).

Risky Food: "Any food that is contaminated or more likely than most others food to be contaminated with bacteria, carcinogens or toxins" (Farlex, 2009).

2.2 Food Contamination and Major Foodborne Illnesses and Causes

There are many reasons that can contaminate food. It can be classified as biological, physical, and chemical contamination.

2.2.1 Food Contamination

When food is corrupted with another material, food contamination occurs. It can happen anytime in the process of food chain from production to cooking process at home. The contamination can be physical, chemical and biological.

(a) Biological Contamination

Biological contaminated food is contaminated by organisms or contents they produce and incorporate biological substance produced by people, rodents, creepy-

crawlies and microorganisms. Typically, the two biggest widely recognized causes of biological contamination are bacteria and viruses and can result in some of the most common forms of food poisoning including salmonella, E. coli, listeria and norovirus. Systematically washing your hands and cleaning the food handling equipment are two of the most excellent ways to anticipate against bacterial defilement (Santacruz, 2016).

(b) Physical Contamination

A contaminated foreign substance can cause physical contamination. This can occur at any phase of the production process and could include Band-Aids, steel wool or pieces of plastic. Physical contamination can cause harm to a person who unintentionally consumes the foreign substance. The additional risk accompanying with physical contamination is that the foreign substance could be carrying biological contamination (Santacruz, 2016).

(c) Chemical Contamination

Food that has been contaminated with a natural or synthetic chemical substance is known as chemical contamination. These noxious substances are particularly dangerous as they uncover individuals to any number of poisonous substances, some of which can be fatal. At any time of the food prepare, food can be contaminated with chemicals whether by pesticides transferred from the land the food is grown in or throughout the manufacturing process. Putting away chemicals independently from food is fundamental to assist secure against chemical contamination (Santacruz, 2016).

2.2.2 Major foodborne illnesses and causes

According to World Health Organization, bacteria, viruses, parasites or chemical substances are root cause for foodborne illnesses and they usually enter the human body through contaminated food or water. Foodborne illnesses are typically contagious or toxic in nature. In general, contaminated food may look, smell, and taste harmless even though it may be unclean and may be competent of causing a foodborne illness. The consequence of foodborne pathogens consists of severe diarrhea to debilitating infections including meningitis. Chemical contamination results in ranging from acute poisoning to long-term diseases, such as cancer. Foodborne diseases can cause long-term disability and death. Raw shellfish having marine biotoxins, raw foods of animal origin, fruits and vegetables contaminated with faeces are examples of unsafe food (WHO, 2017).

(a) Bacteria

Millions of people are affected annually by Salmonella, Campylobacter, and Enterohaemorrhagic Escherichia coli which are the foremost common foodborne pathogens with symptoms of fever, headache, nausea, vomiting, abdominal pain and diarrhea – in some cases with serious and deadly results. Examples of foods that are responsible for outbreaks of salmonellosis are eggs, poultry and other items of animal origin. Campylobacter infection basically caused by drinking of raw milk or contaminated water and having raw or undercooked poultry. Human can be infected with Enterohaemorrhagic Escherichia coli by having unpasteurized milk, undercooked meat and fresh fruits and vegetables (WHO, 2017).

A few strains of *Salmonella* live in water, soil, food plants and feces of contaminated people by accessing those places through cross-contamination of already-infected organisms or feces. The microbes can live several weeks in water and up to quite a few years in soil, whereas in feces *Salmonella* may only survive some days. The bacteria can be able to survive in salt water and cooler situations, but a too hot of an environment may putting to death the bacteria (Adams & Moss, 2008), (U.S. Department of Health and Human Services, 2019). Generally, humans are contracted with Salmonellosis by ingestion of contaminated food of animal origin (mainly eggs, meat, poultry and milk), although other foods, including green vegetables contaminated by manure, have been involved in its transmission. Person-to-person transmission can also be occurred by fecal–oral route. U.S. Department of Health and Human Services (2019) stated that *Salmonella* can cause more serious illness in older adults, infants and persons with chronic diseases. Cooking foods at sufficiently high temperatures kill the microbes and it is very easy to control. *Salmonella* contamination can be prevented by storing of food at appropriate temperatures, following sanitation and hygiene rules and removing rodents and flies from the work environment (Duffy, 2002), (WHO, 2018).

Campylobacter can grow at its ideal temperature 42–45 °C and they cannot multiply in room temperature (Bas, 2004). Campylobacter is one of the bacteria most frequently responsible for causing gastroenteritis. Contaminated water and ice are also sources of infection (WHO, 2018). Campylobacter jejuni can be found not only in fresh water but also in sea water and survive for 5 weeks in this circumstance. To anticipate its contamination, it is critical to take protecting measures in all steps of the food chain, from production to consumption, and to apply these protective measures in both industrial and household environments (WHO, 2018).

Various ready-to-eat foods and unpasteurized dairy products may contain Listeria and can develop at refrigeration temperatures.

Contaminated water or food convey Vibrio cholera and infect people with symptoms include abdominal pain, vomiting and profuse watery diarrhea, which may lead to severe dehydration and probably death. Rice, millet gruel, vegetables and different kinds of seafood have been associated in cholera outbreaks.

(b) Viruses

Nausea, explosive vomiting, watery diarrhea and abdominal pain are characteristic symptoms of Norovirus infections. Hepatitis A virus can occur long-term liver disease and usually spreads through raw or undercooked seafood or contaminated raw products. Infected food handlers are frequently the origin of food contamination (WHO, 2017).

(c) Parasites

A few parasites are only able to transmit through food, such as fish-borne trematodes. Others, for example tapeworms like Echinococcus spp, or Taenia solium, may infect people through food or direct contact with animals, and Toxoplasma gondii may infect people through direct contact with animals or animal faeces, and through unwell cooked meat. Other organisms, such as Ascaris, Cryptosporidium, Entamoeba histolytica or Giardia, contaminate fresh food by entering the food chain via water or soil.

The causal organism of toxoplasmosis is Toxoplasma. gondii, a unicellular microscopic parasite, and it exists all over the world. It also stands the topmost three causes of death from foodborne diseases worldwide. People can contract toxoplasmosis through consumption of uncooked meat or by drinking from fresh water sources, such as lakes or streams. This organism can also harm the fetus via the mother. Moreover, home cats ought to get proper cleaning and hands must be thoroughly washed after handling them because cats are main hosts for T. gondii. Symptoms associated with infection from this parasite include diarrhea, upset stomach, vomiting and abdominal pain (Tenter, Heckeroth, & Weiss, 2000). Food-related toxoplasmosis cases are caused by consumption of uncooked or undercooked meats. Particularly, this parasite spreads quicker by foods that are contaminated with cat feces. With the higher consumption of raw meats, it shows increased prevalence in Europe and South Africa. Toxoplasma infections can be diagnosed by response of antibodies with serologic applications (Tayfur, 2009). Infections caused by microorganisms are basically the consequence of

the poor hygiene of the person accountable for preparing the food. These microorganisms can quickly replicate in temperatures outside the safe ranges specified by food safety regulations (WHO, 2008).

(d) Prions

Prions, infectious agents composed of protein, are exceptional in that they are related with particular forms of neurodegenerative disease. Bovine spongiform encephalopathy (BSE, or "mad cow disease") is a prion disorder in cattle, related with the alternative Creutzfeldt-Jakob Disease (vCJD) in humans. Consuming bovine products containing particular risk material, e.g. brain tissue, is the most probable route of transmission of the prion agent to humans (WHO, 2017).

(e) Chemicals

WHO also states that of major challenge for health are naturally occurring toxins and environmental pollutants.

Mycotoxins, cyanogenic glycosides, marine biotoxins, and toxins occurring in poisonous mushrooms are some types of naturally occurring toxins. High levels of mycotoxins, such as aflatoxin and ochratoxin, produced by mould on grain can be found in staple foods like cereals or corn. A long-term exposure can affect the immune system and normal development, or cause cancer.

Persistent organic pollutants (POPs) are compounds that accumulate in the environment and human body. Dioxins and polychlorinated biphenyls (PCBs), undesirable by-products of industrial processes and waste incineration, are well-known examples. They are found worldwide in the surroundings and accumulate in animal food chains. Dioxins are exceedingly poisonous and can occur reproductive and developmental problems, deteriorate the immune system, interfere with hormones and cause cancer. Heavy metals such as lead, cadmium and mercury cause neurological and kidney damage. Contamination by heavy metal in food takes place mostly through pollution of air, water and soil (WHO, 2017).

2.3 Basic Steps for Handling Food Safely

The four vital steps to keep food safe are (1) *Clean - Wash hands and surfaces often, (2) Separate - Don't cross-contaminate, (3) Chill - Refrigerate promptly, and (4) Cook - Cook to the right temperature* (Byrd-Bredbenner, Berning, Martin-Biggers, & Quick, 2013).

(a) Clean

The objective of clean is to avoid cross contamination—or the transmission of disease causing microorganisms from one food, object, or surface to another—by washing hands, food contact surfaces, and kitchen equipment (WHO, 2006) . Hands are a major "vehicle" for spreading pathogens around the kitchen (Kennedy, et al., 2011) —thus hand washing is critical to prevent cross contamination (Van Asselt, Fischer, de Jong, Nauta, & de Jong, 2009). Nearly all consumers report washing their hands with soap for a full 20 seconds before preparing food all or most of the time (Quick, Corda, & Byrd-Bredbenner, 2013). Most consumers also report they regularly or continuously wash their hands after dealing with raw meat (De Jong, Verhoeff-Bakkenes, Nauta, & de Jong, 2008). In spite of consumers' mindfulness of the significance of hand washing, they are not washing their hands thoroughly. For example, after dealing with raw chicken, 73 to 100% consumers reported washing their hands after touching it. None of the consumers adequately washed their hands to prevent *C. jejuni* contamination to salads after handling the raw chicken (De Jong, et al., 2008). It is not much known about how frequently consumers wash their hands during meal preparation. The most heavily contaminated parts in the kitchen such as fridge handles, tea kettle handles, tap handles, sink drain areas, dishcloths, and sponges (Redmond & Griffith, 2009), (Haysom & Sharp, 2005) are touched during meal preparation, it is likely that hands are not washed frequently enough to prevent the transfer of pathogens to ready-to-eat food (Van Asselt, et al., 2008), (Scott & Bloomfield, 1990), (Emery, 1990) food packaging, or utensils and contact surfaces used to prepare food (Taylor & Holah, 2000). Table 2.1 shows pathogens that are frequently found on touched areas of the domestic kitchen.

Table 2. 1 Keys pathogen found on frequently touch areas of the home kitchen

Site	Campylobacter	Salmonella	S.aureus	E.coli	L.monocytogenes
Dishcloth, sponge, towel	✓	✓	✓	✓	✓
Sink, tap handles		✓	✓	✓	✓
Refrigerator Handle	✓		✓	✓	✓
Cutting Board	✓		✓	✓	
Work Surface	✓		✓	✓	
Floor	✓			✓	

Source: (Quick, et al., 2013)

Abundant microorganisms are usually harboring in dishcloths and sponges that become shortly contaminated with them, and spreading microbes to hands, kitchen equipment, and contact surfaces (Hilton & Austin, 2000). High numbers of *E. coli* survive in dishcloths for at least 48 hr (Scott & Bloomfield, 1990). Consumers have room for enhancement when using sponges and sanitizing dishcloths—of the 92% of consumers who use them, just 9% report changing dishcloths or sponges daily, 44% change them at least weekly, the remainder change them less often, with 5% waiting until they fall apart (American Dietetic Association, 2011). A survey analysis in the U.K suggested that insufficiently cleaned cutting boards and knives were responsible for 14% of all foodborne illnesses and they are also significant routes for cross-contamination (Kennedy, et al., 2005). Although almost all consumers state they clean these kitchen utensils after touching and using them with raw meat or produce, observational data point out that the vast majority of consumers do not clean kitchen utensils and cutting board adequately to prevent cross contamination.

(b) Separate

"Separate" is basic to prevent cross contamination and it is as important as "Clean". The objective of "separate" is to preserve raw meat, poultry, and seafood separate from ready-to-eat foods like salads and cooked meat. A benchmark survey

done by American Dietetic Association (2011) addressed that about 75 percent of consumers keeping raw meat, poultry, and seafood separate from ready-to-eat food products and 90 percent used different dishes for unprepared and cooked meat. However, there is way for improvement especially considering that meat, poultry, and seafood are the lead causes of foodborne sickness.

(c) Chill

"Chill" emphases on the critical role in temperature control of refrigerator. But it is necessary to additionally assume about "clean" and "separate" in this purpose. Many studies indicate that not all household refrigerators are clean. One research from Ireland stated that at least one of these pathogens: *E. coli*, *Listeria monocytogenes*, *S. aureus*, *Salmonella enterica*, and *Yersinia enterocolitica* were found in the swab of more than 50 percent of the refrigerators (Kennedy, et al., 2005). Moreover, most refrigerators do not have optimum cool temperature and more than the recommended temperature 5 °C (40 °F). The similar problem has been noted in other countries namely U.S., U.K., Ireland, New Zealand, and Australia (Kennedy, et al., 2007). The refrigerators are frequently so crowded with food that restrict air circulation result in cooling problem. Tight packing also increases food-to-food cross-contamination risk (Byrd-Bredbenner, Maurer, Wheatley, Cottone, & Clancy, 2007). Only 25 percent of consumers normally check refrigerator temperatures, and another 25 percent do not even have a refrigerator thermometer (Kennedy, et al., 2005), (American Dietetic Association, 2011). One positive note is that only less than 40 percent of those in the U.S. do not know the ideal temperature for refrigerators to be less than 5 °C (40 °F). Additional aspect of chill is storing decaying foods out of danger zone temperatures. It is reported that 79 percent of consumers did not leave prepared perishable food at room temperature more than the recommended two-hour timeframe and nearly 67 percent report thawing food in the fridge (American Dietetic Association, 2011). There also is a common false impression that cooked foods must be cooled to a room temperature earlier than being placed in the fridge (Bruhn & Schultz, 1999).

(d) Cook

According to Healthy People 2020, the greatest area needing improvement is cook. Only about 37% of consumers achieve the goal of to destroy harmful pathogens (Office of Disease Prevention and Health Promotion, 2010). Almost 90 percent consumers recognize that ground beef should be cooked to at heating foods, such as meat and poultry, to a temperature adequately high enough least 160 °F (71 °C) and

nearly two-thirds address they usually heat to this temperature while cooking meats and poultry (American Dietetic Association, 2011). However, most do not recognize that color is not a precise indicator of doneness (Calverton, 1998), (Food Thermometer Campaign Consumer Focus Groups, 1999) and less than 25 percent actually validate the accuracy of the cooking temperature with a thermometer. Consumers understand that undercooked foods are the greatest origin of food poisoning, and that germs in food bring serious threats, however, they do not use thermometers (American Dietetic Association, 2011), (Fein, Lando, Levy, Feisl, & Noblet, 2011).

2.4 Practices Contributing to Foodborne Illness

There are many things that contribute foodborne illnesses. Among them, the following four practices are major contributors.

(a) Personal Hygiene

Personal hygiene is critical in preventing contamination of food and foodborne illness. Anytime a food handler's hands are contaminated by activities such as handling raw ground beef or using the restroom, they must wash their hands properly to prevent contaminating other foods, and surfaces they touch. Consumers should wash their hands prior to preparing or consuming food and after using the toilet, changing diapers, and touching pets. Food items should be washed in running potable water just before cooking. Fruits and fresh vegetables should be washed before eating. Also, kitchen utensils such as cutting boards, knives, dishes, counter surfaces should be cleaned with hot water and soap after preparing each food item to prevent harmful or dirty substances spreads from one area to another (Medeiros, Hillers, Kendall, & Mason, 2001).

Research shows that more than 90% of foodborne illnesses are due to poor personal hygiene. More than 25% of all foodborne illnesses are only contributed by improper hand washing (Weinstein, 1991). According to the Department of Health and Human Services, Australia, 2015 appropriate hand washing includes wet hands with clean, running water, turn off the tap, and then apply soap and lather well for 20 seconds (or longer if the dirt is ingrained), and rub hands together rapidly across all surfaces of hands and wrists. It is also important not to forget to wash the areas that are frequently missed such as the backs of the hands, wrists, between fingers and under fingernails. Preferably, before washing hands, it is better to remove rings and watches, or ensure remove the rings to wash under them, as microorganisms can exist beneath them. Next, rinse thoroughly under clean running water until all traces of soap are clear away. Subsequently, air dry them or dry the hands by using a clean towel and the best is to

use paper towels (or single-use cloth towel). It is important to dry by wiping all places with clean towel including under any rings, as they could become a contaminated source if they remain moist. Hot air driers can also be used. A concept for domestic usage: gives each family member their own towel and wash the towels regularly.

Improper handling and unsafe preparation can occur food contamination whether preparing at home or in a restaurant or in a grocery store. Common causes of food poisoning contain absence of washing hand before preparing or eating food, using unclean utensils, cutting boards or serving dishes, cross-contamination, consuming staled dairy products, drinking unpasteurized milk or food containing mayonnaise, consuming undercooked foods or foods that have not been stored at the right temperature, especially meats and poultry, consuming raw seafood products, and consuming not properly washed raw produce (Seladi-Schulman, 2017). Fecal contamination of water or foods is responsible for causing the infection (WHO, 2018). It can be passed on uncooked or undercooked minced meat or unpasteurized milk. People with debilitated immune systems, pregnant ladies, young children, and older adults have higher chance of serious complications (Seladi-Schulman, 2017). In oral-fecal mode of transmission, the most significant ways is person-to-person contact. Hands should always washed thoroughly and completely after using the bathroom or changing nappies, before, during and after preparing and cooking food, between handling raw and cooked or ready-to-eat food, before eating, after eating, smoking, chewing gum or tobacco, using a tissue or handkerchief, before and after attending to sick people, after handling chemicals, handling or take away garbage, after working in the garden, bussing or cleaning a table, touching clothing or aprons, and touching animals or touching the hair, face or body, after sneezing, or coughing or anything else that may contaminate hands (U.S National Restaurant Association Educational Foundation, 2004) (Better Health Channel, 2015).

(b) Cooking of Food

Several studies have reported that inadequate cooking of foods was one of the main factors contributing to foodborne outbreaks (Todd, 1997). More than three million cases of foodborne illness annually are attributed to pathogens associated with improper food cooking (Ballejos, Hillers, McCurdy, & Takeuchi, 2006). Food safety experts acknowledge that foods are properly cooked when they are heated for a long enough time and at a high enough temperature to kill bacteria that cause foodborne illness. The best way to determine if meat, poultry, or egg dishes are cooked to a safe temperature

is to use a food thermometer. By using a food thermometer, it ensures not only the optimal temperature where bacteria are destroyed but also to determine doneness. Harmful micro-organisms in most foods can be killed by cooking them to temperatures between 140° F (70°C) and 180° F (90°C) (Medeiros et al., 2001). To protect against contamination, the meat should be cooked very well and foods that include meat should be prepared in perfectly hygienic conditions (Duffy, 2002).

(c) Cross Contamination

Transferring of bacteria from food to food, hand to food, or equipment to food (Zain & Naing, 2002) is one of the most common causes of foodborne illness and a little care can help us prevent it. Cross contamination can also occur when uncovered raw foods are stored directly adjacent to or above ready-to-eat foods in a refrigerator or other holding equipment. Allwood, Jenkins, Paulus, Johnson and Hedberg (2004) and Ryan, Wall, Gilbert, Griffin and Rowe (1996) found that food preparers' hands have contributed in up to 39% of domestic foodborne illness outbreaks. To minimize cross contamination, cooked and ready-to-eat foods should be kept separate from raw products while shopping, preparing, and storing food items. Knives, cutting boards, and food preparation areas should be washed away with hot soapy water after use for raw meat, fish, or poultry products. If possible, use separate cutting boards for raw meats, fish, or poultry and other ready-to-eat foods such as breads and vegetables (Medeiros et al., 2001).

(d) Time/Temperature Control

Time/temperature abuse while preparing food is known to result in foodborne illness (McSwane, Rue, Linton, & Williams, 2004). Time/temperature abuse occurs when food has been allowed to stand for an extended period of time at temperatures favorable for bacterial growth (U.S National Restaurant Association Educational Foundation, 2004). Time/temperature abuse include: insufficient amount of cooking or reheating time, improper holding temperature, and improper defrosting procedures (McSwane et al., 2004).

Knowledge and awareness of food safety issues and safe food handling practices are important in reducing foodborne illnesses. Food safety education for consumers is the easiest way to assist in the prevention of foodborne illnesses. The importance of food safety knowledge. Research shows that young adults have a greater tendency to participate in risky food handling behaviors, and are prone to violate many food safety precautions. Such behaviors include: inadequate washing of hands, using cutting boards

to cut fruits and vegetables after contact with raw meat and chicken, eating undercooked hamburgers and eggs, and eating raw oysters (Li-Cohen & Bruhn, 2002) (Morrone & Rathbun, 2003). These risky food handling and consumption behaviors are a major concern for researchers and food safety educators has increased with the increase in foodborne illness and the emergence of new pathogens (Haapala & Probart, 2004). Thus, knowledge and awareness are essential in reducing foodborne outbreaks and illnesses that continue to occur among all consumers (Kendall, Medeiros, Hillers, Chen, & DiMascola, 2003). Insufficient food safety practices are major contributors to the transmission of foodborne illness (Mitchell, Fraser, & Bearon, 2007).

Cooked foods should not be left to sit in room temperature for longer than two hours, and should be cooled quickly and kept refrigerated, ideally at a temperature under 5°C. Microorganisms can replicate very quickly at room temperature. To prevent or slow down the replication of microorganisms, it requires the optimal temperature below 5°C and above 60°C cause the reproduction of microorganisms to slow down or stop (Uçar, Yilmaz, & Çakıroğlu, 2016).

2.5 Homes as High Risk Location for Foodborne Illness

There are numerous reasons why home is the place linked with critical foodborne illness risk.

Firstly, the biggest percentage of the food we consume is prepared at home where increasing the chances for food handling errors to occur. The emphasis normally focus on how frequently people "eat out" causes many to not recognize that the home food environment offers 72% of the food, by weight, consumed by Americans and is responsible for 93% of the food consumed by those who almost always eat meals at home (Carlson, Kinsey, & Nadav, 2002).

Secondly, people who are higher chance of getting foodborne illness can be grouped. For instance, 13% of Americans are 65 years and above, nearly 7% are less than 5 years old, almost 4 million women are pregnant every year (CDC, 2010), and 1% is immunocompromised due to disease itself, medical treatment, and/or organ transplant (Kunisaki & Janoff, 2009). In expansion to this, 12 million people are getting healthcare at home as an extension of or replacement for traditional in-patient care (National Association for Home Care & Hospice, 2010). This amounts to one quarter of the U.S. population being at increased risk for foodborne disease and at high risk for severe health outcomes if they become ill (U.S Department of Health and Human Services, 2010).

Thirdly, numerous consumers—even those in high risk groups—do not see themselves or someone in their families are vulnerable to foodborne illness (Buffer, Kendall, Medeiros, Schroeder, & Sofos, 2013), rank their danger of foodborne illness lower than that of others (Frewer, Shepherd, & Sparks, 1994) or do not take after all recommended food safety practices (Jevsnik, Hoyer, & Raspor, 2008), and as a result of it they do not take adequate precautions. For example, young infants are mostly susceptible to infections due to their imperfect immune systems which makes scrupulous cleaning and handling of equipment associated with infant feeding critical (Trepka, et al., 2008). Although women admit they are curious about food safety after they have a baby (Curtis, 2001), there are numerous documented food handling mistakes concerned with infant feeding (Kennedy et al., 2005), (Davila, Trepka, Newman, Huffman, & Dixon, 2009), (Redmond & Griffith, 2009). Researchers in the United Kingdom, as an example, found that 4% of baby bottles that parents demonstrated had been cleaned, disinfected, and ready to use were absolutely contaminated with *Staphylococcus aureus* (Redmond, Griffith, & Riley, 2009). This contamination is particularly problematic given that bottles frequently are prepared in advance for feeding later; this time lag provides adequate opportunity for significant pathogen replication (Redmond & Griffith, 2009). Food handling in homes of young children needs progress given that children below 4 years have the greatest incidence of laboratory-confirmed infections from: *Campylobacter* species, *Cryptosporidium* species, *Salmonella* species, *Shiga* toxin-producing *Escherichia coli* O157, *Shigella* species, and *Yersinia* species (U.S Department of Health and Human Services, 2010).

Furthermore, food preparation at home may be served to a more extensive community, such as at bake sales, school picnics and church dinners, or even foods children exchange at lunchtime or homemade snacks adults share with colleagues in the working environment. Food samples served at farm market stands also are commonly arranged in-home kitchens.

Contrasting with commercial enterprises, home kitchens are multipurpose zones and are much more than just food preparation and storage places (Redmond & Griffith, 2009), (Byrd-Bredbenner, Maurer, Wheatley, Cottone, & Clancy, 2007). For example, analysts have discovered women's purses that as soon as sat on public ladies' restroom floors were sitting on kitchen counters (Byrd-Bredbenner, Maurer, Wheatley, Cottone, & Clancy, 2007). Pets, old newspapers, messy and dirty laundry, house plants, and soil all are common in home kitchens—one research team even reported observing a home

kitchen where automotive repairs had been going on (Redmond & Griffith, 2009), (Byrd-Bredbenner, Maurer, Wheatley, Cottone, & Clancy, 2007). Kitchen sinks are purposed for hand washing, food washing, dishwashing, soaking clothing, washing children and pets, and wetting mops. Unclean dishes may be stacked nearby clean dishes on kitchen counters. Raw unwashed vegetables, dripping raw meat, as well as cooked ready-to-eat foods are frequent in-home fridges. The various uses of home kitchens offer unsafe potential to present an cluster of pathogens that can spread to foods, multiply, and result in sickness. Some of the pathogens that have been proven in home kitchens consist of Salmonella, pathogenic *Escherichia coli*, *S. aureus*, and *Campylobacter* (Josephson, Rubino, & Pepper, 1997), (Rusin, Orosz-Coughlin, & Gerba, 1998). At least two studies have pronounced that the kitchen is more massively contaminated with fecal coliforms than bathrooms (Rusin, Orosz-Coughlin, & Gerba, 1998), (Ojima, et al., 2002). The control measures are essential at all stages of the food chain, from agricultural production on the farm to processing, manufacturing and preparation of foods in both commercial establishments and household kitchens to prevent infection (WHO, 2018). Issues related to kitchen hygiene should be addressed in food safety because experts agree that the home kitchen is the primary source of food borne illnesses. The arrange and inside plan of the kitchen should be organized in such a way as to encourage appropriate hygiene practices (e.g., prevent cross-contamination) (Alimentarius, 2009).The materials used in the kitchen must be free of any substances that can possibly render the food inappropriate for consumption, such as parasites, pathogenic microorganisms and toxins, or raw materials, food components and others substances used in the production of processed products that have been infected by foreign substance (Kaferstein & Abdussalam, 1999). The surfaces should be outlined in such a way as to no longer gather dirt, to anticipate foreign substances from contamination and to not permit the creation of thick fluids or mold. Pests should also be prevented from entering the workplace. Drainages should be easy to clean and prevent pests such as rodents from entering and waste liquids from re-entering back into the kitchen environment (Anon, 2011). To preserve a clean and hygienic kitchen, the coherence of cleaning and disinfection procedures is vital. Therefore, a cleaning and disinfection plan should be developed for the kitchen, and all cleaning and disinfection practices should be done according to this plan and recorded. The staff should be trained on the sanitation and disinfection of the kitchen (Kaferstein & Abdussalam, 1999).

2.6 Review on Previous Studies

Recent study of Myanmar Candidate by Sah Soh, (2013) found that emphasized on knowledge, attitude, and practice on food safety of employees. Employees' perception on safety food production had been evaluated. It was found that all employees had committed on food safety policy of HACCP, and less than 5-year service period employees should be given food safety training in their food industry. There was much more Attitude and Practice in above 50 age group than those of other age groups whereas 18 – 28 age group had much knowledge than those of other age group.

Chit Ko, (2015) studied the current condition of food safety awareness and measure taken by selected in Yangon City in 2015. The main aim of the study is to identify the current condition of food safety, practices, knowledge, and awareness in two selected high school from urban area and two high schools in suburban area were compared their efforts on food safety awareness. Descriptive analysis based on primary data is made on awareness of sellers and students. This study showed that schools from urban area have better awareness and efforts towards food safety in school canteens while schools from suburban areas have low level of practices even though they have better understanding on food safety.

Thant Zin, (2017) examined the food safety knowledge of street vendors and food safety practices followed by street vendors from selected two markets in Yangon City. It was found that street food sellers from Hledan market have the better knowledge while sellers from Kyimyindine Night Bazaar have lower level of understanding on food safety. Majority of food sellers were found weak to comply the particularly personal hygiene and food handling practices due to lack of food safety training provided by the authority concerned and lack of knowledge.

Food and Agriculture Organization of the United Nations, (2017) studied knowledge, attitude, practices (KAP) among food consumers in the West Bank and Gaza Strip. It is found that concerned with cooking and preparation, although some consumers did not follow safe producers while food preparation and cooking procedures, they do hold a nice mind-set closer to altering their practices. Some consumers lack the proper knowledge to do so, and their current practices are based on what they learned from their families. Households have a positive attitude towards issues related to hygiene, but since they lack the proper knowledge, they do not always follow the right practices. Unsafe practices were identified mainly in relation to the

usage of kitchen towels and sponges. It is also found that availability of information on food safety is lacking and insufficient; households do not have appropriate, reliable sources of food safety information.

CHAPTER 3
FOOD SAFETY PROGRAM AND LEGISLATION IN MYANMAR

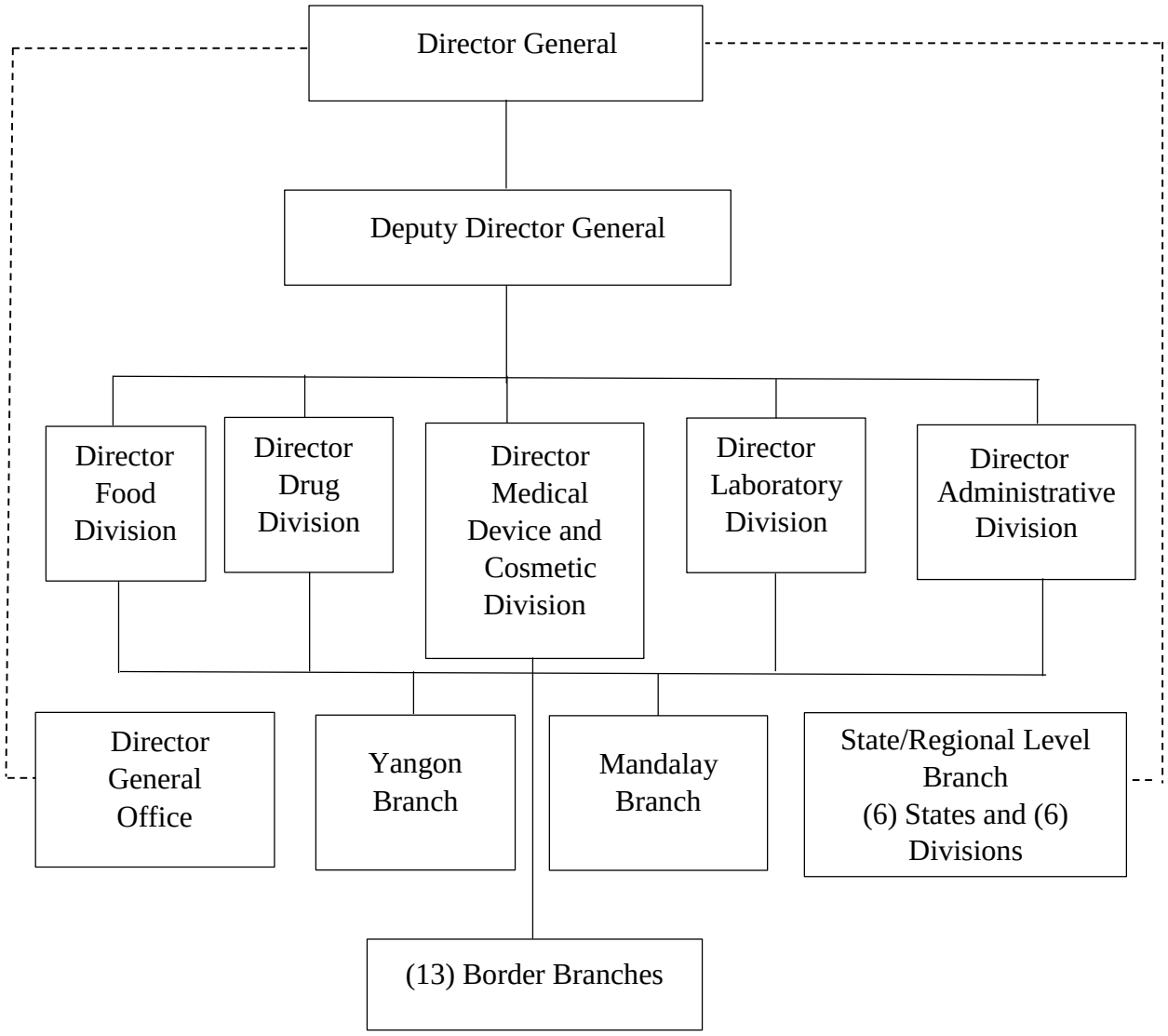
3.1 Food and Drug Administration, Myanmar

The Food and Drug Administration (FDA) was built up in 1995 as one of the divisions under the Department of Health, and it was upgraded as an isolated division in 1st April, 2013. The objective of the department is to guarantee the safety and quality of Food, Drugs, Medical Devices and Cosmetics within the nation. FDA Headquarter is situated in Nay Pyi Taw, the capital city of Myanmar, with five major divisions namely Administrative division, Drug Control division, Food Control division, Cosmetic and Medical Device Control division and Laboratory division (Food and Drug Administration, Myanmar, 2018).

Preexisting Yangon and Mandalay branches are still acting as major branches, control activities have incredibly extended with the foundation of modern FDA branches in 12 Regions and States, and 4 trade border zones such as Muse, Kalthaung, Myawaddy and Tamu (Food and Drug Administration, Myanmar, 2018), (Health in Myanmar, 2014). FDA is responsible for issuing GMP certificate for local food manufacturing businesses, import and export recommendation, import and export health certification. Drug control activities consist of marketing authorization for new product, variety of existing authorization, quality control laboratory testing, adverse drug reaction monitoring, drug promotion and advertisements, Good Manufacturing Practice inspection and licensing of manufacturers, wholesalers, and enforcement activities. FDA issues notification and import recommendation of medical devices and notification of cosmetics (Food and Drug Administration, Myanmar, 2018). FDA has two divisions; food and drugs and all division have enforcement and laboratory units. Food enforcement unit includes inspection, training, advisory services and regulatory affairs. Food laboratory unit has food and water microbiological and chemical laboratories. The objectives of laboratory division are to ensure the safety and quality food, drugs, cosmetics and medical devices, and to ensure the potency and efficacy of

drugs. The first and foremost essential thing is to update food legislation forgetting an effective food safety system and now it is under reviewing stage (Htwe, 2004).

Figure 3. 1 Organogram of Department of Food and Drug Administration



Source: Food and Drug Administration, Myanmar, 2018

FDA, Myanmar is working many activities for getting safety, quality, efficacy of food, drugs and cosmetics and medical devices. The activities of FDA, Myanmar are Pre market Assessment, including issuance of recommendation for domestic food manufacturing facilities and issuance of product registration, and issuance of import and export certification, post market assessment that activities based on priority needs, risk assessment, trainings/ workshop, health education, standards setting together with

MSTRD and related departments, and collaboration with related departments or organizations such as NGOs and INGOs.

3.2 National Food Safety Policy

The vision of the national food safety policy is that foods produced in the Republic of Union of Myanmar shall be safe for human consumption. Its overall objective is to contribute to the protection of the consumer health and facilitate trade. There are two specific goals, strategic and operational in national food safety policy. The strategic goal of national food safety policy contains (1) to ensure domestically produced foods and imported foods are safe for human consumption, (2) to strengthen the national food control system, (3) to enhance commitment of food businesses to only place safe food on the marker, and (4) to implement a national integrated Risk Based Food Safety Framework. The four operational goals are (1) legal power and provisions, (2) food safety information management, (3) resources and competencies, (4) equivalence, mutual recognition, and harmonization (Food and Drug Administration, Myanmar, 2018).

3.3 Food Safety Control System in Myanmar

Food and Drug Control activities was begun since 1927, a year before the first Food and Drug Act (1928). Until 1960, food control work had been fragmented and exercised by various departments. After which, Department of Health took responsibility for overall food safety in the country. In 1972, Public Health Law used to be promulgated and successive attempts had been made to strengthen the food control work. Food Quality Control Laboratory (FQCL) was set up as a division under National Health Laboratory of the Department of Health, however achievements on food control work has been limited to certain extent for various reasons. In early 1990, as the authorities realized the essential to further strengthening the food & drug control work, attempts had been made to progress it. National Drug Law was declared in 1992. As food and drug safety is concerned with wide variety of sectors including agriculture, fisheries, industry, trade & environment, in acknowledgement of the requirements for combination, formation of Myanmar Food & Drug Board of Authority (MFDBA) was shaped out in agreement with the terms of National Drug Law and reorganizing Food and Drug Supervisory Committees were finalized. At the same time, in accordance with the terms of National Drug Law, Food & Drug Division has been updated to be a Department under a Director of Food and Drug Administration (FDA) since 1995 National Food Law has been promulgated in 1997 in line with WHO Model Food Law.

(Htwe, 2004). As Myanmar is in its transformation period and likely to have boom business in the near future, FDA needs to take measures in capacity building matters to keep abreast with the changing situation of the country.

Food safety control system in Myanmar is a multiagency strategy along the food-chain in collaboration with other stakeholder departments and agencies such as Department of Agriculture, Livestock Breeding and Veterinary Department, Department of Fisheries, Department of Consumers Affairs, Municipal Health Departments (Naypyidaw Development Committee and City Development Committees – CDC in Yangon and Mandalay), Custom Department, Disease Control Unit, Department of Public Health, and Consumer Organizations etc.

City Development Committees are accountable for street food and foodservice establishments for food safety. CDCs have licensing authority within their legal power. Under the Industrial Law, the Directorate of Industrial Coordination & Inspection under Ministry of Industry is the licensing authority for industrial establishment; it has to issue a license for all food manufacturing establishments. Food safety control works are (1) GMP Inspection and Certification of food industries, (2) Food Import and Export Inspection and Certification, (3) Post-market Surveillance, and (4) Switching to Risk-based approach.

FDA urges Myanmar food industries to follow HACCP (a systematic preventive strategy to food safety from biological, chemical, and physical hazards in production processes that can cause the finalized goods to be hazardous, and designs measurements to lessen these risks to a safe level) based Food Hygienic Practice on food inspection. FDA uses Codex Alimentarius Commission materials as operating materials as an interim measure before creating national standards, practices, and guidelines (Htwe, 2004).

3.4 National Food Law

To enable the public to have quality and safety food, drugs, medical devices, and cosmetics, FDA is implementing the tasks in accordance with guidance from the National Health Committee (NHC), Ministry of Health and Myanmar Food and Drug Board of Authority (MFDBA). Since there are laws related to food and drug, FDA has to enforce National Drug Law 1992 and its provisions, National Food Law 1997, and Public Health Law 1972 (Health in Myanmar, 2014).

The National Food Law was legislated in 1997 and the Amendment of the National Food Law was finalized in 2013. Currently, a new National Food Law is being

drafted (USAIDS, 2017). The primary purposes of food regulation are to protect the consumer's fitness growing economic viability harmonizing well-being and between countries. There are four main objectives in the National Food Law; (1) to enable the community to consume food of real best free from danger and hygienic, (2) to prevent the public from consuming unsafe food that are harmful to health, (3) to supervise production of controlled food systematically and (4) to control and regulate the production, export, import, storage, distribution, and deal of food efficiently.

According to National Food Law, all food needs product recommendation from the Food and Drug Administration (FDA) (Myanmar Patent No. 5/97, 1997).

3.5 National Policies for Consumer Protection

A national policy for consumer protection in Myanmar is "ongoing" status. UN Guidelines on Consumer Protection (UNGCP) expressed that Member States should establish consumer protection policies that motivate good business practices, clear and up-to-date information to enable consumers to contact business simply, and to enable regulatory and law enforcement authorities to recognize and discover them, clear and up-to-date information regarding the goods or services offered by businesses and the terms and conditions of the relevant transaction, clear, brief, and simple to get it contract terms that are not unfair, a transparent process for the confirmation, cancellation, return and refund of transactions, secure payment mechanisms, fair, affordable and speedy dispute resolution and redress, consumer privacy and data security, consumer and business education (USAIDS, 2017).

3.6 Consumer Protection Law

The Pyidaungsu Hluttaw (Assembly of the Union) approved amendments to the Consumer Protection Law that was enacted in 2014 (Thiha, 2019). The objectives of the Consumer Protection Law are (1) to enable to recognize and claim the own rights as a consumer and not to cause sufferance from fraud in the usage of the goods or services, (2) to cause occurrence of a framework successfully ensure the rights of the consumer, (3) to cause occurrence of consumer protection scheme which include defending with the aid of Law distributing and informing accurate transparent information to the consumer, (4) to cause behaviors taking responsibility in carrying out with respect upon consumer protection activity by the entrepreneur, (5) to cause achievement of goods or services that enable to guarantee the high quality for safety, health, satisfaction of the consumer. In that law, rights and duties of the consumers are mentioned as well.

(a) Rights of the consumers

The rights of the consumers are (1) empowering to use safety of the goods or services, (2) empowering to select the goods or services and empowering to obtain the promised value, terms and conditions and warranty, (3) having right to get totally and accurately of information relating to the condition and guarantee of the goods or services, (4) claiming to hear and settle on dispute related to goods or services used by the consumer, empowering to get consumer protection and empowering to get correct settlement, (5) getting fair relationship that is non-discriminatory treatment and service.

(b) Duties of the consumers

The responsibilities of the consumers are (1) complying with the information and guiding principle associated to goods or services intended and expressed to cause safety, (2) complying with the choices of the Consumer Dispute Settlement which settle accurately in consumer disputes, (3) avoiding false complaint supposed to detriment on entrepreneurs, (4) avoiding the saying, writing and acting in order to detriment on relevant entrepreneurs by means of media or by other meanwhile relevant persons is settling the consumer dispute.

3.7 Consumer Education and Information Programmes

United Nations Guidelines on Consumer Protection (UNGCP) affirmed clearly on how the UN Member States should create comprehensive consumer education and information programmes as follow:

Governments should create or empower the development of general consumer education and information programmes, bearing in mind the cultural traditions of the people concerned. The purpose of such programmes should be to empower people to act as discriminating consumers competent of making an educated choice of goods and services, and aware of their rights and responsibilities in developing such programmes, distinctive attention has to be given to the needs of disadvantaged consumers, in each rural and city areas, including low-income consumers and those with low or non-existent literacy levels.

Consumer education should, where suitable, become an essential portion of the basic curriculum of the educational system, ideally as a component of existing subjects. Consumer education and information programmes ought to include such critical perspectives of consumer protection as health, nutrition, prevention of food-borne diseases and food contaminations, product labelling, product hazards, relevant legislation, how to get compensation, and agencies and organizations for consumer

protection, information on weights and measures, prices, quality, credit conditions and availability of basic necessities, and pollution and environment (UNCTAD, 2016).

U Yan Lin of Kyaiklat Constituency who was a former president of Myanmar Consumers Union (MCU) urged the Union Government to incorporate consumer education topics in current education curricula specifically in Grades 6, 7 and 8, to which Hluttaw agreed to discuss. However, the minister said that the new curriculum that was being drawn up incorporates the subject of consumer education that would be understandable and suitable for the students' age, knowledge and understanding level. Educate about foods, drugs, and services that were not fit for consumption, and selecting healthy and appropriate foods and drugs. The subject will be taught after confirmation from the National Curriculum Committee through the National Education Policy Commission. At the basic education level, there is no subject title of Consumer Education, but in the present "Experiences for Life" subject as well as subjects in the new curriculum being drawn up would include knowledge on this matter (USAIDS, 2017).

CHAPTER 4
SURVEY ANALYSIS

4.1 Survey Profile

This survey was conducted in Thingangyun Township in Eastern District of Yangon Region. According to 2014 Census data, total population of Thingangyun Township was 209,486 and sex ratio was 89 (males per 100 females). There were 38 Wards in Thingangyun Township. The literacy rate of those aged 15 and over in Thingangyun Township was 96.9 percent. It was higher than the literacy rate of Yangon Region (96.6%) and the Union (89.5%). Female literacy rate was 95.8 percent (Ministry of Labour, 2017).

In Thingangyun Township, 31.7 percent of the employed persons aged 15-64 were services and sales workers and was the highest proportion, followed by 19.4 percent in craft and related trades workers. Analysis by sex showed that 28.2 percent of males and 37.3 percent of females were services and sales workers (Ministry of Labour, 2017).

The proportion of people working within the industry of Wholesale and retail trade; repair of motor vehicles and motorcycles was the highest with 21.7 percent. The second highest industry was Accommodation and food service activities at 12.9 percent. In Wholesale and retail trade; repair of motor vehicles and motorcycles industry, 21.6 percent of males and 21.7 percent of females are working (Ministry of Labour, 2017).

The larger part of the families in Thingangyun Township were living in wooden houses (36.7%) followed by households in apartment/condominium (35.9%). Some 97.7 percent of the households in Thingangyun Township had improved sanitation facilities (flush toilet (13.4%), water seal (improved pit latrine) (84.3%). Compared to other townships in Yangon Region, Thingangyun had excessive proportion of households with better sanitation facilities (Ministry of Labour, 2017).

99.3 percent of families within Thingangyun Township used improved sources of drinking water (tap water/piped, tube well, borehole, protected well/spring and

bottled water/water purifier). Compared to other townships in Yangon Region, it was high and it was also greater than the Union average (69.5%). In Thingangyun Township, 97.3 percent of the families used power for lighting. This proportion was higher than the electricity usage compared to other townships within Yangon Region (Ministry of Labour, 2017).

Thingangyun Township was chosen in Yangon Region for survey analysis to get response from food consumers because there was high literacy rate, and its economic status was neither very high nor low.

4.2 Survey Design

There were 38 Wards in Thingangyun Township. Four wards were chosen by using a random table (Ba Wa Myint, Lay Daunt Kan, 16/2, and 16/4 Wards). Total population from those four wards were 20,713; 2,552 in Ba Wa Myint Ward, 11,213 in Lay Daunt Kan Ward, 4,537 in 16/2 Ward, and 2,411 in 16/4 Ward (Ministry of Labour, 2017). The targeted sample size according to 2014 Census data was 195 while the margin of error was taken 7 percent with 95 percent confidence level. Simple Random Sampling was used to select sample respondents from those wards, and a total of 202 samples were collected. A quantitative research method was applied for this survey by using well-structured questionnaires including respondent's information in Part (A), about unsafe food in Part (B), about personal hygiene, storage, handling and cooking of food in Part (C), and about pest control and waste handling in Part (D). Data collection for this survey was carried out during May and June 2019. The collected data was run by SPSS and the descriptive method was used for analyzing results.

4.3 Survey Results

The survey findings are analyzed and shown as characteristics of respondents, knowledge, attitude and practice of the respondents concerned with food safety.

4.3.1 Characteristics of Respondents

Total 202 of food consumers were involved in this study. The findings of respondents' characteristics were presented in Table 4.1.

Table 4. 1 Characteristics of Respondents

Particulars	Number of Respondents	Percent (%)
Gender		
Male	59	29.2
Female	143	70.8
	202	100
Age Group		
15-24	31	15.3
25-34	64	31.7
35-44	60	29.7
45-54	38	18.8
55 and above	9	4.5
	202	100
Number of Family Members		
only one person	6	3.0
two to five	160	79.2
above five persons	36	17.8
	202	100
Below 5 years of age in family		
No	165	81.7
Yes	37	18.3
	202	100
Level of Education		
Illiterate	4	2.0
Can read and write	8	4.0
Primary	13	6.4
Middle	24	11.9
High	49	24.3
Graduate/Postgraduate	104	51.5
	202	100
Food safety awareness		
Yes	45	22.3
No	157	77.7
	202	100
Employment		
Employed	143	70.8
Unemployed	59	29.2
	202	100

Source: Survey data, 2019

Out of 202 respondents, the percentage of female respondents are nearly 2.5 times higher than male. It was because sex ration in Thingangyun was 89 (males per 100 females) and female was more willing to answer survey concerned with food because it was culturally accepted female was more concerned with the cooking of food.

According to survey data, respondents within 25-34 age group was highest (31.7 percent). The second most response group was 35-44 followed by 45-54 and 15-24. Thus, 95.5 percent were between 15-54 years of age and only 4.5 percent were above 55. It was because 65 percent of people living in Thingangyun Township were among 15-54 age group.

The survey findings showed that 79.2 percent had family members between two to five persons. Mean household size from survey data was 2.15 which was half of the mean household size of 2014 census data, 4.6 (Ministry of Labour, 2017). During the survey, the number of households that had below 5 years of age was asked and only 18.3 percent of the families had below 5 years of age.

According to the survey findings. 46.6 percent of respondents had less than tertiary education and 51.5 percent had tertiary education. Among 202 respondents, only 2 percent were illiterate. The total literacy rate was 98.1 percent and it represented the literacy rate of Thingangyun township in census data which was 97 percent (Ministry of Labour, 2017).

Only 22.3 percent of respondents had an awareness session for food safety. It showed that food safety awareness sessions were necessary to implement and upgrade and refresh the knowledge of people. Out of 202 respondents, 143 (70.8 percent) were employed. Survey findings showed that 79.7 percent of employed and 72.9 percent of unemployed persons did not have food safety awareness, so food safety awareness should be given to both employed and unemployed.

4.3.2 Knowledge about Food Safety

During survey, knowledge of the respondents about food safety was accessed and findings are mentioned as below.

(a) Understanding of unsafe food and diseases can be caused by unsafe food

The findings of understanding about unsafe food and diseases can be caused by unsafe food were summarized in Table 4.2.

Table 4. 2 Understanding of unsafe food and diseases can be caused by unsafe food

Unsafe food	Percent (%)
Do not know	0.4
Fatty Food	0.4
Contain narcotic	0.4
Cause diarrhea	0.8
Not mention manufacture and expired date	0.8
Unwell Cooked food	0.8
Fast food	1.2
FDA not approved food	2.4
Food that are not fresh	4.8
Contain chemical substances	5.2
Street Food	9.6
Expired food	12.4
Dye	15.5
Cause Harm Health	20.7
Contaminated food	24.7
	100
Diseases can be caused by unsafe food	
No Diseases	0.2
Food poisoning	19.0
Malaria	2.6
Worm Infestation	15.7
Hepatitis A	9.1
Hepatitis B and C	8.2
Enteric Fever	10.2
Diarrhea	22.1
Cancer	12.8
	100

Source: Survey data, 2019

Survey findings showed that only 0.4 percent answered do not know what unsafe food was, and 45.4 percent gave generalized answers. According to findings, only a few people concerned about unwell cooked food, food that was not approved by the FDA, and food contain chemical substances. Majority of people do not concern about street food, expired food, and date of manufacture and expired. According to findings, food consumers needed to be educated that not to have unwell cooked food, fast and fatty food, food that contain dye and chemical substances and expired food that all could cause serious diseases and complications.

Concerned with diseases can be caused by unsafe food, only 0.2 percent of respondents did not know the diseases triggered by unsafe food. Majority of respondents knew unsafe food cause diarrhea and food poisoning; however, most do not concern about hepatitis A, enteric fever, cancer and worm infestation that all can be transmitted by ingestion of unsafe food. Out of 202 respondents, 10.8 percent could not give correct answers that cannot be transmitted via having food (Malaria, Hepatitis B and C). According to survey findings, people need to be informed that unsafe food not only caused minor illnesses, diarrhea, and food poisoning, but also it could lead serious diseases and complications, including hepatitis A and cancers. Worm infestation could cause serious complication such as anemia, and sometimes deadly side effects (CDC, 2018). Moreover, people needed to know exact information about diseases that could not cause and be transmitted by having food and should look up whether own knowledge was correct one or not, and asked health personnel if there was a doubt.

(b) Diseases occur in family and affected family age

Table 4.3 showed whether diseases mentioned in Table 4.2 occur in the family or not and if occurred, the age at which being affected.

Table 4. 3 Diseases occur in family and affected family age

Disease occur in family or not			
Age being affected		**Number of Respondents**	**Percent (%)**
Not affected	No	85	42.1
	Don't know	8	4.0
	Don't want to answer	3	1.5
Less than 5 years	Yes	10	5.0
5 years and above	Yes	96	47.5
Total		202	100

Source: Survey data, 2019

The survey findings showed that 52.5 percent of the respondent's family suffered from the diseases mentioned in Table 4.2. Mostly affected age was above 5 years (Table 4.3). It can conclude that people do care about the safety of food for children because it was accepted that their immune system was weaker than the adults. People need to be educated that food safety is related to all ages.

(c) Sources of food contamination and its contents

In Table 4.4, the findings of food contamination sources and its contents were summarized.

Table 4. 4 Sources of food contamination and its contents

Sources of food contamination	Percent (%)
Food handlers	15.8
Contaminated Surfaces	10.0
Improper Cooking	15.5
Improper Storage	16.9
Cross Contamination	8.9
Improper Waste Handling	14.0
Pets	18.8
	100
Unsafe food contains	
Bacteria	24.4
Viruses	10.9
Parasites	15.2
Chemical Substances and Pesticides	25.3
Moulds	24.2
	100

Source: Survey data, 2019

The survey findings showed that the most concern of the majority of respondents was pests, followed by improper storage, through food handlers, improper coking and waste handling. Most people did not aware that cross-contamination and contaminated surfaces were a culprit of food contamination. Moreover, pets were easily visible, however, pets-touched surfaces were not simply known, and it should stress to people in food safety session.

Concerned with the question about unsafe food contents, people cared about chemical substances, and pesticides, bacteria, and moulds, however, parasites and viruses were not being noticed much. Norovirus is a very contagious virus that causes vomiting and diarrhea. People of all ages can get infected and sick with norovirus (CDC, 2018). Moreover, parasites such as Ascariasis, and Giardiasis are frequent cause of worm infestation (CDC, 2018) and foodborne diarrhea (Bartelt, 2018). Although in this question, respondents mostly stressed about unsafe food contain chemical substances and pesticides, they did not mention much about it in the question of "How do you understand unsafe food" (Table 4.2).

(d) Knowledge of food safety information source

Sources of food safety information knowledge were summarized in Table 4.5.

Table 4. 5 Source of food safety information

Do you know source of information?	Percent (%)
Yes	81.2
No	18.3
Don't want to answer	0.5
	100
From Where?	
Internet (Facebook, Websites)	25
Magazines, Newspapers, Journals	20.3
TV	23.5
Radio	9.9
Friends and Family	18.9
Others	2.3
	100

Source: Survey data, 2019

The survey findings showed that 81.2 percent knows the source of information for food safety, and 18.3 percent did not know where the source of information could be obtained (Table 4.5). Majority of respondents who knew the source of information received information from the internet (Facebook, Websites), followed by getting from TV. Information got from Magazines, Journals, and Newspapers and friends, family members and neighbors were not much different because the number of people surfing

the net is getting more and more nowadays and 61.4 percent of the respondents were between age group 25-44 who mostly surfed the Net in their daily life (Table 4.1). According to the survey findings, the food safety message could be shared effectively by using the internet (Facebook, Websites) and TV.

(e) Knowledge of proper separation of food

The findings of knowledge about proper separation of food were presented in Table 4.6.

Table 4. 6 Knowledge of proper separation of food

Food Storage	Percent (%)
Separate meat and fish	10.8
Separate meat, fish and vegetables	45.9
Separate meat, fish and cooked food	42.6
No need to separate meat, fish and vegetables	0.5
No need to separate meat, fish and cooked food	0.3
Total	100

Source: Survey data, 2019

According to survey results, only 0.8 percent did not know how to separate food properly and 10.8 percent did not aware that it was necessary to keep separate meat and fish. Two persons answered "no need to separate meat, fish, and vegetables" and the education level of one respondent was middle school, and another one was graduate/post-graduate. The education level of the one who answered "no need to separate meat, fish, and cooked food was middle school. According to the survey, food consumers need to be well-informed that proper separation of raw meat, fish, vegetables, and cooked food were essential to prevent cross-contamination (being transferred of microorganisms from food to food) that is one of the most common causes of foodborne illnesses (Zain & Naing, 2002). Moreover, it was the least response answer in sources of food contamination, and only 8.9 percent answered it (Table 4.4).

4.3.3 Food Safety Attitude

During survey, attitude of the respondents toward food safety was accessed and results are mentioned below.

(a) Attitude toward expired food

The survey answers about agree or not having expired food and cans because its appearance, taste and smell are good were presented in Table 4.7

Table 4. 7 Agree to have expired food because it seems good

Expired food and cans could be eaten because its appearance, taste and smell are good apparently	Number of Respondents	Percent (%)
Strongly Agree	15	7.4
Agree	25	12.4
Neither Agree nor Disagree	15	7.4
Disagree	51	25.2
Strongly Disagree	96	47.5
Total	202	100

Source: Survey data, 2019

The survey findings showed that 72.7 percent disagree to have expiry food though it seems good apparently and 19.8 percent answered agree to have that kind of food. It showed that most of the respondents cared about the drawback of consuming expired food, however, some did not. Thus, good and bad points of checking the expiry date and consequences of having expired food should be stressed during food awareness session and education.

(b) Attitude to handwashing can prevent foodborne illnesses

In Table 4.8, the findings of handwashing prevent foodborne illnesses were summarized.

Table 4. 8 Handwashing can prevent foodborne illnesses

Handwashing prevent foodborne illnesses	Number of Respondents	Percent (%)
Strongly Agree	85	42.1
Agree	65	32.2
Neither Agree nor Disagree	28	13.9
Disagree	13	6.4
Strongly Disagree	11	5.4
Total	202	100

Source: Survey data, 2019

74.3 percent agreed that handwashing could prevent foodborne illnesses, however, 11.8 percent did not agree it, and 13.9 percent neither agreed nor disagreed. Personal hygiene is one of the contributing factors for contaminated or unsafe food that caused foodborne illnesses and researchers showed that poor personal hygiene causes more than 90 percent of foodborne illnesses and improper handwashing alone accounted for more than 25 percent of all foodborne illnesses (Weinstein, 1991). According to survey findings, 52.5 percent suffered diseases from contaminated or unsafe food (Table 4.3). Hence, it must share and stress that handwashing is the cheapest ways of preventing foodborne illnesses in public.

(c) Attitude towards separation of cutting boards for raw meat and vegetables

Table 4.9 showed attitude toward using separate cutting boards for raw meat and vegetables.

Table 4. 9 Attitude to use separate cutting boards for raw meat and vegetables

Not necessary to separate cutting boards for raw meat and vegetables	Number of Respondents	Percent (%)
Strongly Agree	33	16.3
Agree	23	11.4
Neither Agree nor Disagree	34	16.8
Disagree	36	17.8
Strongly Disagree	76	37.6
Total	202	100

Source: Survey data, 2019

The survey findings showed that 55.4 percent did not agree that it was not necessary to keep separate cutting boards, however, 27.7 percent agreed it, and 16.8 percent did not give precise answer agree or disagree. Moreover, responses to contaminated surfaces and cross-contamination were the two lowest answers in the question about sources of food contamination (Table 4.4). According to survey findings, most of the food consumers accepted to use separate cutting boards for raw meat and vegetables, however, some did not. Thus, they need to be educated about getting diseases from cross-contamination and contaminated surfaces.

(d) Attitude towards pest control

Table 4.10 presented about the summary of attitude towards pest control.

Table 4. 10 Attitude towards pest control

High chance of getting diseases from pest in and around home	**Number of Respondents**	**Percent (%)**
Strongly Agree	89	44.1
Agree	53	26.2
Neither Agree nor Disagree	25	12.4
Disagree	20	9.9
Strongly Disagree	15	7.4
	202	100
Severe diseases can contract from pest in home		
Strongly Agree	72	35.6
Agree	66	32.7
Neither Agree nor Disagree	30	14.9
Disagree	18	8.9
Strongly Disagree	16	7.9
	202	100
Concerned that pest in and around my home make me ill		
Strongly Agree	84	41.6
Agree	56	27.7
Neither Agree nor Disagree	27	13.4
Disagree	20	9.9
Strongly Disagree	15	7.4
	202	100
Pest control is too expensive		
Strongly Agree	29	14.4
Agree	48	23.8
Neither Agree nor Disagree	28	13.9
Disagree	58	28.7
Strongly Disagree	39	19.3
	202	100
Pest control is time consuming		
Strongly Agree	31	15.3
Agree	40	19.8
Neither Agree nor Disagree	30	14.9
Disagree	52	25.7
Strongly Disagree	49	24.3
	202	100

Source: Survey data, 2019

The survey findings showed that 70.3 percent agreed that the chance of getting a disease from pest in and around the home was high, however, 17.3 percent disagreed, and 12.4 percent did not give agree or disagree precisely. According to survey findings, pest control techniques and diseases could be caused by pest should be educated to food consumers intensively.

68.3 percent agreed that catching a disease from pest would lead to serious health problem, however, 16.8 percent did not agree, and 14.9 neither agreed nor disagreed. The findings showed that some food consumers did not know about pest brought many deadly diseases and affected human health seriously.

The survey findings showed that 69.3 percent worried about pest in and around their home make them ill, however, 17.3 percent did not worry, and 13.4 percent neither agreed nor disagreed. This result also indicated that some food consumers did not have awareness about danger of pest.

The survey findings showed that 38.2 percent thought pest control was too expensive for them, so it could conclude that pest control activities would not put effort much. Food consumers should be informed that the cost of pest control was much cheaper than costs for treating serious health problems caused by pest.

The survey findings showed that 35.1 percent thought pest control took time a lot. An inference could be drawn that pest control activities would not do much because it was supposed that pest control wasted time a lot, expensive, not supposed that pest cause dangerous health problems.

4.3.4 Food Safety Practice

During survey, assessment of practice of the respondents about food safety was done and results are mentioned as below.

(a) Practice of checking expiry date

In Table 4.11, the results of practice about checking expiry date when buying food, cans, and dairy products were presented.

Table 4. 11 Checking expiry date when buying food, cans and dairy products

Do you check expiry date?	Number of Respondents	Percent (%)
Always	144	71.3
Sometimes	25	12.4
Seldom	17	8.4
Forget to check	10	5.0
Don't know to check	6	3.0
Total	202	100

Source: Survey data, 2019

The survey findings showed that apart from 25.8 percent, the majority usually check expiry date when buying food, cans and dairy products. 3 percent answered they do not know to check. According to survey findings, it is necessary to educate people to check expiry date whenever they buy or have food to prevent contracting from mycotoxins, such as aflatoxin and ochratoxin, produced by moulds that can cause liver cancer.

(b) Handwashing Practice

The survey results of handwashing practice were shown in Table 4.12.

Table 4. 12 Practice of handwashing

Practice of handwashing	Percent (%)
Before Eating	13.7
After Eating	12.1
Before using restroom	2.9
After using restroom	12.9
After touching animals	10.8
After sneezing and coughing	7.3
Before food preparation	11.2
During food preparation	7.3
After food preparation	9.4
After cleaning of home	12.5
Total	100

Source: Survey data, 2019

According to survey findings, most people washed hands before and after eating, after using the restroom, and cleaning of the home, however, practices of washing hand after sneezing and coughing, before and after food preparation, and after touching animals were low. People need to educate more about keeping hands clean is the easiest and one of the most important steps to avoid getting sick and spreading germs to others, and it decreases the number of people who get sick with diarrhea by 23-40 percent, reduces diarrheal illness in people debilitated immune systems by 58 percent, decreases respiratory illness, like colds in general community by 16-21 percent, and reduces gastrointestinal illness in schoolchildren by 29-57 percent (CDC, 2018).

(c) Practice of reheating method of frozen raw meat or fish and storage of cooked food

Table 4.13 showed the findings of practice about reheating method of frozen raw meat or fish and storage of cooked food.

Table 4. 13 Practice of reheating method of frozen raw meat or fish and storage of cooked food

Method of thawing or reheating for frozen raw meat or fish	**Percent (%)**
Keeping at room temperature for more than 2 hours	18.8
Keeping at room temperature for less than 2 hours	50.5
Keep at lower shelves of fridge	30.7
	100
Cooked food is	
Kept in fridge	40.1
Kept uncovered	3.7
Kept in larder or covered	55.8
Other	0.3
	100

Source: Survey data, 2019

The survey findings showed that 50.5 percent kept frozen raw meat or fish to reheat or thaw at room temperature less than 2 hours, and 30.7 percent kept in lower shelves of the fridge. However, 18.8 percent used the ways that being kept frozen raw

meat or fish to reheat or thaw at room temperature for more than 2 hours. According to survey findings, food consumers need to educate not to keep freeze perishable food at room temperature no longer than two hours that is recommended timeframe to prevent occurring danger zone where dangerous bacteria grows.

Concerned with the practice of keeping cooked food, the survey findings showed that 55.8 kept in the larder or covered, 40.1 kept in the fridge, however, only 3.7 percent answered uncovered cooked food. Thus, 95.9 percent kept cooked food properly. It showed the majority of food consumers concerned about contamination by pest, however, many respondents did not willingly do pest control activities because it was accepted time-consuming, and costs a lot (Table 4.10).

(d) Practice of using separate cutting board for raw meat and vegetables

Table 4.14 presented the practice of using separate cutting boards for raw meat and vegetables.

Table 4. 14 Practice of using separate cutting boards for raw meat and vegetables

Use separate cutting boards for raw meat and vegetables	Number of Respondents	Percent (%)
Yes	126	62.4
No	72	35.6
Don't know	4	2.0
Total	202	100

Source: Survey data, 2019

The survey findings showed that 62.4 percent used separate cutting boards for raw meat and vegetables, however, 35.6 percent did not, and 2 percent did not know whether the separate cutting board was used for raw meat and vegetables (Table 4.14). According to survey findings, it could be concluded that some people did not know about food contamination from cross-contamination and contaminated surfaces that were culprits of foodborne illnesses. It should stress to food consumers that food contamination can be caused by cross-contamination and contaminated surfaces.

(e) Storage of kitchen waste material and frequency of putting away garbage

The survey results of practice about the storage of kitchen waste materials and the frequency of putting away garbage were summarized in Table 4.15.

The survey showed that 16.8 percent did not store kitchen waste materials properly. It could inference that some food consumers did not care the diseases contracting from pest and should educate that it could attract pest in and around the home and end up with contracting serious health problems from pest even though wastes were discarded every day.

Table 4. 15 Storage of kitchen waste materials and frequency of putting away garbage

Storage of kitchen waste materials	**Number of Respondents**	**Percent (%)**
Tied plastic bag	42	20.8
Untied plastic bag	15	7.4
Uncovered bin	19	9.4
Covered bin	126	62.4
	202	100
Frequency of put away garbage		
Every day	136	67.3
Weekly	63	31.2
Once in two weeks	3	1.5
	202	100

Source: Survey data, 2019

The survey findings showed that 32.7 percent did not discard garbage every day. It could be concluded that some food consumers did not aware microorganisms could breed from stored garbage and awareness should be given that improper storage of kitchen waste materials and discard attracts pest and do thorough storage and discard if they afraid costs for pets control and time-consuming for it.

CHAPTER 5
CONCLUSION

5.1 Findings

Foodborne illness is a common, costly and occasionally serious public health problem, yet they are preventable. Sometimes the foods we enjoy and rely on for wellbeing are contaminated with germs that cause sickness and can even be deadly because it is required not only by people but also for microorganisms. The burden of foodborne diseases to public health and welfare and to economy has often been underestimated due to underreporting and trouble to set up casual relationships between food contamination and ensuing illness or death. Safe food bolsters national economies, trade and tourism, contribute to food and nutrition security, and support feasible environment. When food supplies are insecure, and uncertain, people have to tendency to shift to less healthy diets and eat more hazardous food – in which chemical, microbiological, other hazards pose health risks. Food can get to be contaminated at any point of production and distribution, and the primary responsibility lies with food producers. Yet a huge extent of foodborne disease occurrences is caused by improperly prepared or mishandled at home. Food safety is now widely recognized as a major public health issue.

In this study respondents' characteristics are given in terms of gender, age group, household size, education level and getting the awareness of food safety session and employment status. In terms of gender, the number of females is greater than that of male. Thus, they need to take care of food safety at home. The survey shows that 31.7 percent of respondents are between 25 to 34. The average household size consists of two to five family members, and of which only 18.3 percent household has below 5 years of age. 51.5 percent of the respondents are graduate or postgraduate level, and out of 202 respondents, only 22.3 percent have food awareness session experience. 70.8 percent of respondents are employed and out of them, 64.4 percent has awareness session about food safety.

Knowledge, attitude, and practice of food safety among food consumers are analyzed with 20 well-structured questionnaires. According to findings, the majority do not concern about unwell cooked food, food not approved by FDA, and street food. Majority of respondents know unsafe food cause diarrhea and food poisoning, however, they do not aware unsafe food cause hepatitis A, enteric fever and cancer. According to the survey, 52.5 percent of respondents answered they have suffered from diseases such as diarrhea, and food poisoning. Food consumers do not aware much about cross-contamination and viral infection from unsafe food. Most usually check expiry date when they buy food, and do not agree to have expired food though its appearance, smell, and taste seem good. Majority of respondents know the source of information for food safety and they usually have information from the Internet, and TV.

74.3 percent agree handwashing can prevent foodborne illnesses; however, they are not used to washing hands after sneezing, coughing, during and after food preparation. 95.5 percent store cooked food properly, only 18.8 percent use danger thawing or reheating method. Most of the people separate meat, fish, vegetables, and cooked food; however, 10.8 percent do not aware that it is necessary to separate. 55.4 percent agree to use separate cutting boards, and 62.4 percent use it separately in practice. Majority of respondents suppose severe diseases can contract from pest in the home; however, some food consumers reluctant to do pest control activities because they think it is time-consuming and cost a lot. According to survey findings, 83.2 percent keep kitchen waste materials and 63.7 percent of respondents discard it every day.

5.2 Recommendations

According to the findings of this study, I would like to recommend that food safety awareness is necessary to provide all food consumers. During awareness sessions, people need to be informed that unsafe food can cause from minor illness to severe results, such as hepatitis, and cancer, and even death, and such kind of health messages should be posted on the internet, and social media such as Facebook, and shared via television because according to this study, these two ways are used more by people nowadays. Moreover, health professionals and health-related staff should educate people about cross-contamination, and proper storage of cooked food and how to thaw freeze meat and fish without occurring danger zone where microorganisms breed easily. People should be well informed to keep surfaces clean in the kitchen to prevent contamination and care about the danger of pest. I would like to recommend to

do further research about food safety management other food safety process chain, especially during distribution because this study only covers food safety knowledge, attitude and practice of home consumers.

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Food Safety on Knowledge, Attitude, and Practice

Survey Questionnaires

No	Questionnaires	Answer/ Response	Code No.
BLOCK (A) Respondent's Information			
A1	Male/ Female	.....	|__|
A2	Age (Completed Year)	..... Yr	|__|
A3	How many household members do you have including you?	1. 1 2. 2-5 3. >5	|__|
A4	Among your household members, how many are under 5 and above 5?	1. Number of <5 Yr ..... 2. Number of >5 Yr	|__|
A5	Level of Education	1. Illiterate 2. Can Read and Write 3. Primary School 4. Middle School 5. High-School 6. Graduate/ Post Graduate	|__|
A6	Have you ever had food safety awareness orientation session?	1. Yes If yes, when _____(year) 2. No	|__|
A7	Are you employed or unemployed?	.....	|__|
BLOCK (B) About Unsafe Food			
B1	How do you understand unsafe food? (collect everything what interviewee says)	....	|__|
B2	What diseases can be caused by unsafe food? (can choose more than one answer)	1. No diseases can occur 2. Food poisoning 3. Malaria 4. Worm Infestation 5. Hepatitis A 6. Hepatitis B and C 7. Typhoid / Enteric Fever 8. Diarrhoea 9. Cancer	|__|

1. Strongly Agree 2. Agree 3. Neither Agree nor Disagree
4. Disagree 5. Strongly Disagree

B3	Above diseases, did you/your family member/s contract any of them?	1. Yes 2. No 3. Don't know 4. Don't want to answer	|__|
B4	If you answer B3 "YES", Please choose mentioned age categories of your family member/s.	1. <5 Yr 2. >5 Yr	|__|
B5	Sources of Food Contamination (can choose more than one answer)	1. Food handlers 2. Contaminated surfaces 3. Improper cooking 4. Improper storage and handling 5. Cross-contamination 6. Improper waste handling 7. Pest – rat, flies, ant, cockroach	|__|
B6	Unsafe Food contains (can choose more than one answer)	1. Bacteria 2. Virus 3. Parasite 4. Chemical substances/Pesticides 5. Moulds	|__|
B7	Do you usually check expiry date when you buy food, cans, or dairy products?	1. Always 2. Sometimes 3. Seldom 4. Usually forget to check 5. Don't know to check	|__|
B8	Do you agree that it is OK to have expire food and cans because its appearance, taste and smell are good apparently?	1 | 2 | 3 | 4 | 5 | | | | |	|__|
B9	Do you know any source of information about food safety?	1. Yes 2. No 3. Don't want to answer	|__|
B10	If you answer B9 "YES", Please choose mentioned answer. (Can choose more than one answer)	1. Internet (Facebook, Websites) 2. Magazines/ Journals/ Newspapaers 3. TV 4. Radio 5. Friends/Family Members/ Neighbours 6. Others (Please Specify) ……	|__|

1. Strongly Agree 2. Agree 3. Neither Agree nor Disagree
4. Disagree 5. Strongly Disagree

BLOCK (C) About Personal Hygiene, Storage, Handling and Cooking of Food			
C1	Foodborne illnesses can be prevented by washing hands.	<table><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table>	|__|
C2	When do you usually wash your hands? (Can choose more than one answer))	1. Before eating 2. After eating 3. Before using restroom 4. After using restroom 5. After touching animals 6. After sneezing or coughing 7. Before food preparation 8. During food preparation 9. After food preparation 10. After cleaning home 11. Others (Please Specify) ……	|__|
C3	Where do you store cooked food? (Can choose more than one answer)	1. In fridge/ freezer 2. On table (uncovered) 3. On table (covered) / in larder 4. Other (Please Specify) ……	|__|
C4	If you keep raw meat and fish in fridge, then how do you usually thaw/reheat them?	1. Keeping at room temperature over 2 hours 2. Keeping at room temperature less than 2 hours 3. Keep at lower shelves of refrigerator	|__|
C5	What kind of things should be kept separately? (Can choose more than one answer)	1. Raw meat and fish 2. Raw meat, fish and vegetables 3. Raw meat, fish and cooked food 4. No need to separate raw meat, fish and vegetables 5. No need to separate raw meat, fish and cooked food	|__|
C6	It is not necessary to keep separate cutting board for raw meat and vegetables and fruits.	<table><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table>	|__|

1. Strongly Agree 2. Agree 3. Neither Agree nor Disagree
4. Disagree 5. Strongly Disagree

C7	Do you use separate cutting board for raw meat and vegetables at your home?	1. Yes 2. No 3. Don't know 4. Don't want to answer					|__|
BLOCK (D) About Pest Control and Waste Handling							
D1	Pest control statements • I think the chance of catching a disease from pest in and around my home is high. • Catching a disease from pest in my home would lead to serious health problems. • I am concerned that pest in and around my home make me ill. • Pest control is too expensive for me. • Pest control is time consuming.	1.	2.	3.	4.	5.	|__|
D2	How do you store kitchen waste materials?	1. In Plastics bags (tied) 2. In Plastics bags (untied) 3. In uncover rubbish bin 4. In covered rubbish bin 5. Others (Please Specify) ……					|__|
D3	How frequently do you put away garbage?	1. Everyday 2. Every week 3. Once in 2 weeks 4. Once in a month					|__|

Thanks a lot for your cooperation and patience.

1. Strongly Agree 2. Agree 3. Neither Agree nor Disagree
4. Disagree 5. Strongly Disagree

အစားအစာ ဘေးကင်းလုံခြုံမှု ဆိုင်ရာ ဗဟု
သုတ၊ သဘောထားနှင့် အပြုအမူ ဆန်းစစ်ခြင်းဆိုင်ရာ

သုတေသန ပြုလုပ်ခြင်းမေးခွန်းလွှာ

စဉ်	မေးခွန်း	အဖြေ/တုံ့ပြန်ချက်	ကုဒ် နံပါတ်
အပိုင်း (က) ဖြေကြားသူ၏ သတင်းအချက်အလက်			
A1	ကျား/မ	.....	|__|
A2	အသက် (ပြည့်ပြီးသောအသက်ကိုရေးပါ)	.....နှစ်	|__|
A3	သင်၏အိမ်တွင် သင်အပါအဝင် မိသားစု ဘယ်နယောက် ရှိပါသလဲ။	၁. (၁) ဦး ၂. (၂ - ၅) ဦး ၃. (၅) ဦးထက်	|__|
A4	သင်၏မိသားစုဝင်များတွင် အသက် ငါးနှစ်အောက်နှင့် ငါးနှစ်အထက် မည်မျှရှိပါသနည်း။	၁. အသက် ၅ နှစ်အောက် ..... ဦး ၂. အသက် ၅ နှစ်အထက် ..... ဦး	|__|
A5	ပညာအရည်အချင်း	၁. စာမတတ် ၂. ရေးတတ် ဖတ်တတ် ၃. မူလတန်း ၄. အလယ်တန်း ၅. အထက်တန်း ၆. ဘွဲ့ရ /ဘွဲ့လွန်	|__|
A6	အစားအစာ ဘေးကင်းလုံခြုံမှုဆိုင်ရာ ပညာပေး ဟောပြောပွဲ တက်ရောက်ဖူးပါသလား။	၁. တက်ဖူးပါသည် တက်ဖူးပါက ခုနှစ်ဖော်ပြပါ ..... ၂. မတက်ဖူးပါ	|__|
A7	သင်တွင်အလုပ်ရှိပါသလား။	.....	|__|
အပိုင်း(ခ) ဘေးကင်းလုံခြုံမှု မရှိသော အစားအစာအကြောင်း			
B1	ဘေးကင်းလုံခြုံမှု မရှိသော အစားအစာကို သင်မည်သို့ နားလည်ပါသလဲ။ (ဖြေဆိုသူ၏ အဖြေများအားလုံး ရေးပါရန်)	....	|__|
B2	ဘေးကင်းလုံခြုံမှု မရှိသော အစားအစာများသည် မည်သို့သော ရောဂါများကို ဖြစ်စေသနည်း။ (အဖြေတစ်ခုထက်မက ဖြေဆိုနိုင်ပါသည်)	၁. မည်သည့်ရောဂါမှ မဖြစ်စေပါ ၂. အစာအဆိပ်သင့်ခြင်း ၃. ၎က်ဖျားရောဂါ ၄. သန်ကောင်ရောဂါ ၅. အသည်းရောင် အသားဝါ အေ ၆. အသည်းရောင် အသားဝါ ဘီ နှင့် စီ ၇. အူရောင်ငန်းဖျား တိုက်ဖွိုက်ရောဂါ ၈. ဝမ်းပျက်ဝမ်းလျှောက ၉. ကင်ဆာရောဂါ	|__|

၁. အလွန်သဘောတူ ၂. သဘောတူ ၃. သဘောတူသည်လည်းမဟုတ် မတူသည်လည်းအဟုတ် ၄. သဘောမတူပါ ၅. အလွန်သဘောမတူ

B3	သင် သို့မဟုတ် သင့်မိသားစုတွင် အထက်ပါ ရောဂါများ ဖြစ်ခဲ့ဖူးပါသလား။	၁. ဖြစ်ခဲ့ဖူးပါသည် ၂. မဖြစ်ခဲ့ဖူးပါ ၃. မသိပါ ၄. မဖြေလိုပါ	|__|
B4	မေးခွန်းအမှတ် B 3 တွင် ဖြစ်ခဲ့ဖူးပါသည်ဟု ဖြေဆိုပါက သင့်မိသားစုအတွင်း မည်သည့် အသက် အပိုင်းအခြား တွင် ဖြစ်ခဲ့ပါသလဲ။	၁. အသက် ၅ နှစ်အောက် ၂. အသက် ၅ နှစ် နှင့် အထက်	|__|
B5	အစားအစာ မသန့်ရှင်းခြင်း၏ အဓိက အကြောင်းအရင်းများမှာ (အဖြေတစ်ခုထက်မက ဖြေဆိုနိုင်ပါသည်)	၁. အစားအသောက်ကိုင်တွယ်သူများမှ တဆင့် ၂. မသန့်ရှင်းသော မျက်နှာပြင်များမှ တဆင့် ၃. အစားအသောက်များအား သေချာစွာ မချက်ပြုတ်ခြင်း ၄. အစားအသောက်များအား သေချာစွာ မသိမ်းဆည်းခြင်း၊ မကိုင်တွယ်ခြင်း ၅. အစားအစာများအချင်းအချင်းမှ ညစ်နွမ်းမှု ကူးစက်ခြင်း ၆. စွန့်ပစ်ပစ္စည်းများအား သေချာစွာ မစွန့်ပစ်ခြင်း ၇. ပိုးမွှားများ - ကြွက်၊ ယင်၊ပုရွက်ဆိတ်၊ ပိုးဟပ်	|__|
B6	ဘေးကင်းလုံခြုံမှု မရှိသော အစားအစာများတွင် အောက်ပါတို့ ပါဝင်သည်။ (အဖြေတစ်ခုထက်မက ဖြေဆိုနိုင်ပါသည်)	၁. ဘက်တီးရီးယား ၂. ဗိုင်းရပ်စ် ၃. ကပ်ပါးကောင်များ ၄. ဓါတုပစ္စည်းများ / ပိုးသတ်ဆေးများ ၅. မှိုများ	|__|
B7	အစားအစာများ၊ စည်သွပ်ဗူးများ၊ နို့ နှင့် နို့ထွက်ပစ္စည်းများ ဂယ်ယူရာတွင် ရက်လွန်သက်တမ်းကို စစ်ဆေးလေ့ရှိပါသလား။	၁. အမြဲတမ်း ၂. မကြာခဏ ၃. တခါတရံ ၄. စစ်ဆေးရန် မေ့လျော့လေ့ရှိသည် ၅. ထိုသို့ စစ်ဆေးရမည်ကို မသိပါ	|__|
B8	ရက်လွန်သွားသော အစားအစာများနှင့် စည်သွပ်ဘူးများသည် အမြင်၊ အနံ့အရသာအားဖြင့် မပျက်စီးသေးသောကြောင့် စားသုံးရန် အဆင်ပြေသည်ဟု သင်သဘောတူပါသလား။	၁ ၂ ၃ ၄ ၅ |						|__|
B9	အစားအစာ ဘေးကင်းလုံခြုံမှု နှင့် ပတ်သက်သော သတင်းအချက်အလက်များ မည်က ရနိုင်သည် ကို သင် သိပါသလား။	၁. သိပါသည် ၂. မသိပါ ၃. မဖြေလိုပါ	|__|

B10	မေးခွန်း အမှတ် B 9 ကို သိပါသည် ဟုဖြေဆိုပါက တစ်ဖက်တွင် ဖော်ပြထားသော အဖြေများကို ရွေးပါ။ (အဖြေတစ်ခုထက်မက ဖြေဆိုနိုင်ပါသည်)	၁. အင်တာနက် (Facebook, Websites) ၂. မဂ္ဂဇင်း/ဂျာနယ်/သတင်းစာ ၃. တီဗွီ ၄. ရေဒီယို ၅. သူငယ်ချင်း/ မိသားစုဝင်များ/ အိမ်နီးနားချင်းများမှ တဆင့် ၆. အခြား (ဖော်ပြရန်)	|__|
အပိုင်း (ဂ) တစ်ကိုယ်ရည်သန့်ရှင်းမှု၊ အစားအစာများ သိမ်းဆည်းခြင်း၊ ကိုင်တွယ်ခြင်း နှင့် ချက်ပြုတ်ခြင်းအကြောင်း			
C1	အစားအစာများမှတစ်ဆင့်ကူးစက်သောရောဂါများကို လက်ဆေးခြင်းဖြင့် ကာကွယ်နိုင်သည်။	၁ ၂ ၃ ၄ ၅ |						
C2	သင်မည်သည့်အချိန်တွင် လက်ဆေးလေ့ရှိပါသလဲ။ (အဖြေတစ်ခုထက်မက ဖြေဆိုနိုင်ပါသည်)	၁. အစာမစားခင် ၂. အစာစားပြီး ၃. အိမ်သာအသုံးမပြုမီ ၄. အိမ်သာအသုံးပြုပြီး ၅. တိရစ္ဆာန်များကိုင်တွယ်ပြီးနောက် ၆. ချောင်းဆိုး နှာချေပြီးနောက် ၇. အစားအစာမပြင်ဆင်ခင် ၈. အစားအစာ ပြင်ဆင်ချက်ပြုတ် နေစဉ်အတွင်း ၉. အစားအစာချက်ပြုတ်ပြီးနောက် ၁၀. အိမ်သန့်ရှင်းရေးပြုလုပ်ပြီးနောက်	|__|
C3	ချက်ပြုတ်ပြီးသော အစာအစားများကို မည်သည့်နေရာတွင် သိမ်းဆည်းလေ့ရှိပါသလဲ။ (အဖြေတစ်ခုထက်မက ဖြေဆိုနိုင်ပါသည်)	၁. ရေခဲသေတ္တာထဲတွင် ၂. စားပွဲပေါ်တွင် (မအုပ်ထားဘဲ) ၃. ကြောင်အိမ် (သို့) စားပွဲပေါ်တွင် အုပ်ထားခြင်းဖြင့် ၄. အခြား (ဖော်ပြရန်)	|__|
C4	အသားစိမ်း ငါးစိမ်း များအား ရေခဲသေတ္တာထဲတွင် သိမ်းဆည်းပါကချက်ပြုတ်ရန်အတွက်မူလ အခြေအနေရောက်အောင် မည်သို့.ပြုလုပ်သနည်း။	၁. အခန်းအပူချိန်တွင် အချိန် ၂ နာရီကျော်အောင်ထားခြင်းဖြင့် ၂. အခန်းအပူချိန်တွင် အချိန် ၂ နာရီထက်နည်း၍ ထားခြင်းဖြင့် ၃.ရေခဲသေတ္တာအောက်ထပ်တွင်ထားခြင်းဖြင့်	|__|
C5	မည်သည့်အရာများကို ခွဲခြားထားသင့်ပါသလဲ။ (အဖြေတစ်ခုထက်မက ဖြေဆိုနိုင်ပါသည်)	၁. အသားစိမ်း၊ ငါးစိမ်း ၂. အသားစိမ်း၊ ငါးစိမ်း နှင့်ဟင်းသီးဟင်းရွက်များ	|__|

		၃.အသားစိမ်းငါးစိမ်းနှင့် ချက်ပြုတ်ထားသော အစားအစာများ ၄. အသားစိမ်း၊ ငါးစိမ်းနှင့် ဟင်းသီးဟင်းရွက်များကို ခွဲထားရန်မလိုပါ ၅.အသားစိမ်းငါးစိမ်းနှင့် ချက်ပြုတ်ထားသော အစားအစာများကို ခွဲထားရန်မလိုပါ	
C6	အသားစိမ်းလှီးဖြတ်သော စဉ်းနှီတုံးနှင့် ဟင်းသီးဟင်းရွက် လှီးဖြတ်သော စဉ်းနှီတုံးတို့ကို ခွဲခြား အသုံးပြုရန် မလိုအပ်ပါ။	၁ ၂ ၃ ၄ ၅ | |__|
C7	သင်၏အိမ်တွင် အသားစိမ်းလှီးဖြတ်သော စဉ်းနှီတုံး နှင့် ဟင်းသီးဟင်းရွက်လှီးသော စဉ်းနှီတုံးတို့ကို ခွဲခြား အသုံးပြုပါသလား။	၁. သုံးပါသည် ၂. မသုံးပါ ၃. မသိပါ ၄. မဖြေလိုပါ	|__|
အပိုင်း (ဃ) ပိုးမွှားများနှင့် စွန့်ပစ်ပစ္စည်းများအကြောင်း			
D1	ပိုးမွှားထိန်းချုပ်မှု နှင့် ပတ်သက်သည့် ဖော်ပြချက် • ကျွန်ုပ်၏ အမြင်တွင် ကျွန်ုပ်အိမ်နှင့် အိမ်ပတ်ဝန်းကျင်၌ပိုးမွှားများမှ ရောဂါရရှိနိုင်မှုများသည်ဟုမြင်ပါသည်။ • ကျွန်ုပ်အိမ်ရှိ ပိုးမွှားများမှ ရသော ရောဂါများသည် ပြင်းထန်သောကျန်းမာရေးပြဿနာများကိုဖြစ်စေသည် •ကျွန်ုပ်အိမ်နှင့် အိမ်ပတ်ဝန်းကျင်ရှိ ပိုးမွှားများကြောင့် ရောဂါဖြစ်မည်ကို စိုးရိမ်ပါသည် •ပိုးမွှားထိန်းသိမ်းခြင်းသည်ကျွန်ုပ်အတွက်ငွေကုန်ကြေးကျများသည် •ပိုးမွှားထိန်းသိမ်းခြင်းသည် အချိန်ကုန်စေသည်	၁ ၂ ၃ ၄ ၅	|__|
D2	မီးဖိုချောင်ထွက်အမှိုက်များကို သင်မည်သို့ သိမ်းဆည်းပါသလဲ။	၁.ချည်နှောင်ထားသော ပလတ်စတစ်အိတ် ၂.မချည်နှောင်ထားသောပလတ်စတစ်အိတ် ၃. အဖုံးမပါသော အမှိုက်ပုံး ၄. အဖုံးပါသော အမှိုက်ပုံး ၅. အခြား (ဖော်ပြရန်)	|__|
D3	သင်၏ မီးဖိုချောင်မှ ထွက်သော စွန့်ပစ်ပစ္စည်းများကို ဘယ်လောက်တခါ စွန့်ပစ်ပါသလဲ။	၁. နေ့စဉ် ၂. အပတ်စဉ် ၃. နှစ်ပတ် တစ်ကြိမ် ၄. တစ်လတစ်ကြိမ်	|__|

ပူးပေါင်းပါဝင်မှု အတွက် ကျေးဇူးတင်ပါသည်။

၁. အလွန်သဘောတူ ၂. သဘောတူ ၃. သဘောတူသည်လည်းမဟုတ် မတူသည်လည်းအဟုတ် ၄. သဘောမတူပါ ၅. အလွန်သဘောမတူ