

Food Handlers' Safety Knowledge and Its Impact on Personal Hygiene and Disease Control Practices

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ABSTRACT

Building on the knowledge, attitude and practice model, this thesis investigated the role of food handlers in adherence to hygienic-sanitary standards for food safety. Specifically, using data gathered from food handlers in restaurants, hotels and hospitals, the study examined the effect of food handlers' safety knowledge on their hygienic-sanitary practices of personal hygiene, kitchen hygiene and disease control measures. It also checked the mediating role of food handlers' attitudes in the causal relationship between food safety knowledge and the hygienic-sanitary practices of food handlers.

Empirical findings supported the hypothesized assumptions that food safety knowledge positively impacts food handler's attitudes and attitudes in turn significantly contributes to the adherence to hygienic-sanitary conditions for food safety. Further, other than the indirect effect of handler's attitude on food safety knowledge and personal hygiene, food handlers' attitude partially mediates the effect of knowledge on kitchen hygiene and disease control measure. Implications for managers, government and academicians were also discussed.

Keywords: Food safety knowledge, personal hygiene, kitchen hygiene, hospitality, Nigeria

ÖZ

Bilgi, tutum ve uygulama modeline dayanarak, bu tez, gıda işleyicilerinin gıda güvenliği için hijyenik sağlık standartlarına uymadaki rolünü araştırmıştır. Özellikle, restoranlarda, otellerde ve hastanelerde gıda işleyicilerinden toplanan veriler kullanılarak, gıda işleyicilerinin güvenlik bilgilerinin kişisel hijyen, mutfak hijyeni ve hastalık kontrol önlemlerinin hijyenik sağlık uygulamaları üzerindeki etkisi incelenmiştir. Ayrıca, gıda işleyicilerinin gıda güvenliği bilgisi ile gıda işleyicilerinin hijyenik sağlık uygulamaları arasındaki nedensel ilişkideki tutumlarının aracılık rolünü de kontrol etmiştir.

Ampirik bulgular, gıda güvenliği bilgisinin gıda işleyicisinin tutum ve tutumlarını pozitif yönde etkilediğine dair varsayımları desteklemiştir ve bu da gıda güvenliği için hijyenik sağlık koşullarına uymaya önemli ölçüde katkıda bulunmuştur. Ayrıca, işleyicinin gıda güvenliği bilgisi ve kişisel hijyen konusundaki tutumunun dolaylı etkisinden başka, gıda işleyicilerinin tutumu kısmen bilginin mutfak hijyeni ve hastalık kontrol önlemi üzerindeki etkisine aracılık eder. Ayrıca yöneticiler, hükümet ve akademisyenler için de sonuçlar tartışılmıştır.

Anahtar Sözcükler: Gıda güvenliği bilgisi, kişisel hijyen, mutfak hijyeni, misafirperverlik, Nijerya

DEDICATION

In Honor to God Almighty, my Lord, Salvation and Redeemer.

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To the Holy and Ever-Faithful God, the Father of my Savior Jesus Christ, I ascribe all Glory and Honor great thing He has done onto me.

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Chapter 1

INTRODUCTION

Food safety involves the conditions and practices that deals with the proper handling, preparation, and storage of food. The concept describes the precautions to be taking to avoid or reduce to a minimum degree the risk of contamination of food, which eventually causes food poisoning, and subsequently, could lead to disease outbreak and even death if not immediately tackled.

Looking at the societies with well-developed food safety systems, such as the European “farm-to-fork” and the American “farm-to table” approaches, a “weak link” can cause significant morbidity and mortality from foodborne illness, (Jianu & Golet, 2014). Then developing nations (for instance, Nigeria), the weak links are definitely higher, and that increases the chances of food borne diseases, with ability to spread very wide and fast, within a short space of time due to population. According to Worldometers (2019), Nigeria’s population is about 200,567,413 thereby, stands the risk of an outrageous spread of any form of endemic diseases, for example, Ebola, Lassa Fever, Typhoid Fever, Cholera, Diarrhea, etc. which are activated by lack of proper hygiene, and highly contagious (Odeyemi, 2016).

Therefore, Food Safety Knowledge is an imperative for the Practices of Personal and Kitchen Hygiene, in order to attain the goal of healthy food consumption. Posited by Woh, Thong, Behnke, Lewis, and Zain (2016), knowledge is the component that

affects the ability of someone to respond with a positive attitude in terms of the practicing of the vital habits of hygiene, and some forms of training must be engaged for personnel to acquire this necessary knowledge. Nevertheless, the potency of the extent of hygiene training is inconsistent, (Bas, Ersun, & Kivanç, 2006). Clayton, Griffith, Price, and Peters (2002) suggest that, training can actually boost the level of understanding of food workers in regards to food safety precautions; although, in most cases, it does not necessarily bring about the right attitude expected of persons handling food (Bas et al., 2006; Clayton et al., 2002).

A Food handler is referred to as any person involved with food preparations and services, and a critical factor in ensuring food is offered wholesome. According to Kunadu, Ofofu, Aboagye, and Tano-Debrah (2016), personnel handling food should consciously wash their hands the moment they enter the food court, in fact, before touching any food at all. During the process of handling food, there may be a need to visit the toilet, or touching of nose, ear, raw food materials, etc., it is expected that the personnel wash hands before continuing with food preparation. As indicated by researchers, the role of food workers hands in transmitting pathogens unto ready-to-eat foods is so prevalent in the foodservice industries, causing more harm so easily than when the work environment is not disinfected (Clayton et al., 2002; Kunadu et al., 2016; Montville, Chen, & Schaffner, 2001). So, the ability to enhance hygiene practice and ethical washing of hands will certainly negate the spread of microorganism in the food area, and foods, making it safe for consumers to eat.

Consequently, the food handlers' knowledge, attitude and practices of hygiene are a critical point for safe food delivery. Baser, Ture, Abubakirova, Sanlier, and Cil (2017) posit that there is a high relationship between the knowledge of food safety

and attitude of food personnel. The level of the knowledge of the food personnel, positively affects their responsive attitude in practicing personal and kitchen hygiene (Abdul-Mutalib et al., 2012). In a nutshell, as food safety is important for safe food delivery, the end result is heavily dependent on the joint efforts of any persons in touch with food from its raw stage to the point of serving; to be careful enough to offer food that is safe for consumption.

1.1 Rationale of Study

Other researchers have done some degree of assessments on various aspects of food safety knowledge of food handlers, attitude and practices, most of which are related to restaurants, food vendors, schools, fast foods, etc. and particularly in Jos, Plateau State of Nigeria. But, looking at the hotel sector of the industry, little or no research has been conducted in this regards. Therefore, this study going to look at the hotel business, which provides an abode for a traveler away from home, who is on a visit mission, business venture, leisure, or tourism purpose, to Jos, Plateau State in Nigeria, West Africa. To ensure a sanitary profile of hotels in the State is consistently updated, bringing quality and safety in food delivery.

Jos, the capital city of Plateau State, known as “The Home of Peace and Tourism” has the potential of attracting people from all over the world, who are either on tourism purposes, business deals, cultural festivals, sports events, intellectual symposiums, inter-continental seminars, religious, gatherings, etc. An ideal environment for the aforementioned factors, with all it takes to bring fulfilment and guest experience to anyone irrespective of their backgrounds, that is why it is called a Home of Peace and Tourism.

Although, there have been challenges in the recent times, such as, insecurity, economic instability, disease outbreaks, etc. These challenges seem not to be the problem of Plateau State alone, most developing countries are going through such threats to human freedom, and every global mind has to look for strategies to cope with the menace, because activities of life must keep going on. But, disease outbreaks, (such as Cholera, Lassa fever, Ebola, Hepatitis B, Typhoid, Diarrhea, etc.) are highly communicable, and if these perils are not properly tackled, it can ravage an entire nation's economy, no matter its competitive advantage in the global market.

1.2 Purpose and Aim of Study

The purpose of this study is to ascertain the food safety knowledge of food handlers in the hotel industry, and to determine the impact of that knowledge on the practices of Personal and Kitchen Hygiene, to ensure food served is safe and free of pathogenic substances. And also to bring out the level of preparedness by hotel employees and the food courts, to receive guests and offer them quality service experience, with safe food as key to human life, when staying in any hotel of their choice during visit to Jos- Plateau State, Nigeria - West Africa.

So, the study is aimed to develop and test a model that investigates the impact of food safety knowledge of food handlers on their personal hygiene, kitchen hygiene and disease control practices. And to further examine the mediating role of food handler's attitude on these relationships.

This will be achieved through the following objectives:

- ❖ To identify hotel businesses in Jos that receive both local and international guests,

- ❖ To ascertain the attitude of food handlers as it relates to food handling in such hotels,
- ❖ To determine the level of compliance of food handlers on personal and kitchen hygiene practices,
- ❖ To suggest to government, the need to enact laws to serve as surveillance, ensuring developing and sustaining food safety regulation, for a welcoming atmosphere to her tourists.

1.3 Significance and Contribution of Study

Hotel is a commercial establishment providing lodging, meals, and other guest services (Medlik & Ingram, 2000), actually is the most needed facility for accommodation and rest, to any traveler away from home. Such facility is not just needed for comfort, but most, importantly offer different level of amenities and quality services for foods and drinks.

“The hospitality industry which offers a broad category of fields within the service industry that includes lodging, event planning, theme parks, transportation, cruise line, travelling and additional fields within the tourism industry”(Mellander, Klaesson, & Öner, 2015. p2). Based on that definition, a hotel is an essential facility for every tourist, and so the service providers must ensure quality service delivery to customers for total wellbeing and satisfaction, and the hotel sector within Jos metropolis should at the end of this study, guarantee all guests the safety of foods and drinks offered during their visit.

Considering the importance of food safety to hospitality industry and the economy of nations at large, this thesis puts forward a research model that investigate the

application of knowledge, attitude and practices in mitigating against foodborne diseases. This approach is significant as extant literature in food control and food hygiene studies have only gauged the level of handler's knowledge of safety vis-a-viz practices of safety (Al-Kandari, Al-abdeen, & Sidhu, 2019; Buccheri et al., 2010; Sharif & Al-Malki, 2010). With the understanding of the mechanism through which knowledge influences handlers' practices of food safety behavior, hospitality stakeholders can effectively deploy their resources to yield maximal impact in the eventual delivery of safe food to their consumers or guests.

Also, the research work intends to assess the level of the knowledge of persons associated with foods and food products in the hotel setting, about food safety rules and regulations, and how impactful is that knowledge on their attitude when it comes to the practices of hygiene in the kitchen and on themselves as personnel, irrespective of the possible training acquired, perhaps, at some levels (Baluka, Miller, & Kaneene, 2015; Lazou, Georgiadis, Pentieva, McKevitt, & Iossifidou, 2012; Martínez-Tomé, Vera, & Murcia, 2000). It will be necessary to be sure all food handlers are updated with the principles of food safety and hygiene practices, for all guests and potential tourists to confidently eat and drink anything served in the hotel setting within the metropolis.

1.4 Structure and Timeline of Study

Chapter 1 introduces the general focus of the thesis. In chapter 2, hotel industry, food and beverage, food safety, food handlers, food knowledge, attitudes and practices, personal hygiene and kitchen hygiene are discussed. Chapter 3 covers the development of hypotheses while focus was on methodology in chapter 4. Chapter 5

provided detailed result of empirical analysis while the general conclusion and implications were given in chapter 6.

Chapter 2

LITERATURE REVIEW

2.1 The Hotel Industry

The hotel industry is seen as an establishment providing lodging, and if so required food and drink to any traveler away from home, who is ready to pay for the services (Medlik & Ingram, 2000), simple definition known for ages. That definition will not go well for a traveler who feels need more than just a place to sleep, and food to eat, but much more, an atmosphere to relax, rejuvenate, explore new opportunities; to such a person, the ambience in the hotel setting brings fulfilment, and certainly food security is of utmost importance. A Hotel is therefore defined as an establishment that has different types, classifications and themes, offering hospitality services (paid or unpaid) to travelers and tourists, but are not limited to lodgings and foods (Source: Global Hospitality portal, 2017).

The Hotel industry today is global, trading from a tiny part in the ancient days of an Inn in the 18th century, when travelers look for a place to lodge after a tiring journey, to an era with global and multi-faceted ideas of fascinating concept of the hotel industry. De Grosbois (2012) describes the hotel industry as one of the fastest growing sectors in the world, and vital in the tourism industry, because people are always travelling from one country to another on different purposes. The world derives a lot of benefits, socially and economically as a result of tourism activities like, leisure and recreational activities, business markets, employment opportunities,

inter-personal interactions, etc. thereby, so many hotels are situated in the cities for travelers to view both natural and cultural heritage spots attracting an increasing influx of tourists (De Grosbois, 2012). The hotel industry in Nigeria is expanding with the increasing growth and development of tourism in the country. According to information accessed from (Statista, 2019) there have been a steady growth in the number of hotel rooms in Nigeria. Specifically, in 2011, there are 7,900 rooms across the nation, this number increased to 10,600 in 2019 and expected to continue to increase to 12,600 by 2020.

Baser et al. (2017) posit that, hotels, being an integral aspect of the tourism industry, the most sensitive area are the kitchen, where food is prepared and served. Bolton, Meally, Blair, McDowell, and Cowan (2008) in their study in Ireland, reported that, the hotel enterprise and the prospective guests are faced with the risk of immeasurable harm from unpleasant hygiene breakdown within the food court. (Baser et al., 2017) also said, to be assured of hygiene practices in the hotel business, critical degree of adherence to safety rules must be enforced, and employees have to go through training on food safety standards more often to maintain safety of food to be consumed. Both food service providers and their consumers are found to lack proper awareness on food safety knowledge, and also neglect the policies guiding food from any micro-organisms, and to ensure food handlers are educated on that subject (Zyoud et al., 2019). Moreover, it is expected that hotels being the immediate station for any traveler away from home, should be well equipped, not just with fine structures, standard rooms and furniture of the twenty first century, creative themes for ambience, internet facility, well cultured front line employees, but also with antiseptic surfaces and spotless skilled staff, who obey food safety principles. Therefore, hotel owners should consider the matter of food hygiene practices as

important as the anything else that is needed to compete favorable in the global market chain. Owing to the fact that the acquired knowledge on food safety, work experience, and professional outfit, provides an exceptional quality service; it is assumed that food eaten in a hotel is safe to the recognition of the hotel and customer satisfaction (Baser et al., 2017).

2.2 Food and Beverage (F & B)

The F & B service is an aspect of the hotel business which provides the customers with all variety foods and drinks as they may so require, and are in a fit state to pay. Most outstanding hotels would offer a range of F & B services to their guest at every stage of the guests' experience, from the lounge, restaurant, coffee corner, room service, banquet, and bar (Park, Almanza, Miao, Sydnor, & Jang, 2016).

This section generally meets the hunger and thirst need of a traveler away from home, so it is expected that the foods and drinks are handled with much care, attractiveness, able to nourish and provide energy, and more importantly, free from harmful bacteria (Davis, Lockwood, Pantelidis, & Alcott, 2013). Strictly, this department in any hotel business has the responsibility to serve their guests with hygienic and safe food and drinks. If for whatever reason, the food court (kitchen) is not clean, food prepared there will not be safe to consume, and of course, the first place to suspect in any case of food poisoning.

Food basically is crucial in dealing with hunger. Ismail, Chik, Muhammad, and Yusoff (2016) posit that, food is eaten to meet the biological needs as a part of the hierarchy pyramid developed by (Maslow, 1954) and also as endorsed by (Ismail et al., 2016) who pointed that, the consumption of food shows an act of fulfilling the

biological needs. Therefore, food is a necessity to sustaining life, especially when prepared in a most hygienic way, maintaining its nutritional value so that the consumer maximizes the whole benefit of eating food, thereby, going beyond just eating for survival. Also, it can be followed with an enjoyable moment in homes or outside the home. Food, being so critical in the life of every human being, and boosts energy for daily activities, demands attention, so it becomes paramount for food to be handled with caution during preparation, cooking and serving, in order for it to be safe for consumption, and meet the basic needs in the humans. Owing that a lot of health issues worldwide are connected to the consumption of contaminated foods, even when the food appeared is scrupulously clean and may also taste pleasant. Therefore, careful attention is given in the food sector to monitor all necessary processes that concern food and its safety at consumption stage (Park et al., 2016).

2.3 Food Safety

Food Safety as defined by WHO (2006) is the certainty that food is void of any harm to the person consuming it, and it has actually been a matter of concern in the past three decades in the food industry. FAO (2002) reports that “Millions of people become ill and many die from unsafe food intake. Every year, more than one third of the total population in developing countries will be affected by foodborne illness” (Sani & Siow, 2014). Another study by Pichler, Ziegler, Aldrian, and Allerberger (2014) shows that “the European Union Summary Report on Trends and Sources of Zoonoses, Zoonotic Agents and Foodborne Outbreaks e published by the European Food Safety Authority and the European Centre for Disease Prevention and Control e reported 5262 foodborne outbreaks with 43,473 cases, 4695 hospitalizations, and 25 deaths in the European Union for the year 2010”. It was also strongly established that 31% outbreaks, had much to do with hotels, pubs, bars, restaurants, coffee shops, and

17% of the outbreaks are associated with school cafeterias, boarding high schools, mass event centers, canteens in workplaces (Pichler et al., 2014). Most illnesses are as a result of unsafe food intake, so food safety has continually become a matter of great importance to all people in life, especially in food business, food related organizations, both in the under developed regions and the advanced regions, (Osaili, Al-Nabulsi, & Krasneh, 2018).

According to World Health Organization (WHO) 2015, the danger of foodborne disease is more common in under developed countries, such as in the Middle East, because countries in that region don't have foodborne disease tracking mechanisms and control ethics, (Osaili et al., 2018). Therefore, having a full understanding of food safety knowledge is imperative and crucial, and also looks at the practices that set the pace for food to be wholesome, and fit for consumption. Also, Sani and Siow (2014) stated that "foods can be mishandled during preparation, processing or storage"(P.210). Moreover, in the service area, a lot of elements can be attributed to reasons associated to food poisoning and infections, such as unsafe sources of food, improper storage temperature, insufficient cooking, inadequate re-heating, contaminated utensils and lack of proper personal hygiene, all of which can bring an uncontrollable foodborne epidemic.

Food safety is essential in the food sector being a service industry that serves a huge portion of food on a daily basis. Food poisoning outburst sequel from a mass food production has been shown by reports all over the world, causing foodborne diseases, and basically rooted in lack of adequate personal hygiene, (Rebouças et al., 2017). It has been demonstrated in a number of studies that the presence of pathogenic microorganisms in food handlers' hands serves as transmission vehicle for foodborne

disease. Based on the study of Rebouças et al., (2017) and Al-Shabib, Mosilhey, and Husain,(2016) the mishandling of food by the food personnel is the reason for majority of cases associated with foodborne disease, also, using of wrong temperature in storage and preservation, cross contamination due to improper personal hygiene, contaminated equipment. Consequently, the attitude of food handler which is a critical factor in influencing food safety behavior and practices, and food safety being an integral part of sustainable development, any careless situation associated with food-borne diseases that occur in one country has the high chances to affect others in another country. This why a country like Brazil, hosting the world Olympic, 2016, and will certainly deal with a huge number of personalities, enhanced the hygiene profile by creating “Ordinance Number 817/2013 in all the cities that will host the participants, in order to keep the check on quality food services (Rebouças et al., 2017).

2.4 The Food Handler

Food handlers are very significant medium in conveying pathogens from polluted sources in to food. Persons involved with food may also be responsible for viruses that cause diseases like noroviruses, Staphylococcus aureus, typhoidal Salmonella, and Shigella sp, Hepatitis A, which could be through the skin, hands, wounds, mouth, hair, nose, ears, etc. (Sharif, Obaidat, & Al-Dalalah, 2013) also said, “the most frequently reported food worker errors were handling of food by a person either actively infected by or carrying a pathogen, bare-hand contact with food, failure to properly wash hands when necessary, insufficient cleaning of food surfaces, or food preparation areas, equipment or kitchen tools”. This kind of improper hygiene practices can contaminate food being prepared, through cross-contamination in to ready-to-eat foods. So, those who handles food are key actors when it comes to

carefully obeying the rules or principles of food safety within the entire food chain process, especially during preparation and preservation points, food handler must avoid putting fingers into the nose, ear, or scratching the skin, these are called human reservoirs of infection (Davis et al., 2013). The most important ordeal to every food worker is the ability maintain general hygiene practices, wear deterged work clothing, strictly follow food safety modules, and in to crown it all, attain organized training sessions, all to ensure food served is safe (Asmawi et al., 2018).

In carefully choosing a place to eat, food patrons have considered food sanitation and cost to be the criteria for a good choice, a critical factor (H. Park et al., 2016). The business owners themselves poses that to select a strategic plan to survive the competitive market, the quality of food and hygienic condition of the food must remain a critical point (Park, Kwak, & Chang, 2010). Lack of proper food handling in the food sector has the risk to damaging the health of a guest, and at the same time bring a huge lost to the economy of any government, if proper attention is not given to improve set standards (Park et al., 2010).

2.5 Food Safety Knowledge, Attitude and Practices

It is obvious that much awareness has been created through corporate organizations, and food experts, WHO (World Health Organization), HACCP (Hazard Analysis Critical Control Point), USDA (United States Department of Agriculture), NAFDAC (National Agency for Food and Drug Administration Control), FDA (Food and Drug Administration), EFSA (European Food Safety Authority), for food handlers to know about food safety rules, and hazards involved in improper handling of food. Also, for food sectors to organize trainings, workshops in order for food personnel to acquire the necessary knowledge and skills, to combat foodborne disease outbreak caused by

the contamination of foods carelessly handled. But despite all attempts to transport knowledge to food personnel, a good number of cases are still reported following food poisoning on account of improper hygiene practices- Personal, Food and Kitchen Hygiene (Bryan, 1988) and (Evan & Littlewood, 1998) posits that most outbreaks are as a result of faulty handling of food, kitchen and personal hygiene.

While Food Hygiene is “all conditions and measures that are necessary during the production, processing, storage, distribution, and preparation to ensure food is safe, sound and wholesome, and fit for human consumption” (WHO, 2006. P46); Kitchen Hygiene then, are the conditions and measures necessary for the cooking environment to be scrupulously clean to avoid bacteria from coming in contact with the process of food preparation, and definitely the person handling the process has to be physically fit for that duty. Lack of food safety knowledge, its practices by domestic food workers has the capacity to negate the deliberate attempts to improve and maintain food safety benchmark as set by food chain (Lazou et al., 2012). Food can actually be contaminated from the cultivation, the storage, at the cooking environment, or through the cooking equipment and utensils, etc. However, at whatever level the food is being handled, some personnel must have been involved. So, it become a duty for food handlers at all levels of operation, particularly, in the food sector to respond to food safety rules by acquiring the knowledge, and go beyond getting the knowledge to practicing food safety-related.

According to the study by Asmawi et al., (2018) aiming at finding out the Knowledge, Attitudes and Practices (KAP) of food workers in Petaling Jaya, Malaysia, results posit that food handlers had poor knowledge about food safety, but with training and work experience, there was a lift in the understanding of these

hygiene practices. As food borne illnesses grew more rapidly in Kuala Lumpur, Malaysia, pointing to the fact that food personnel were careless in obeying hygiene rules and practices in the food court, (Lee, Abdul Halim, Thong, & Chai, 2017) carried out an assessment to judge KAP and its effect on the transmission of pathogens to food through the instrumentality of food handlers. And although in Malaysia, it is obligatory based on the “Food Act 1983” that everyone handling food must be trained on food safety regulatory principles as enacted by the government of Malaysia, after which the person receives a vaccination against typhoid, because typhoid is prevalent in the country, (Lee et al., 2017). (Lee et al., 2017) in their study affirmed that, work experience, the level of education, and food safety training, all had various levels of food safety knowledge and attitudes of those handling food. The higher the educational level, the better their performance, much better were those with work experience.

2.6 Personal Hygiene Practice

Food planned and prepared under good hygiene criterion becomes extremely important state of food security, and will promote and preserve health not just on oneself, but to any other person around, who could be vulnerable. Where adequate hygiene practice is neglected, bacteria are inevitable. These bacteria can be so tiny and practically difficult to see with plain eyes to dictate when food has become contaminated and dangerous to consumed, worse of it is that, the taste, appearance, or smell of the food may not even change (Hobbs, 1953).

A daily routine of keeping hygiene habits can make one feel good, smart, healthy, confident, etc. There are some generally acceptable personal hygiene tips for food handlers to follow as the deal with food;

- ❖ Hands are to be washed and kept dry before and after touching food, using either clean hand towel or disposable or put under hand dryer.
- ❖ Avoid smoking, spitting, chewing, touching raw foods, changing baby diapers, during handling of food.
- ❖ Food handler should avoid coughing or sneezing where there is food.
- ❖ A food worker must always put on antiseptic clothing for protection (apron).
- ❖ Head should be trimmed and covered when in the food court.
- ❖ Trim nails, avoid painting them, and excessive wearing of lip sticks (for women), uncut nail harbors bacteria.
- ❖ Jewelries, such as wristwatches, bangles, ribbons or hand bands, earrings (stunted ones could be acceptable), etc.
- ❖ Open cuts, wounds, should be bandaged with waterproof bandages, and can use hand gloves.
- ❖ Food handlers should use gloves, and change very often at the course of work.
- ❖ Staff should not come to food court if not well (Bidawid, Farber, & Sattar, 2000; Tuladhar et al., 2015).

2.7 Kitchen Hygiene Practice

The kitchen is the center of all food preparation and service, and often an important department in the food industry. Being a workshop for all food storage, preparation, preservation and service, even tiny details in ensuring cleanliness should not be neglected to avoid the contamination of ready to eat food, which can result to food poisoning. And the very common practice in the kitchen that can trigger food poisoning is the poor hygiene of the work area, or surface, inefficient cooking, contaminated equipment/utensils, wrong temperature setting (Baluka, Miller, &

Kaneene, 2015). The proper procedure for the kitchen to be kept cleaned is to enforce daily routine, and clean as the work goes on. The caution to ensure food is safe in the kitchen cannot be over emphasis; therefore, the following rules for good hygiene in the kitchen can be put in place:

- ❖ To wash hand regularly and as work goes on, should be a deliberate habit.
- ❖ Ensure that foods are stored properly.
- ❖ Food should not just be cooked, but must be properly cooked.
- ❖ It is not safe to defrost food on any counter to avoid contamination from danger zone on food surfaces.
- ❖ When cleaning, it should start from up to end down.
- ❖ Food should either be kept cold or hot.
- ❖ Sinks should be cleaned always.
- ❖ Avoid using same utensils for everything, like chopping board for cutting vegetables cannot be used for fish, meat, poultry, etc.
- ❖ Freezers and fridges should be maintained in hygienic state.
- ❖ A good, well-covered waste bin must be emptied constantly (Martínez-Tomé et al., 2000; Osimani, Aquilanti, & Clementi, 2015).

2.8 Attitudes

Attitudes in this study was used to mean “a complex mental state involving beliefs, feelings, values and dispositions to act in certain ways”(Sharif & Al-Malki, 2010, p. 55). Essentially, it refers to the habitual behaviors of food handlers toward the practice of food safety. For instance, it is not enough for food handler to know that defrosted foods should not be refrozen but should also act in accordance with the knowledge. A positive attitude therefore will imply a disposition that tend to act out

the knowledge of food safety in order to ensure that food is safe for all (Akabanda, Hlortsi, & Owusu-Kwarteng, 2017).

Other than knowledge, attitude is a critical factor that may inspire food safety practices and/behaviors, thus mitigating against the outbreak of foodborne disease (Sani & Siow, 2014). Invariably, hospitality organizations that intend to be competitive through product innovations must strive to imbibe positive attitudes into their employees especially food handlers who are responsible for preparation and delivery of food to guest.

Chapter 3

RESEARCH HYPOTHESES

In this chapter, the research model, hypotheses development and the empirical reasoning for the hypotheses are presented. In essence, data gathered from food handlers in hotels and hospitals was used to investigate the food safety knowledge → food handler's attitude → personal hygiene, food safety knowledge → food handler's attitude → kitchen hygiene, and food safety knowledge → food handler's attitude → disease control measure relationships. By so doing, the mediating role of food handler's attitude was tested.

3.1 Model Development

The knowledge, attitude and practice (KAP) model was used as the theoretical underpinning for the development of the hypothesized relationships. Essentially, food handler's safety knowledge plays a significant role in determining their attitudes and eventually their practices of personal hygiene, kitchen hygiene and disease control measures. As presented in figure 1, food safety knowledge enhances handler's attitudes. Food handler's attitudes motivate their personal and kitchen hygiene as well as their practice of implementation of disease control measures. The research model indicates that both food safety knowledge and food handler's attitudes motivate their practices. Here, food handler's attitudes mediate the effect of food safety knowledge of handlers on their practices.

3.2 Hypotheses

3.2.1 Food Safety Knowledge and Handler's Attitudes

Scholars in the field of food control and safety unanimously conclude that safety knowledge and handler's attitude significantly correlates (Al-Shabib et al., 2016; Sani & Siow, 2014). Knowledgeable handlers tend to act and behave in manners that affirm their knowledge level and vice-versa, thus, knowledge level is perhaps a crucial factor in understanding the link between attitude and practices (Zanin, da Cunha, de Rosso, Capriles, & Stedefeldt, 2017). Sani and Siow (2014) posit that when food personnel have adequate information on food safety, and become knowledgeable about its practices, it is possible to translate such knowledge in the food court during food preparation and service. Thus, the following hypothesis is advanced:

H1: Food safety knowledge of food handlers among hotel employees positively influences their attitudes on food safety.

3.2.2 Food Handler's Attitudes, Kitchen and Personal hygiene

The study by (Zhang et al., 2015) proposes that if a food handler knows food safety standards, the attitude of that employee will positively be affected, so will do as expected in terms of hygiene practices. Following the KAP model, attitudes predicts practices and handlers' safety knowledge crucially influence their attitudes to practices of personal and kitchen hygiene. Therefore, the following hypotheses are advanced:

H2: Food handlers' attitude positively influences their perception to personal hygiene.

H3: Food handlers' attitude positively influences their perception to kitchen hygiene.

3.2.3 Food Handler's Attitudes and Disease Control Measure

Over the years, the involvement of food handlers in preventing food borne disease outbreak have been well documented (Lima, Loiko, Casarin, & Tondo, 2013; Zanin et al., 2017). Many argued that food handlers save the nation economy when they practice adequate disease control measure and ensures wellbeing of the citizens or consumers. Improper handling of food during storage, especially touching raw food, unwrapped food, and possibly storing food at wrong temperature, has significant impact on disease control measure (Angelillo, Foresta, Scozzafava, & Pavia, 2001). This advances the next hypothesis:

H4: Food handlers' attitude positively influences their perception to disease control measure.

3.2.4 Mediating Role of Food Handler's Attitudes

The above hypothesis indicates that the practices of personal hygiene, kitchen hygiene and disease control measures are linked to food handler's knowledge about food safety, through the mediating role of the food handler's attitude. Knowledge in this capacity can influence positively the attitude of food personnel to practice the aforementioned hygiene components (KO, 2010). As the KAP model proposes, food handlers with positive attitudes based on adequate safety knowledge will display positive food safety practices such as personal hygiene, kitchen hygiene, and disease control practices (Asmawi et al., 2018).

Although limited, it has been proven that food safety knowledge is positively related to food handler's hygienic practices. For instance, Rebouças et al. (2017) reported that increased in safety knowledge increases head chefs and managers of restaurants' practices of personal hygiene. Sharif et al. (2013) provided evidence regarding the relationship between food safety knowledge and overall hygienic practices of food

handlers in military hospitals. Since attitudes are beliefs, behaviors, values and dispositions, it goes without saying that food handler's attitude is linked to their actual practices of hygienic practices. Accordingly, the following hypotheses are given on the basis of KAP model:

H5: Food handlers' attitude mediates the effect of food safety knowledge on food handler's perception of (a) personal hygiene, (b) kitchen hygiene, and (c) disease control measures.

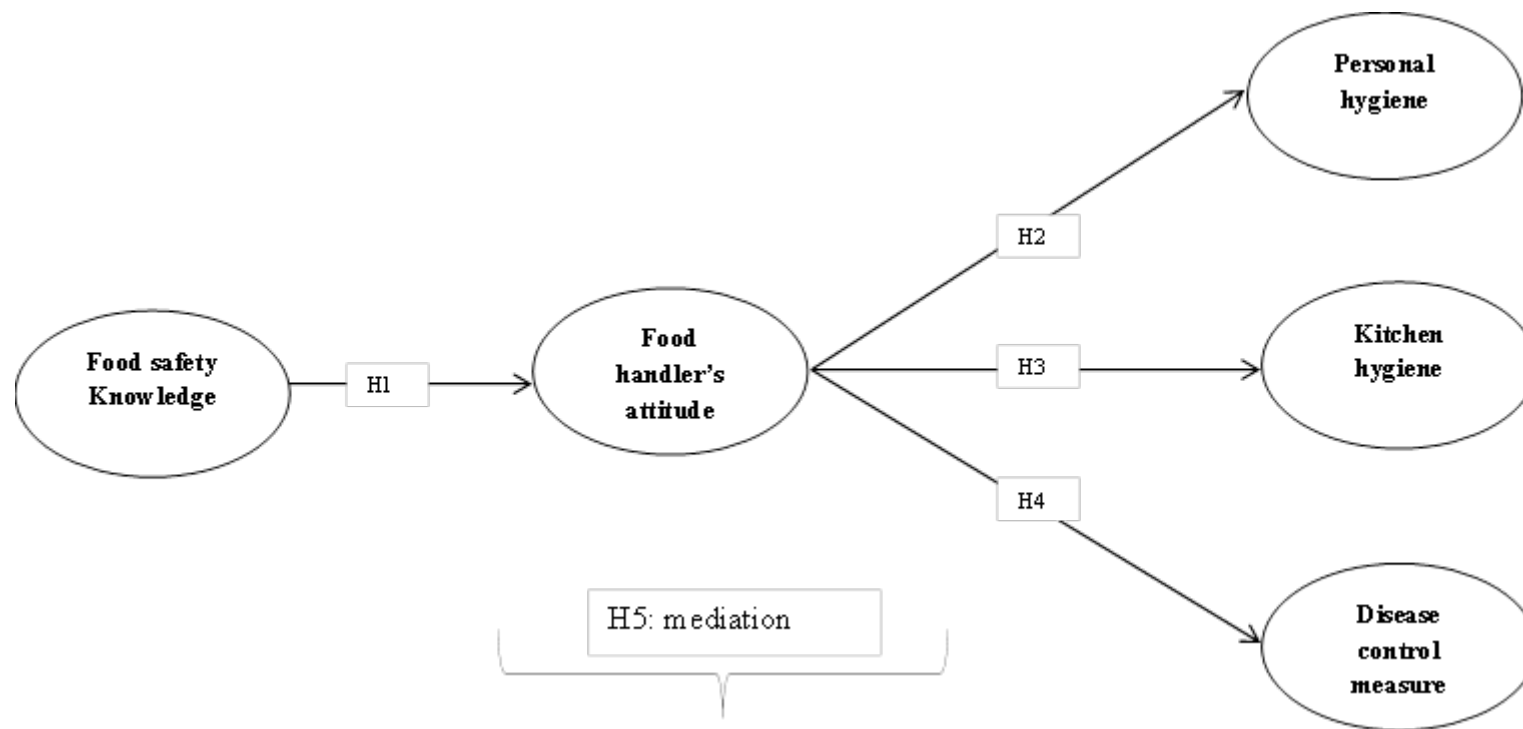


Figure 1: Research Model

Chapter 4

RESEARCH DESIGN

This chapter presents issues pertaining to the research context, study approach, research philosophy, data collection, questionnaire design and strategy of analyses.

4.1 Study Context

Nigeria, the largest country in West Africa, with a diversity of culture and languages, has Abuja as the capital city. According to Worldometers, (2019), Nigeria has a population of 200,567,413 which is equal to two point six percent (2.6%) of world's population, and the total land area is 910,770 Km² (351,650 sq. miles). The country has a lot of Tourism potentials with assorted tourism products scattered all over the country (Adora, 2010), and tourism industry, growing so fast across the globe is seen as a critical tool for healthy economic development in a nation (Liaw et al., 2012); (Ayeni & Ebohon, 2012). The hospitality sector which is very much part of the tourism package, plays a significant role in the experience of a tourist. Hospitality, which also means "receive as a guest" has to do with how guests relates to the one hosting them, as well as the service experience encounter at the point of visit (Gambo & Jakada, 2013). Moreover, hospitality gives the guest the comfort of protection, safety and embrace, so he/she can feel at home away from home. Therefore, the hotel as a service industry must be standardized in order to render to their customer a satisfactory embodiment of quality in service delivery, and according to their demands and spending power. It goes beyond the usual atmosphere to a most

pleasurable and hedonic world of dynamic innovation that brings excitement (Gambo & Jakada, 2013).

Hotels in Nigeria vary in size and purpose such as traditional guest hotel and 4-5 star hotels. Some identified hotel chains in Nigeria (e.g. South African Hotel chain, Protea, Transcorp, Sheraton, and French Le Meridien and Eko Hotel. Rock view, Chelsea, Chida Hotels among others) and mostly in major cities of the country (Jakada, Gambo, & others, 2014), and couple with the resorts in several tourism destinations cutting across states in the country, Obudu cattle ranch, Yankari Game Reserve, Gurara falls, Kajuru castle, etc. Recent innovations with awesome recreational activities have made Nigeria an interesting place for vacation.

Plateau State, with Jos as the capital city is the main focus. The concept of a tourist resort among others is to offer higher quality experience for visitors. Tourist resorts and other tourist destination (HBC, Resort, Jos Wildlife Park, Jos Museum), in Plateau State on establishment were for the purpose of recreational adventures, thus attracting people from within the country and outside the country as well. The managers are ensuring continuously that facilities are upgraded to boost quality for fascinating customer experience (Gonap, Clement, & Nesla, 2017). With this in place, the hospitality sector must be is ready to provide a suitable atmosphere for food and beverage service to her guests.

4.2 Study Approach

Because this thesis was designed to test and validate an existing theory in a new context, it adopted a deductive research approach. Practically, deductive approach is adequate when investigating hypotheses which were development from a theoretical

framework in conjunction with the findings from existing literature in order to shed light or deduct a new precept with insight into practice.

This thesis's hypotheses were developed using KAP model and extensive findings from extant literature. Based on the tenets of KAP model, an individual's practice (P) is a function of the level of their knowledge (K) and points that availability of information is necessary to cause a change in attitude (A) and consequently a change in practice (Clayton et al., 2002). The hypothesized model of this thesis includes the impact of food handler's food safety knowledge on their attitudes, food handler's attitude on their personal hygiene, kitchen hygiene and disease control measures. Further, the model investigated the mediating role of food handler's attitude on the association between handler's safety knowledge and outcome variables of personal hygiene, kitchen hygiene and disease control measures.

4.3 Sampling and Procedure

This empirical study employed purposive sampling technique for drawing its sample from the study population. According to (Babbie, 1999), this non-probabilistic sampling approach gives investigator the opportunity to select respondents who are most adequate to represent the intended population of study. Technically, Curwin, et al., (2013) posited that "... there is no element of chance and judgment that is used to select participants" (p. 116). This thesis used food handlers because of their high level of involvement in the making and delivery of safe food to the customers which is critical role in the process of service delivery.

In Jos metropolis, according to the information gathered from the local municipality office, there are two (2) main hospitals - one owned by the federal government and

the other by the state government; twelve (12) standard hotels and ten (10) standard restaurants. The authorities of all the hotels, hospitals and restaurants were contacted to obtain permission for the conduct of the survey. Both hospitals granted the permission to conduct the research while 7 hotels and 4 restaurants granted their permission respectively. In all, 24 hospitality organizations (that is, hotels, restaurants and hospitals) were contact for permission, only 13 of those organization accepted that the study should be conducted with their employees.

4.4 Data Collection

The food handlers participating in the study were briefed about the purpose and objectives of the study and were also assured of the confidentiality of the study. They were also informed about the voluntary nature of the study and are encouraged to discontinue if they feel uncomfortable supplying the required information. These processes were taken as part of the procedural remedy for common-method variance. Since English language is the official language in Nigeria, back translation was not necessary for this study. The final questionnaire was shared with two instructors in Nigeria to assess the content for clarity and understandability.

A total of 450 questionnaires were distributed to the 13 organizations where permission has been granted to conduct the study. Out of the 450 survey distributed, 403 representing 89.6% were properly filled and returned. This high response rate may be due to the understanding that the management of the organization endorsed the survey.

4.5 Measurement

Data used for estimation in this thesis were gathered from food handlers in major hospitality organizations such as hotel, restaurants and catering section of hospitals.

Since, respondents are native English-language speakers; there was no need for back-translation of the measures.

Measures of food safety knowledge, attitude and practices (personal hygiene, kitchen hygiene and disease control measures) are adapted from the structured questionnaire of WHO/FAO which has been previously used by Al-Kandari, Al-abdeen, & Sidhu, (2019) in the Kuwait context. Sample item for food safety knowledge is “Hand washing practice is important for food safety”; for food handlers’ attitude includes “I believe that how I handle food relates to food safety”; for personal hygiene include “Washing of hand with warm soapy water before and after handling raw food is essential”; for kitchen hygiene include “Kitchenware washing practice is important for food safety” and lastly for disease control measure include “Is the use of gloves when you touch or distribute unwrapped foods important?”. Food handler’s attitude items were anchored using a 5-point Likert scale ranging from “1” strongly disagree to “5” strongly agree. Disease control practices items were anchored using 5-point Likert scale ranging from “1” less important to “5” strongly important. Personal hygiene items were anchored using 6-point Likert scale ranging from “1” least important to “6” Most important. Food safety knowledge and kitchen hygiene items were anchored using 5- point Likert scale ranging from “1” I certainly don’t agree to “5” I certainly agree.

4.6 Data Analysis

All variables (food safety knowledge, food handler’s attitude, personal hygiene, kitchen hygiene, and disease control measure) were subjected to exploratory factor analysis in SPSS v 22. In so doing, the researcher can assess the data’s discriminant and convergent validities. The subsequent step which involved the evaluation of the

structural model was done using SPSS macro program. Assessing structural model with this approach has been proven to be beneficial as it offers range of benefits to the researcher. For instance, Bagozzi and Yi (1988) stated that "...it helps researchers to be more precise in their specification of hypotheses and operationalization of constructs...guides exploratory and confirmatory research in a manner combining self-insight and modeling skills with theory. Works well under the philosophy of discovery or philosophy of confirmation...is useful in experimental or survey research, cross-sectional or longitudinal studies, measurement or hypothesis testing endeavors, within or across groups and institutional or cultural contexts..." (p.12).

Since the survey was cross-sectional, we checked for common-method variance through Herman's single factor test. The default settings extracted 5-factors with the first factor consisting of 38.25% variance. This result suggests that common method is not a problem. In aligned with previous studies (Anasori, Bayighomog, & Tanova, 2019; Bayighomog & Arasli, 2019), this thesis used bootstrapping technique with 5000 sub-samples and 95% bias-corrected confidence interval to confirm mediating effects. Other statistical analyses like frequencies and correlations are also given.

Chapter 5

RESULTS OF STUDY

Empirical findings from analysis of the solicited data from service employees in hotels, restaurants, and hospital in the Jos Metropolis of Plateau State, Nigeria, are reported in this chapter. Specifically, the profile of the respondents as it pertains to marital status, age, education, organizational tenure and gender is provided. The psychometric quality of the instrument with regards to both discriminant and convergent validity are also given. Further, correlations and internal consistency reliable of study variables are individually reported using the Cronbach's alpha. Lastly, hypothesized relationships were also reported through multiple regression analysis.

5.1 Profile of the Study's Respondents

As reported in table 1 below, respondents' profile with regards to marital status, organizational tenure, education, gender and age are provided. The results in Table 1 indicate that the overarching majority (76.4%) of the respondents are aged between 18 and 37 years. According to the results in Table 1, 213 (52.9%) are females while the remaining 190 (47.1%) are males. In terms of education, 210 (52.1%) have university-level education while 97 (24.1%) and 85 (21.1%) have secondary school and two-year college degrees respectively. The remainders of the respondents have primary school level education.

With respect to organizational tenure, the majority 148 (36.7%) have been on the job for less than one year, 109 (27%) have been working for one to five years. 77 respondents (19.1%) had worked for six to ten years. While the others 69 (17.2%), had more than ten years of working experience.

Table 1: Respondent's Profile (n = 403)

| | <u>Frequency</u> | <u>%</u> |
|------------------------------|------------------|--------------|
| Age | | |
| 18-27 | 164 | 40.7 |
| 28-37 | 144 | 35.7 |
| 38-47 | 53 | 13.2 |
| 48-57 | 34 | 8.4 |
| 58 and older | 8 | 2.0 |
| Total | 403 | 100.0 |
| Gender | | |
| Male | 190 | 47.1 |
| Female | 213 | 52.9 |
| Total | 403 | 100.0 |
| Education | | |
| Primary school | 11 | 2.7 |
| Secondary school | 97 | 24.1 |
| Two-Year College | 85 | 21.1 |
| Four-Year degree | 46 | 11.4 |
| Graduate degree | 164 | 40.7 |
| Total | 403 | 100.0 |
| Organizational Tenure | | |
| Under 1 year | 148 | 36.7 |
| 1-5 | 109 | 27.0 |
| 6-10 | 77 | 19.1 |
| 11-15 | 31 | 7.7 |
| 16-20 | 18 | 4.5 |
| More than 20 | 20 | 5.0 |
| Total | 403 | 100.0 |
| Marital Status | | |
| Single or divorced | 217 | 53.8 |
| Married | 186 | 46.2 |
| Total | 403 | 100.0 |

To confirm convergent and discriminant validity of the study scales, exploratory factor analysis (principal component with varimax rotation) and internal consistency test was performed. Table 2 presents scale items, exploratory factor analysis and internal consistency results. All factors loaded distinctly on their underlining construct. All factor loadings were significant at 0.4 threshold value. All eigenvalues were greater than 1.0. The three factors accounted for 55.877% of the variance. These results indicated that were evidence convergent and discriminant validity. As reported in Table 2, the first factor accounted 23.594% of the variance. This indicates that common method bias may not be a significant problem. The results in Table 2 also demonstrated that all measures were reliable ($\alpha > .60$)(Peterson, 1994).

Means, standard deviations, and correlations of the study variables are given in Table 3. The results explicitly show that all correlations but for the relationship between food safety behavior and disease control measure are significant. For example, the correlation between food safety knowledge and personal hygiene is .197 ($p < .01$). The results surfacing from the correlations analysis provide further evidence about the issue of discriminant validity since the correlations among the study variables are below 0.70.

5.2 Hypotheses Testing

In order to evaluate the hypothesized relationships, Hayes', (2013) SPSS macro was used. Hypothesis 1 which proposed that food safety knowledge of food handlers exerts significant positive effect was empirically supported ($\beta = .395$, $p < 0.000$) (see table 4.)

Table 2: Factor loadings (FL), AVE and Cronbach's Alpha of Scale items

| Variable/items | FL | AVE | Cronbach's Alpha |
|--------------------------------|------|--------|------------------|
| Food Handler's Attitude | | 23.594 | .834 |
| FHA2 | .829 | | |
| FHA1 | .758 | | |
| FHA3 | .746 | | |
| FHA4 | .679 | | |
| FHA9 | .645 | | |
| FHA10 | .516 | | |
| Disease Control Measure | | 8.344 | .783 |
| DCM2 | .769 | | |
| DCM5 | .729 | | |
| DCM6 | .714 | | |
| DCM4 | .669 | | |
| DCM1 | .579 | | |
| Food Safety Knowledge | | 6.134 | .759 |
| FSK3 | .742 | | |
| FSK4 | .736 | | |
| FSK1 | .707 | | |
| Personal Hygiene | | 5.255 | .637 |
| PH3 | .729 | | |
| PH4 | .719 | | |
| PH2 | .694 | | |
| PH6 | .542 | | |
| PH1 | .483 | | |
| PH5 | .414 | | |
| Kitchen Hygiene | | 4.628 | .712 |
| KH4 | .685 | | |
| KH5 | .661 | | |
| KH6 | .559 | | |
| KH1 | .492 | | |
| KH3 | .433 | | |

Table 3: Correlations of Study Variables and Descriptive Statistics

| Variables | Mean | SD | 1 | 2 | 3 | 4 | 5 |
|----------------------------|--------|------|--------|--------|--------|--------|---|
| 1. Food handler's attitude | 4.3098 | 0.71 | 1 | | | | |
| 2. Disease control measure | 3.5767 | 0.98 | .335** | 1 | | | |
| 3. Food safety knowledge | 4.3449 | 0.83 | .465** | .364** | 1 | | |
| 4. Personal hygiene | 4.0649 | 1.18 | .168** | .269** | .197** | 1 | |
| 5. Kitchen hygiene | 4.1092 | 0.67 | .502** | .355** | .399** | .261** | 1 |

Notes: * $p < 0.05$, ** $p < 0.01$ Two-tailed test.

Table 4: Direct and indirect effects of FSK on FHA, KH, DCM, and PH

| | β | SE | t | p | | |
|---|-----------------------|-----------------------|--------|--------------------------|--------------------------------------|---------------------------------------|
| Direct Effects | | | | | | |
| a FSK \rightarrow FHA | .395 | .038 | 10.507 | .000 | $R^2 = .216$, F = 110.406, P = .000 | H1 = Supported |
| Criterion: Personal hygiene | | | | | | |
| b1 FHA \rightarrow PH | .164 | .092 | 1.779 | .076 | $R^2 = .046$, F = 9.687, P = .0001 | H2 = Not-supported |
| c1 FSK \rightarrow PH | .214 | .078 | 2.738 | .006 | | |
| Indirect effect | | | | | | |
| FSK \rightarrow FHA \rightarrow PH | <i>Coeff.</i> .065 | <i>BootSE</i> .055 | | <i>95%BCaCI</i> -.048 | <i>VAF</i> .171 | - H5a = Not-supported |
| Criterion: Kitchen hygiene | | | | | | |
| b2 FHA \rightarrow KH | .170 | .038 | 4.442 | .000 | $R^2 = .287$, F = 80.553, P = .0000 | H3 = Supported |
| c2 FSK \rightarrow KH | .380 | .045 | 8.465 | .000 | | |
| Indirect effect | | | | | | |
| FSK \rightarrow FHA \rightarrow KH | <i>Coeff.</i> .150 | <i>BootSE</i> .033 | | <i>95%BCaCI</i> .088 | <i>VAF</i> .218 | 88.2% H5b = supported (Part.Med.) |
| Criterion: Disease control measure | | | | | | |
| b3 FHA \rightarrow DCM | .292 | .071 | 4.104 | .000 | $R^2 = .168$, F = 40.354, P = .0000 | H4 = Supported |
| c3 FSK \rightarrow DCM | .313 | .061 | 5.170 | .000 | | |
| Indirect effect | | | | | | |
| FSK \rightarrow FHA \rightarrow DCM | <i>Coeff.</i> .115 | <i>BootSE</i> .033 | | <i>95%BCaCI</i> .053 | <i>VAF</i> .181 | 39.38% H5c = supported (Part.Med.) |

Note: FSK- Food safety knowledge, FHA- Food handler's attitudes, KH – Kitchen hygiene, PH – Personal hygiene, DCM – disease control measure, 5000 resampled size, 95% bias-corrected

Surprisingly, hypothesis 2 which proposed that attitudes of food handlers predicts their personal hygiene practices was not supported ($\beta = .164, p < 0.076$). This finding may be because of the peculiarity of the study context. Specifically, the culture of regulation and strict adherence to standard is not often obtainable in Nigeria, this may be responsible for why food handlers though knowledgeable but fails to act according to their knowledge since there will be no strict punishment attached to failing to comply with specific safety regulation. However, all other hypothesized relationships were adequately supported. Specifically, hypothesis 3 which proposed that food handler's attitude predicts their kitchen hygiene received sufficient empirical support ($\beta = .170, p < 0.000$). Further, hypothesis 4 which proposed direct influence of food handlers on their disease control measure also received adequate support ($\beta = .298, p < 0.000$).

The mediating roles of food handler's attitude on the relationship between food safety knowledge and personal hygiene, kitchen hygiene and disease control measure were hypothesized in H5a, H5b and H5c respectively. While food handler's attitude was a significant partial mediator of the relationship between food safety knowledge and kitchen hygiene as well as disease control measure, it was not a significant mediator of the relationship between food safety knowledge and personal hygiene. Since the effect of attitudes on personal hygiene was not significant, it is expected that attitude will not mediate the effect of knowledge on practice of personal hygiene. Hence H5a was rejected while H5b and H5c were empirically supported (see Table 4).

Chapter 6

DISCUSSION AND CONCLUSION

This thesis work provides unique information and divulges a number of critical features about the knowledge, attitudes and practices of food handlers working in hotels, hospitals and restaurants located in Jos metropolis of Nigeria. Food handlers in Nigerian hotels, hospitals and restaurants possess a fair amount of food safety knowledge. This finding is contrary to the claim of (Bas, Temel, Ersun, & Kivanç, 2005; Buccheri et al., 2010; Oludare, Ogundipe, Odunjo, Komolafe, & Olatunji, 2016). The contrary result of this study may be attributed to peculiarity of the context of our study. For example, unemployment rate in Nigeria is surging and the population of graduates is increasing thereby creating a large pool of able workforce that can easily replace any incompetent hand on the job (Abu, 2019). This may serve as motivation to encourage current workforce to consistently acquire more knowledge that will aid the effective delivery of their assigned-tasks.

In understanding the hygienic-sanitary quality of food, KAP model is ideal and critical. It provides the basic assumption upon which food handlers can base their hygienic knowledge of the food safety in order to delivery standard compliant hygienic practices. It also assumed the basis upon which attitudinal changes in food handlers can be hinged to ensure optimal compliance with best hygienic food practices (Bas et al., 2006). In this thesis, positive responses to food safety knowledge survey items indicated that significant level of safety knowledge cut

across all spheres of food handlers whether in the hospitals, hotels or restaurants. This finding corroborates those of similar studies conducted in Asia and Middle Eastern countries (Odeyemi et al., 2019). As expected, positive attitudes of food handlers is a crucial factor in the transitioning of safety knowledge to effective hygienic practices. Thus, focused training on shaping handler's attitudes is not only necessary but important in ensuring that handlers not only possess head-knowledge of food safety but understand how to transform this knowledge into functional practices (Zanin et al., 2017).

6.1 Contribution to Theory

This thesis extends the application of KAP model to Nigerian Hospitality context. Previous literature which have investigated the application of this model have done so in a more developed setting where knowledge standards are fixed and control regulations are strict and clear. However, in developing country like Nigeria, food control agencies are more relaxed and this may adversely impact the attitude of handlers in adherence to the model. Interestingly, our findings suggest that the model works well within the Nigeria context thus validating the global relevance of the KAP model in ensuring the deterrence of epidemic food borne diseases.

6.2 Contribution to Practice

Scholars and practitioners have argued and concluded that supervisors, managers and leaders' general have their quotas to contribute in ensuring that food handlers adhere to required standards through the establishment of vital food safety culture that is geared towards encouraging behavioral changes that reflects the tenets of KAP model (Zanin et al., 2017). When considered in the context of hospitality services, food safety culture involves activities that managements put in place to shape the behavior of workers and align them towards the values of the organization (Huang,

2018). Since the practices of food handlers affects to a great deal the performance of the food service establishments, managers must of necessity provide motivational mechanism that will aid food handlers in ensuring their practices are done in alignment with the required standards based on the food safety knowledge at their disposal (Al-Shabib et al., 2016; Sani & Siow, 2014; Zanin et al., 2017).

It will also be interesting to explore innovative and creative managerial approaches which are aimed at delivering quick services but with utmost assurance of safety in food delivery service outlets. These approaches may incorporate combination of innovative organizational values with traditional values in disseminating effective value that locals can understand and relate to (Vrontis, Bresciani, & Giacosa, 2016). To be successful, food services outlets must possess competitive business model that prioritize standard based practices in the preparation and delivery of their service products (Santoro, Vrontis, Thrassou, & Dezi, 2018).

On the national scale, government may embark of policies that centers on food safety education and sensitization programs. Periodical examination and training of food vendors and handlers may also be a positive direction for the government in ensuring nationwide commitment to safe food consumption and maximal reduction in the outbreak of food related diseases in the country. Further, since information acquisition, storage and retrieval is a common challenge in developing countries, the government could also put in place regulations that encourages food handlers to report and document occurrences of food borne diseases which will further help in establishing the influence of safety knowledge in the overall outcome of reduction of food borne diseases in the country.

6.3 Limitation and Future Research Directions

6.3.1 Limitations

An obvious limitation to the current study is in the cross sectional nature of the study. Data used in the analysis was self-reported and was collected within short period of time. This may indeed impact on the inference of causal relationships between the variables of study. Also, the context was Jos metropolis; a city in a state of 36 states country. This may also affect the generalization of the result to cover the entirety of the country as culture and belief systems differs with geographical distribution in the country and may indeed impact on the interpretation of the results.

6.3.2 Future Research Direction

Although this study is not the first to be conducted in Nigeria, it is the first that applied the KAP model in its investigation of food handlers' attitudes and the associated affect such attitude cast on their practices of food safety and hygienic-sanitary standard compliance. While the thesis offers relevant and interesting results, future studies may include the assessment of food handler's physical environments, working conditions and exposure to microbiological assessment in examining how food handlers changes with such scenarios in place.

Furthermore, a number of studies argued that knowledge alone may not be enough to result in significant behavioral change in people's attitude (Clayton et al., 2002; Sani & Siow, 2014); thus, representing a major drawback for the KAP model adopted in this study. To further validate the significance of the result of this study, future studies may employ different theoretical perspective such as the HACCP.

In hope of minimizing the outburst of foodborne disease and promoting food safety, more diagnostic study with longitudinal focus on social, psychological factor as well as environmental sustainability in shaping behavioral changes in food handlers may also be insightful for future research (Zanin et al., 2017). Also, as suggested in the managerial implication, knowledge-driven approach to food safety training may also offers an interesting outcome in the behavioral conditioning of food handlers (Scuotto, Del Giudice, Bresciani, & Meissner, 2017). As such, future study that seek to understand the difference between attitudes of handlers exposed to such trainings in comparison with those without such training may also contribute immensely in ascertaining the appropriate module of trainings required to optimally prepare handlers to utmost performance.

6.4 Conclusion

This thesis concludes that KAP of food handlers in Jos metropolis of Nigeria was adequate but could also benefit from proper documentation and training. Particularly, food handler's attitude is at the core of the effective running of the model and sufficient attention is needed to ensure that food handlers are motivated adequately to carry out the required hygienic food practice personally and in the kitchen; thereby minimizing the outbreak of food borne endemic diseases. Should food safety knowledge lack in food handlers, the consequence can be grievous as the attitudes of handlers mostly reflects their knowledge levels. Hence, it poses an increased risk of outburst of food borne diseases.

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APPENDIX

FOOD SAFETY KNOWLEDGE SURVEY QUESTIONNAIRE

Dear Participants,

This survey is aimed at understanding your perception of the importance of food and kitchen hygiene in the hotels. It is our belief that your contribution to this study will help to shed light on the pertinent issue surrounding food hygiene and food safety in general. Therefore, we asked that you fill out the following few questions.

Please note that this survey is purely for academic purpose and you are not under any obligation to fill it out, however, your input will be of great value towards achieving the research objectives, and will help in the successful completion of the master thesis. Your confidentiality and anonymity is a top priority for us and you are thus not required to fill any question that may reveal your identity.

You can reach the main researcher for any query or inquiry via her email:

vicsteveuk@gmail.com

Thank you for your time.

Researcher Team
Student: Victoria KWOL
Supervisor: Prof. Dr. Turgay AVCI

Part 1 (Food handler's attitude)

The following statements reflect possible attitudes toward food hygiene and other related issues. Please indicate whether you agree or disagree with each statement. Kindly circle the number that best describe your agreement with the statements.

- 1= strongly disagree
- 2= disagree
- 3 = neutral
- 4 = agree
- 5 = strongly agree

| S/N | | 1 | 2 | 3 | 4 | 5 |
|-----|--|---|---|---|---|---|
| 1. | Safe food handling is an important part of my job responsibilities | 1 | 2 | 3 | 4 | 5 |
| 2. | Learning more about food safety is important to me | 1 | 2 | 3 | 4 | 5 |
| 3. | I believe that how I handle food relates to food safety | 1 | 2 | 3 | 4 | 5 |
| 4. | Raw foods should be kept separately from cooked foods | 1 | 2 | 3 | 4 | 5 |
| 5. | Defrosted foods may be refrozen only once | 1 | 2 | 3 | 4 | 5 |
| 6. | Using cap, masks, protective gloves, and adequate clothing reduces the risk of food contamination | 1 | 2 | 3 | 4 | 5 |
| 7. | It is important to know the temperature of the refrigerator to reduce the risk of food safety | 1 | 2 | 3 | 4 | 5 |
| 8. | It is necessary to check thermometer settings of refrigerators and freezers once per day | 1 | 2 | 3 | 4 | 5 |
| 9. | Improper storage of foods may be hazardous to health | 1 | 2 | 3 | 4 | 5 |
| 10 | Food-services staff with abrasion or cuts on fingers or hands should not touch unwrapped foods (do not cover cuts with easily detectable plasters) | 1 | 2 | 3 | 4 | 5 |

Part 2 (Food handler's food-borne disease prevention)

The questions below regard adopted measures for foodborne diseases control measures. Please respond as indicated, according to use, with each statement. Kindly circle the number that best describe your agreement with the statements.

- 1= Less important
- 2 = Equally important
- 3 = Slightly important
- 4= Important
- 5 = Strongly important

| S/N | | 1 | 2 | 3 | 4 | 5 |
|-----|--|---|---|---|---|---|
| 1. | Is the use of gloves when you touch or distribute unwrapped foods important? | 1 | 2 | 3 | 4 | 5 |
| 2. | Is washing your hands before using gloves important? | 1 | 2 | 3 | 4 | 5 |
| 3. | Is washing your hands after using gloves important? | 1 | 2 | 3 | 4 | 5 |
| 4. | Is using protective clothing when you touch or distribute unwrapped foods important? | 1 | 2 | 3 | 4 | 5 |
| 5. | Is using a mask when you touch or distribute unwrapped foods important? | 1 | 2 | 3 | 4 | 5 |
| 6. | Is wearing a cap when you touch or distribute unwrapped foods important? | 1 | 2 | 3 | 4 | 5 |
| 7. | Is washing your hands before touching unwrapped raw foods important? | 1 | 2 | 3 | 4 | 5 |
| 8. | Is washing your hands after touching unwrapped raw foods important? | 1 | 2 | 3 | 4 | 5 |
| 9. | Is washing your hands before touching unwrapped cooked foods important? | 1 | 2 | 3 | 4 | 5 |
| 10 | Is washing your hands after touching unwrapped cooked foods important? | 1 | 2 | 3 | 4 | 5 |

Part 3 (Personal hygiene)

The questions below regard adopted measures for personal hygiene. Please respond as indicated, according to your level of agreement or disagreement with each statement. Kindly circle the number that best describe your agreement with the statements.

- 1= Least important
- 2 = Equally important
- 3 = Slightly important
- 4= Important
- 5 = Strongly important
- 6= Most important

| S/N | | 1 | 2 | 3 | 4 | 5 | 6 |
|-----|--|---|---|---|---|---|---|
| 1. | Handling of pets when preparing foods. | 1 | 2 | 3 | 4 | 5 | 6 |
| 2. | Prepare food for yourself but not others when ill with diarrhea | 1 | 2 | 3 | 4 | 5 | 6 |
| 3. | Properly dress and glove cuts and burns on hands before handling foods | 1 | 2 | 3 | 4 | 5 | 6 |
| 4. | Use utensils not bear hands to serve food | 1 | 2 | 3 | 4 | 5 | 6 |
| 5. | Wash your hand with warm soapy water after defecating, changing a baby soiled diaper before handling food. | 1 | 2 | 3 | 4 | 5 | 6 |
| 6. | Wash hand with warm soapy water before and after handling raw food. | 1 | 2 | 3 | 4 | 5 | 6 |

Part 4 (Kitchen hygiene)

The questions below regard adopted measures for kitchen hygiene. Please respond as indicated, according to your level of agreement or disagreement with each statement. Kindly circle the number that best describe your agreement with the statements.

- 1= I certainly don't agree
- 2 = I don't agree
- 3 = Undecided
- 4= I agree
- 5 = I certainly agree

| S/N | | 1 | 2 | 3 | 4 | 5 |
|-----|--|---|---|---|---|---|
| 1. | The inside of cold stores and refrigerators should be clean and well-cared | 1 | 2 | 3 | 4 | 5 |
| 2. | Sunlight cannot enter into the store or pantry | 1 | 2 | 3 | 4 | 5 |
| 3. | Grounds of the fields of food production and service should be well cared and kept dried | 1 | 2 | 3 | 4 | 5 |
| 4. | One should not put his or her hands into water glasses | 1 | 2 | 3 | 4 | 5 |
| 5. | One cannot hold forks and knives from their top parts | 1 | 2 | 3 | 4 | 5 |
| 6. | The surfaces where food is prepared should be cleaned after putting away the foods | 1 | 2 | 3 | 4 | 5 |
| 7. | Used cleaning clothes should always be washed and dried | 1 | 2 | 3 | 4 | 5 |
| 8. | In the course of washing dishes, one should be fastidious while washing, rinsing and sterilization of the dishes | 1 | 2 | 3 | 4 | 5 |
| 9. | Wastes should be eliminated from the kitchen by grinding or putting in the waste baskets | 1 | 2 | 3 | 4 | 5 |
| 10 | All equipment should not be dried up in the open air after washing, rinsing and sanitation | 1 | 2 | 3 | 4 | 5 |

Part 5 (Kitchen Safety Knowledge)

The questions below regard adopted measures for kitchen Safety knowledge. Please respond as indicated, according to your level of agreement or disagreement with each statement. Kindly circle the number that best describe your agreement with the statements.

- 1= I certainly don't agree
- 2 = I don't agree
- 3 = Undecided
- 4= I agree
- 5 = I certainly agree

| S/N | | 1 | 2 | 3 | 4 | 5 |
|-----|--|---|---|---|---|---|
| 1. | Hand washing practice is important for food safety | 1 | 2 | 3 | 4 | 5 |
| 2. | Hand washing by pipe water only is safe | 1 | 2 | 3 | 4 | 5 |
| 3. | Hygiene of kitchenwares is important for food safety. | 1 | 2 | 3 | 4 | 5 |
| 4. | Kitchenwares washing practice is important for food safety | 1 | 2 | 3 | 4 | 5 |

Part 6 (Demography)

Please indicate your answer by placing a (x) in the appropriate alternative.

- 1. How old are you?
 - 18-27 ()
 - 28-37 ()
 - 38-47 ()
 - 48-57 ()
 - 58 and over ()
- 2. What is your gender?
 - Male ()
 - Female ()
- 3. What is the highest level of education you completed?
 - Primary school ()
 - Secondary school ()
 - Two-year college degree ()
 - Four-year college degree ()
 - Graduate degree ()
- 4. How long have you been working in food related industry?
 - Under 1 year ()
 - 1-5 years ()
 - 6-10 ()
 - 11-15 years ()
 - 16-20 years ()
 - More than 20 years ()
- 5. What is your marital Status?
 - Single or Divorced ()
 - Married ()

Thank you for your kind cooperation.