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## Chapter

# Hospitality Restaurant Operations: Safety and Hygiene Practices

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## Abstract

Hotel Restaurants contributes immensely to the economic well-being of many Countries worldwide. Apart from solving patrons' dining needs, restaurants employ many people across the world and thus contributes to the global economic growth. Notwithstanding, restaurant operations provides an avenue for customer attraction, service, and retention! Globally, hotels and/or restaurants invest heavily in restaurant operations processes with a view of staying competitive within the highly volatile field. However, investors within this lucrative business are facing a myriad of challenge pertaining safety and hygiene, which is a threat to the goodwill, and in many cases results in legal proceeding which may be very costly to hospitality organizations. This book chapter will therefore focus on safety and hygiene practices within independent and dependent restaurants, in order to equip hotel practitioners with up-to date and relevant skills, knowledge and information on how to provide hazard-free environment, in consideration of sound restaurant operations that incorporates sound hygiene practices, critical control points and organizational safety principles.

**Keywords:** foodborne illness, food intoxication, hazard, safety, critical control points

## 1. Introduction

Food safety initiatives are critical to both independent and dependent restaurants, whose main aim is to develop an all-inclusive farm-to-fork strategies [1, 2]. It is therefore important for these organizations to develop and implement food safety and hygiene procedures and practices in order to ensure a free microworld and thus eliminating the occurrence of related foodborne illnesses among their clientele, both internal and external. These processes must commence right from the level at which food leaves the farm all the way to the fork. However, this procedural approach depends on many factors among which food type remains the major factor [3, 4]. Whereas meats and meat products may require more critical handling processes at various stages of transition, dry cereals on the other hand might not be such technical [5]. Moreover, the slightest lapse in any of the processes and/or conditions required for successful transition of meats and meat products might lead to huge disasters.

Even so, catering outlets constitutes key social points for leisure, relaxation, and business transactions [1, 6]. Thus, restaurants have of late become a 'home' for the global community, not only to meet their physiological needs but also social needs. Thus today, hotels and hotel restaurants host people from all walks of life, but on the

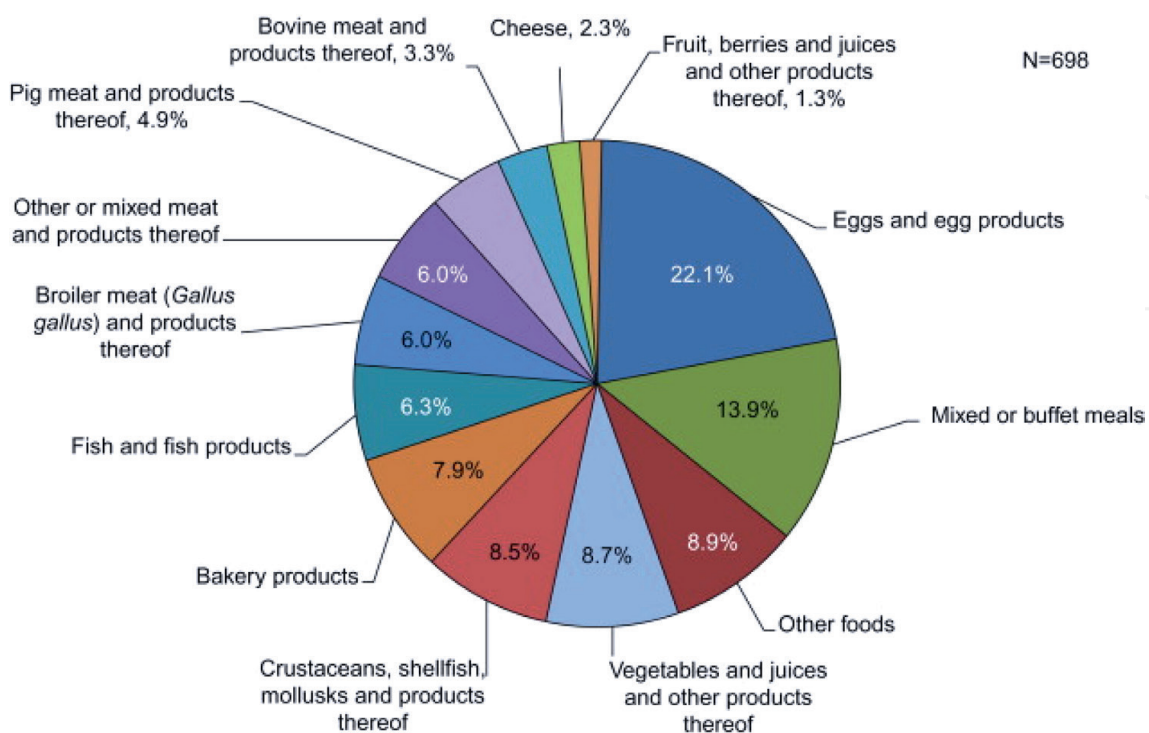
other hand a source of income to many hospitality practitioners worldwide. Further, the larger hospitality industry has emerged as one of the highest foreign exchange earners for many countries in the world [2, 7, 8]. However, increased activity as a result of mobility is speculated as being the probable cause of vulnerable diseases, including foodborne illnesses as well as food intoxication across the world [3, 5, 9–11]. Hotels offer accommodation as well as a place to have food and drink to clientele from around the globe, both healthy and sick [3, 6, 12–15]. In essence, it is possible for hotels to accommodate patrons already infected with an amalgam of ailments including infections which are known to spread rapidly among hospitality staff or client. This could be explained on the basis of the social role that hotels play, bringing together people from all walks of life across the world, but again involving many personalities in order to act as the link between restaurant menus and hospitality organizations. Therefore, catering outlets have attracted attention from hospitality, public health as well as other professionals including medical personnel and government agencies in an attempt to minimize and/or eliminate the spread of food related illnesses and intoxications that are the greatest threat to humanity and thus the world economy.

Indeed, it is true that ‘cleanliness is closer to Godliness’ and therefore all restaurant personnel have an obligation to ensure proper levels of sanitation as well as safety. Human health is currently treated with priority as many Countries of the world struggle to keep their citizens healthy, including huge capital investments in both preventive and curative approaches. Factual pride in operational professionalism demands hospitality brigade to observe high standards of workplace hygiene and safety [5, 16]. This will not only minimize and/or control foodborne illnesses and food intoxications, but also minimize costs that would arise from legal battles, compensation awarded by the courts for the affected as well as business goodwill from the market segments served. Furthermore, the inconveniences and humiliation faced by restaurant owners as well as staff from the public health sector and the police is incredible. But above all, many business associates and customers alike may no longer have the trust to engage in any meaningful business transaction with any catering business associated with foodborne related illnesses and food intoxication.

Nonetheless, the containment in the spread of these diseases must be spearheaded by hospitality practitioners, and particularly the food and beverage production and service staff [1, 17, 18]. This is on the basis of the problem being more prevalent within the food and beverage sections of hotels as compared to other operational departments, although all front-of-the-house staffs have a role to play in the process of not only eliminating but also minimizing the spread of foodborne illnesses and food intoxications. In general, disease transmission in the global hospitality’s restaurant business remains a significant universal economic problem, public health issue, and restaurant management challenge that needs concerted efforts in order to solve [2]. This is for the reason that hotels have an active role and thus considered to be the hot bed in the spread of diseases from a social point of view. Because the geographic distribution of diseases is dynamic and influenced by ecologic, genetic, and human factors, travel allows humans to interact with micro-organisms and introduce them into new locations and populations [19, 20]. The global spatial mobility therefore has reduced geographic barriers for disease causing micro-organisms as well and heightened the potential for the spread of diseases that can negatively affect the not only the tourism and hospitality’s restaurant industry, but also many other industries across the globe.

Thus, the fear of foodborne illnesses and food intoxication outbreaks require that hotel practitioners must be constantly on the alert not only to detect but also contain any possible outbreaks [5, 21, 22]. They should also be capable of monitoring the trends and initiate preventive mitigations on a day-to-day basis so that they can make the necessary positive adjustments to their operations. This includes being prepared for unforeseen circumstances and changes in their operating environment by practicing and ensuring compliance to food safety and sanitation practices in order to not only mitigate but also prevent the occurrence and spread of these ailments [16, 23]. One way of doing this is by constantly practicing hygiene related control measures, some of which is captured in the occupational safety and public health act, [22, 24]. Thus, it is possible to customize these OSHA requirements within hospitality's food and beverage operations in order to curb the ever-increasing threat of foodborne illnesses. According to Motarjemi and Lelieved [2] the most common foods that caused food poisoning in 2010 are presented in **Figure 1**.

The study results show that many restaurant food items are agents of food poisoning, with eggs and egg products being responsible for 22.1%. This is a clear indication that eggs and egg products are the most hazardous among all the food items prepared and offered for customer consumption in restaurants. Nonetheless, mixed or buffet meals came in second (13.9%), followed by other foods (8.9%), vegetables and juices (8.7%), Crustaceans, shellfish, mollusks and other products thereof (8.5%), bakery products (7.9%), fish and fish products (6.3%), broiler meat and other products thereof (6.0%), Mixed meat and products thereof (6.0%), pork and products thereof (4.9%), bovine meat and products thereof (3.3%), cheese (2.3%), fruit, berries and other products thereof (1.3%). The data results signify that almost all food items served in restaurants have the potential to cause foodborne illnesses if maximum care is not practiced in the process of receiving, storing, preparing and service.



**Figure 1.** Food poisoning 2010 from restaurant foods. (Adopted from Motarjemi and Lelieved [2]).

Moreover, the global burden of food intoxication and foodborne illnesses to public health and to economies has often been underestimated by the various state authorities due to underreporting across many countries of the world and therefore the difficulty to establish causal relationships between food contamination and resulting illness or death. Further, the 2019 World Bank report on the global economic burden of the food intoxication and foodborne illnesses indicates that the total productivity loss associated with these diseases in low- and middle-income countries such as Kenya and many African and Asian Countries, was at US\$ 95.2 billion per year, and the annual cost of incurred in preventive and curative approaches to these illnesses is estimated at US\$ 15 billion [4]. This calls for concerted efforts not only among hospitality practitioners, but across all global industries to help putting in place preventive measures with the aim of minimizing and/or eliminating these diseases for a global economic gain.

### **1.1 Categories of food contamination**

Food poisoning may be categorized in three depending on the contaminant type [25]. These three categories of food poisoning include;

**Chemical poisoning:** Chemical food poisoning may occur when food is contaminated with chemicals substances. It is accidental contamination of food caused by cleaning solvents, pest control sprays, or other chemicals used in entire food production chain [4, 22]. This food may contamination occur when utensils or other tableware are not wiped dry after washing them using cleaning liquids [5, 25, 26]. This may occur either during growth of the food by pesticides, storage especially if storage of food is not separated from chemical substances such as cleaning detergents, or during food preparation and service in a restaurant set-up as a result of negligence food handling by hospitality personnel.

**Physical:** This is accidental in nature and is caused by employee carelessness [4, 22, 26]. The major culprits are air, dust, smoke, and dirt. To prevent this, food must be properly covered and stored.

**Biological:** This is a contamination type resulting from micro-organisms such as bacteria, molds, parasites, and fungi [4, 22]. However, of the most effect are bacteria which are known to cause foodborne illnesses as well as food intoxication if infected food is ingested.

Even though the public health act was meant to protect both clientele as well as hospitality practitioners by enhancing surveillance and building an early warning system; improving responses to foodborne outbreaks; improving risk assessment; developing new research methods for identification, prevention, and control of pathogens; improving inspections and compliance; broaden food hygiene and safety education; and continuation of the long-range planning process, very little has so far been achieved [15]. Food born illnesses as well as food intoxications are so commonly reported not only in Kenya but many countries of the world. Food contamination in many cases has been as a result of poor food handling practices and/or improper food handling by both catering personnel within these outlets [26]. According to Walczak [26], five coping strategies, if applied properly may effectively eliminate the food contamination and menace within hospitality's catering outlets. These strategies include proper maintenance and control of temperature, efficient management and control of the time factor, proper, safe and hygienic food handling procedures, proper and up-to-date restaurant as well as employee hygiene, adequate, proper and standardized cleaning and sanitizing techniques, and the

plan of hazard analysis and critical control points applicable within the restaurant operations cycle.

## **2. Coping strategies**

Foodborne illnesses as well as food intoxication related ailments cause a lot of harm not only to the hospitality industry but also clientele at large. These diseases are widely spread through restaurant foodservice within hotels [26]. The global hospitality industry registers massive losses annually, which results to global economic shrinkage. According to WHO [4], 600 million cases of foodborne illnesses and 420,000 deaths occur annually all over the world, with 30% of foodborne deaths occurring among children under 5 years of age. This is such a huge loss of life and income that calls for urgent and effective intervention in order to curb the trend. For purposes of this chapter, restaurant mitigation strategies against foodborne illnesses will be discussed, as it contributes a huge percentage of food related contamination and therefore foodborne illnesses and intoxication cases.

In relation to the transmission and spread of this disease, restaurant personnel are the most responsible and vulnerable as they are always in close contact with both clients as well as food supplies. This does not only risk the employees but also the hospitality clients who may either contract the disease from infected hotel employees and contaminated foods alike. However, food contamination in restaurants remains the most common explanation of foodborne illnesses and food intoxication in addition to many other factors. This constitutes the basis upon which these infectious ailments are spread and hence risking thousands of lives, both staff and clientele [26]. The industry therefore needs to provide long lasting solutions with the aim of combating the growth and spread of concerned micro-organisms against future outbreaks. The hotel and hospitality organizations have to change their way of operation by adopting strategies that would ensure minimal growth and spread of pathogens.

In an attempt to address the global effects of foodborne illnesses and food intoxications, various food-safety related coping strategies have been effectively proposed for application within the restaurant sector with the main aim being to minimize the multiplication and spread of foodborne infections via hospitality's restaurant operation related services. Basing on various studies on foodborne infections, hospitality's restaurant management needs to focus more on the coping strategies in order to break microbial cycle and therefore effectively address these infections. Thus, in view of the restaurants' food service systems, five basic strategies were tested, approved and proposed for adoption, in which food service personnel may try to prevent customers as well as restaurant service providers from getting sick. These strategies include; time and temperature control, safe food handling procedures, good employee hygiene, cleaning and sanitizing techniques, and a Hazard Analysis and Critical Control Points (HACCP) plan. These are critical control measures that front-of-the house hotel personnel must embrace in order to suppress the spread of these diseases.

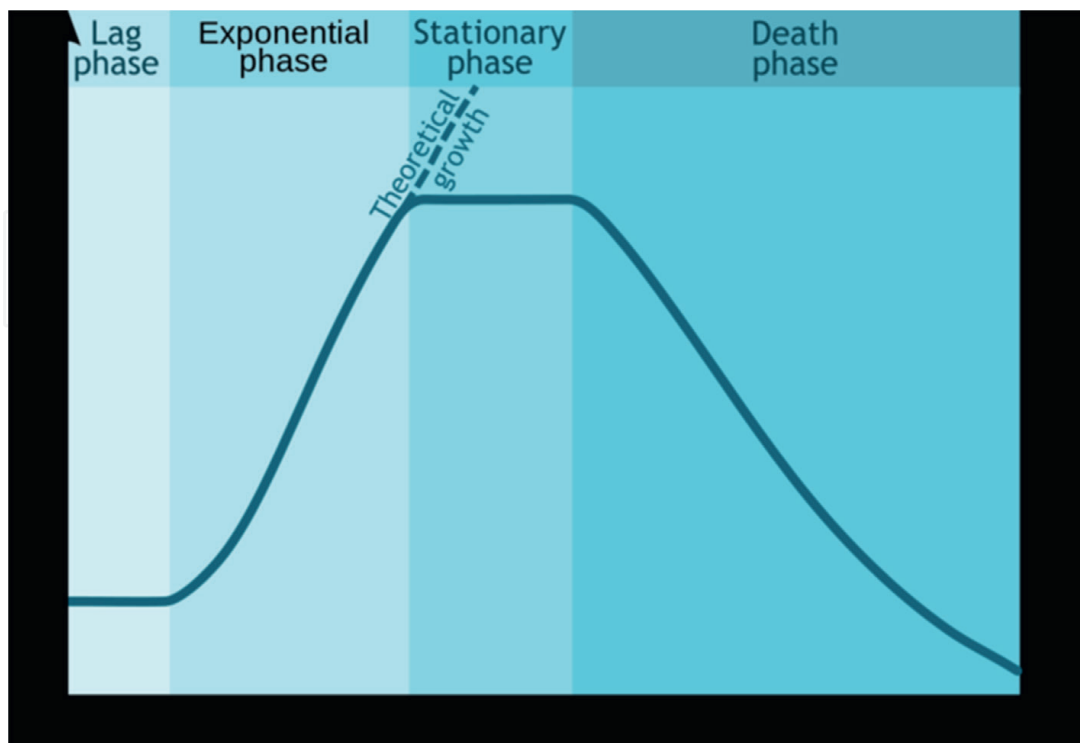
### **2.1 Time and temperature control**

Micro-organisms generally thrive well under favorable temperatures, preferably the temperature danger zone [25]. Nonetheless, time is also needed for the micro-organisms to grow and thus increase in numbers, capable enough to cause diseases. Time and temperature are therefore fundamental factors for the growth,

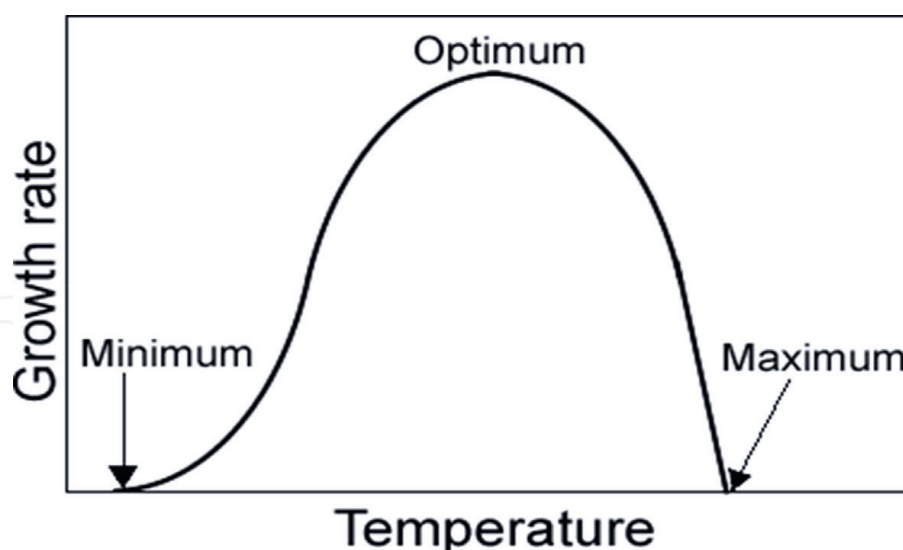
multiplication and survival of micro-organisms. When considering growth rates of microbial pathogens, in addition to temperature, time is a critical consideration [25]. At optimal temperatures over moderately long-time duration, micro-organisms can multiply very quickly and this normally happens at satisfactory temperature, mainly within the temperature danger zone. By holding at temperatures below 4°C or above 60°C, the growth of micro-organisms is slowed down or stopped.

In essence, lower temperatures below 4°C makes micro-organisms inactive and therefore reduce their multiplication. This limits further reproduction and therefore multiplication of the microbes and thus minimizing their pathogenic effect in food. On the other hand, temperatures above 60°C denatures micro-organisms. This would lead to their depletion with time and therefore eliminated from food substances which as well eliminates their pathogenic effect. Thus bacteria, fungi and viruses have a defined temperature range in which they flourish, with a minimum, maximum, and optimum temperature levels. Nonetheless, temperature danger zone, at which the reproduction and growth of microbes is at its optimal level, is the cornerstone of any restaurant food safety program. Thus, a clear comprehension of the interaction between time, temperature, and other inherent and extrinsic aspects is crucial for the successful manipulation and therefore, control, destruction and elimination of infection of any diseases that may arise out of these microbes. **Figure 2** below illustrates the reproduction and/or multiplication of micro-organisms with time.

At the very initial stages of infestation, the microbes are fewer in number (Lag phase). With the right conditions, they exponentially reproduce and therefore increase rapidly in numbers with time (exponential phase) until at the level when they are so many that they begin to compete for the available nutrients and thus reproduction and growth stops (Stationary phase). Since the microbes are so many in numbers, the available nutrients start getting depleted with time as competition for



**Figure 2.** Bacterial growth curve. (Adopted from Motarjemi and Lelieved [2]).



**Figure 3.**  
*Bacterial growth curve (number-temperature effect). (Adopted from Motarjemi and Lelieved [2]).*

the same intensifies and therefore the same microbes declining in numbers (Decline/Death phase).

On the other hand, studies into the effect of temperature on the multiplication and/or reproduction of microbes have shown almost similar results for the bacterial growth curve as in **Figure 2** above. Thus, in consideration of temperature, the results have yielded outputs as illustrated in **Figure 3** above.

At lower temperatures (below 5°C), the microbes are at their minimal reproduction and/or growth rate is at its minimal. This could be explained by the inactivating effect of lower temperatures on microbes. As the temperatures increases, the growth rate of the microbes increases exponentially as well until the temperatures hits 40°C (optimal temperature) which do not yield any significant increase in the microbial load. Further increase in temperature above 40°C will see the microbes reduce in number. Further increase in temperature up to 60°C will see the microbial load drop to zero in number (maximum temperature). This is because from 40°C and above, the micro-organisms are denatured and completely eliminated at 60°C.

Previous studies on many foodborne illnesses and food intoxications suggest that warm temperature increases the intensity of transmission [11]. Thus, these study results confirms that temperature and time are important factors in the spread of many foodborne illnesses and food intoxications, hence higher infection rates translate into a greater number of individuals who experienced multiple infections and thereby may have an elevated risk for not only developing serious illnesses but also spreading the infections. Thus, increasing temperature to a certain level would lead to diminishing survival of the microbes and therefore an important factor which may be adopted by hospitality's restaurant operators for not only minimizing the spread but also eliminate these illnesses. From the study findings therefore it's apparent that increases in temperatures leads to destruction of microbes causing foodborne illnesses and food intoxications.

It is therefore imperative for hospitality practitioners to apply the effects of temperature in minimizing the spread of foodborne illnesses. This could be achieved through proper handling of food service equipment and the food service processes. Before handling any food service equipment, food service employees must first ensure high personal hygiene. Cutlery should be well taken care of by first soaking in



hot soapy water in addition to vinegar and/or lemon juice for purposes of disinfecting [5, 24, 27]. They should be well rinsed and drip-dried after which they should be wiped clean using a sanitized piece of linen. Linen should be washed properly using disinfectants and pressed before use. Hand towels must be pre-heated well before being used by clients. Crockery should as well be correctly cleaned using warm soapy water, dried and wiped with a sanitized piece of linen too. Further, service of hot food must be carried out on hot crockery while cold food must be on cold crockery. This implies that dinner plates, soup and/or consommé' cups, tea/coffee cups etc. must be pre-heated before being used to serve food for the client. On the other hand, glasses must be chilled before service of cold drinks to the client. All these will ensure alteration of temperature which perhaps is one of the most effective applicable strategies in minimizing and may be eliminating microbial contamination which results in food-borne illness and food intoxications.

## **2.2 Safe food handling procedures**

For all food businesses including restaurants, retail foodservice, fast-food, hospital, cafeterias, cafes, messes etc., food safety policies and procedures must be seriously adhered to in order to minimize, if not, eliminate contamination and thus foodborne disease outbreaks. The origin of microbial contaminants in food includes the food itself or its source, the environment, cross-contamination or an infected food handler. Contamination from microorganisms can be responsible for foodborne disease outbreaks passed from food workers to consumers via food. It is therefore important for hospitality personnel to understand the theory and practicalities of safe food handling procedures, and apply the same in the food production-service cycle within both commercial and non-commercial food outlets. Thus, a critical review of purchasing, receiving, storage, issuance, preparation and service of food is an important approach in order to ensure safe and healthy food production and service.

Many countries have statutory regulations in relation to safe food handling requirements and procedures. In Kenya for example, the public health Act 2012 stipulates guidelines as far as safe handling of food is concerned [5, 15]. It is this act that provides important guidelines for animal slaughter, transportation of the carcass, preparation and cooking of meat and allied products. Thus, the act provides well-structured procedures and practices related to safe handling of food, over and above the carcasses that are fit for human consumption. It is therefore a legal requirement that all food-related businesses conform to the requirements of this act, and ensure that food is free from contamination and minimize food poisoning incidents. Thus, the act provides guidelines to ensure sound food safety practices, identify food safety hazards, and reduce the likelihood of foodborne illnesses and food intoxications. Thus, in accordance with the Public Health Act, various issues must be reinforced including personal hygiene for the food handlers, reporting the presence of any suspected illness, continuous education as well as regular medical certification, which applies to all food handlers within the larger restaurant operations business [5, 15].

Nonetheless, food source is as important and safe as the food itself. This implies that proper due diligence is important at the very initial stages of sourcing for supplies. This requires a critical review of the environment in which the food source is nurtured, the feeding and care process as well as the pathological history of the breed and/or species from which the food is harvested. Food should therefore be sourced and supplied from approved, reliable and reputable sources. Thereafter, food supplies must be promptly identified and moved to proper and appropriate

storage areas within the food outlet upon receipt. This is important in facilitating the process of tracing the affected products in the event of a recall or food incident. Sourcing, purchasing, storage, issuing and consumption of food from un-approved food suppliers and distributors is a threat to the safety of food held and offered by the food service organization. Therefore, only reputable suppliers should be engaged for the supply of food after due diligence by the relevant authorities for approval. Additionally, food and raw materials should be stored off the floor and first-in-first-out (FIFO) or Last in First Out (LIFO) principle applied appropriately to minimize the growth of microorganisms and to prevent food from becoming unsafe or unsuitable during their expected shelf-lives. Further, food outlets should develop systems in order to effectively and efficiently manage stocks appropriately from receiving, storage, production and service. Foods that have been received and/or issued from storage should take the minimal time on work surfaces before being prepared and presented for service. Nonetheless, food should be held at proper temperature during the sale and service time.

Temperature control has yielded fruits as evidenced from previous studies. Thus, food must be kept at proper temperature during delivery, storage, display, sale and consumption to suppress bacteria, viruses and fungi from multiplying to an unsafe level [2, 22]. The temperature inside the refrigerator should be kept at or below 4°C and the freezer at or below -18°C. The temperature inside the refrigerator should be controlled and monitored regularly by the stipulated staff within the organization [5, 22, 26]. Further, frozen food should be thawed properly and completely to minimize the growth of food poisoning microbes and toxin production. Prevention of cross-contamination between raw and cooked or ready-to-eat food should be by separate handling (e.g., using separate knives and chopping boards) and storage [2, 22].

Food should also be properly protected during storage, preparation, display, service and transportation to prevent contamination by equipment, utensils and personnel as the transfer of micro-organisms from one food (usually raw) to another is one of the major causes of foodborne illnesses [3, 14]. Further, food should be cooked thoroughly and/or appropriately marinated before consumption in order to ensure food safety [2-5, 22]. The center or the thickest part of the food needs to reach 75°C for 15 seconds to destroy any micro-organism causing foodborne diseases, although heating food to a lower temperature for longer periods of time may be equally effective. Food that previously cooked and cooled should be reheated thoroughly before service or consumption to minimize the time that cooked food is exposed to the temperature danger zone (between 4°C and 60°C) which allows not only pathogenic bacteria but also viruses and fungi to grow during the reheating process [14, 19].

However, vegetables should only be sautéed to ensure that nutrients and especially vitamins are not lost through the process of cooking. This calls for proper hygiene practices, by washing vegetables properly and several times, and blanching them before finishing for presentation and service. Vegetable salads and fruits must be handled with caution, right away from sourcing, transportation, storage, preparation and service. Ensure that vegetables and fruits to be used in the preparation of vegetable and/or fruit salads and allied menu items are properly washed, several times before cutting. The food handler must wear gloves while preparing vegetable and/or fruit salads and allied products, and minimize handling of the salads with hands, but instead use a folk and table spoon for mixing. Ensure that your vegetable salad is well dressed with vinegar, lime or lemon juice, and should be kept frozen before service. All dressings for vegetable salads must be from reputable and approved sources.

### **2.3 Good employee-clientele hygiene**

Infected workers and personal hygiene account for about twenty-five per- cent of foodborne illness out-break. Employees cannot work with food unless they have a clean bill of health. According to Calcador as well as Knowles [14, 19], good personal hygiene means employees must learn how and when to wash their hands properly. Their uniforms and aprons must be kept clean and should be worn only in designated areas [19]. Uniforms should not be worn to and from work, and aprons should not be worn to the bathroom. Employees must ensure they take a bath before service and every time they are engaged in heavy tasks leading to sweating and may be cross contamination [5, 11, 25].

The existing legal responsibilities of food handlers in connection with the prevention of transmission of micro-organisms encompass personal hygiene, illness reporting and not working if a possible source of infection relevant to food safety is suspected. Food handler obligations relating to personal hygiene must be included in the food service staff training schedules that should be well planned and administered by the restaurant food service managers of every hospitality's catering organization. They should cover personal hygiene, in particular proper hand washing, clean and hygienic clothing, hygienic maintenance of equipment and general hygiene measures encompassing the facility, restaurant food service staff as well as the food service clientele. Thus, in an effort to combat the ever-rising foodborne illnesses within the hospitality's restaurant set-up, every person working in a food service area must maintain a high degree of personal cleanliness and should wear suitable, clean and, where appropriate, protective clothing. Food handlers whose work involves touching unwrapped foods to be consumed raw or without further cooking or other forms of treatment have been identified as a particular risk group and this explains the concern on personal hygiene of the kitchen brigade. Other requirements like washing hands properly after visiting the washrooms, smoking as well as handling refuse must be adhered to strictly.

In summary, Lillicrap and Cousins [25] among many other authors postulates that food service staff must portray proper professional and hygienic appearance. Thus, all food service staff MUST put into consideration the following factors;

- a. Staff should be clean and use deodorants, NOT strong-smelling perfumes
- b. Aftershave and perfumes should be avoided, and if NOT, then should not be too strong
- c. Hands should always be clean, free from nicotine stains and with clean well-trimmed nails
- d. Men should normally be clean shaven
- e. Women should only wear light make-up
- f. Uniform should be clean, starched and neatly pressed
- g. Hair MUST be clean and well groomed
- h. Shoes MUST be comfortable and clean, and of a plain neat design

- i. Staff must brush their teeth after every meal
- j. Any cuts and/or burns should be covered with waterproof dressings
- k. Any colds and/or other infections among staff should be reported immediately
- l. Staff should wash hand immediately after using the toilet, smoking or dealing with refuse
- m. Staff must avoid any mannerisms such as running fingers through hair, chewing gum, or scratching the face

## **2.4 Cleaning and sanitizing techniques**

Proper cleaning and sanitizing techniques can also be effectively used to combat the spread of contagious illness within the global hospitality operations. Food personnel should be sensitized not to use side towels or sponges to clean or sanitize knives, cutting boards, and work stations as this could be a vehicle for further spread of contagious illnesses within hospitality's restaurant operations. Instead, proper cleaning and sanitization mechanisms should be put in to consideration, with the aim of not only minimizing but also bringing to a halt the spontaneous spread of foodborne ailments. Time and temperature considerations are necessary factors in the cleaning and sanitization process of crockery, silverware, cutlery, linen and other food service equipment, either manually or by use of relevant equipment, water and detergents. This should also be made common among food and beverage production and service staff in order to address cross contamination of microbes. Food service equipment washed by hand must be air-dried and given ample time before they are utilized in the food production-service cycle.

Hand wash products including un-medicated (plain) soaps, medicated soaps and alcohol hand disinfectants should be provided and used by both the food service staff as well as patrons. A number of studies have been carried out to evaluate the effectiveness of a variety of such hand wash products. According to the National Disease Surveillance Centre [5], there has been no standardized approach to evaluating the effectiveness of these hand wash products, and therefore making comparisons between studies on these products is difficult. According to Larson, Mayur and Laughon [24, 28], plain soaps are detergent-based cleansers that have no bactericidal activity and, by mechanical action, are used for the physical removal of dirt. However, studies have shown that washing with plain soap and water has been shown to be effective in mechanically removing transient microorganisms from the hands [2, 5, 24, 28]. Nonetheless, plain soaps are considered to be sufficient to remove transient microorganisms from the hands of food employees as well as patrons and thus eliminating the spread of foodborne diseases [4, 26]. In addition, plain soaps are gentle on skin, are non-allergenic and are cosmetically acceptable –important factors in promoting hand washing compliance.

On the other hand, medicated soaps contain ingredients active against microorganisms and are used for the mechanical removal and killing or inhibition of both transient and resident micro-organisms [16, 28]. Thus, according to studies by Fendler, Dolan & Williams [16], antimicrobial hand washing agents were found to yield considerable effectiveness in not only suppressing the growth and development cycle of micro-organisms, but also destroying (killing) them. Therefore, these

agents have shown a great potential, basing on the outcome of previous studies in providing outstanding antimicrobial activity for over a period of several days and/or hours [4, 14, 16, 28]. Nonetheless, the antimicrobial effectiveness of medicated soaps has been proven to increase with multiple applications over a number of days. This is mainly of particular relevance when a long-term reduction and/or elimination of the colonizing micro flora is needed. However, the impacts of repeated hand washing with chemical substances, which might be harsh to the human skin and body. This is in view of the sustainability of these products as well as their irritant effect not only to food workers hands but also to restaurant clientele, and therefore require intensive fact-finding, evaluation, as well as investigation prior to consideration. Larson carried out a study review on the effects of hygiene by skin products found that the integrity of the skin could be damaged by excessive washing with antiseptic preparations [28]. The explanation could be pegged on the common chemicals used in the manufacture of these chemical products, which has a broad spectrum of activity and a relatively low skin-irritation, but which may magnify on continual use. The use of plain soap by food handlers as well as restaurant patrons for hand washing should be adequate for removing transient micro-organisms. Further, soap may also be beneficial as it avoids the risks of excessive drying and irritation leading to dermatitis [28].

Conversely, alcohol-based sanitizers may also be applied instead of hand washing, although it is only effective when used on physically clean hands. These sanitizers are known for providing a rapid reduction in skin micro-organisms [5]. Larson [28] contents that alcohol-based formulations have been recommended in preference to detergent based products for health care workers. However, the literature available is minimal on the use of these products in the food service organizations by both food handlers as well as patrons. But still, as a measure to save on the cost of water bills, this could be the better option instead of hand washing. Nonetheless, alcohol solutions have been shown to have a very drying effect on the skin causing skin irritation, although many commercially produced products now contain emollients to solve the problem of drying effect of these products, [28]. While alcohol formulations containing 70% alcohols have been found to be effective in reducing the numbers, recent research has shown that washing hands with a mild soap was more effective than applying a 70% alcohol hand sanitizer [11, 12].

## **2.5 Hazard analysis critical control point plan**

Hazard Analysis and Critical Control Points (HACCP) is the name of a wide-ranging hazard analysis methodology in combination of critical point prevention-based food safety system that is commonly, effectively and efficiently applied by food handlers in any food related organization, including hospitality's restaurant business. This program was developed by the Pillsbury Company in the 1960s for the U. S. space program but currently utilized in almost all global food related production and service organizations including hospitality's restaurant sector [22]. This is because of the effectiveness of the program in containing foodborne illnesses and food intoxication if properly applied and adhered to. HACCP is a seven principles plan aimed at achieving the stated goal. These seven principles are;

- i. Hazard analysis
- ii. Critical control point identification

- iii. Establishing critical limits
- iv. Monitoring procedures
- v. Corrective action
- vi. Verification procedures
- vii. Record keeping and documentation

Thus, HACCPs seven principles provides guidelines for effectively dealing and eliminating biological hazards and therefore foodborne illnesses. A good application of this system may be traced in the United States where federal law requires that all meat and poultry producers including food service businesses must adopt a HACCP system. Nonetheless, similar legislative frameworks have trickled to other countries of the world. Loken [22] further argues that HACCP is the cornerstone of a paradigm shift that is occurring at the retail level, indeed an indication of HACCP application at the lowest level of food distribution cycle. The original ancient food safety paradigm was based on a sanitation program according to a 44-point inspection system which included issues ranging from covering and refrigerating all foods, requiring hair restraints for all food preparation and service employees, cleaning and sanitizing the physical environment, and monitoring hot and cold temperatures [3, 19]. All these was aimed at minimizing and further checking off microbial activity as well as cross contamination.

The proposal in the new food safety model however focuses on HACCP as a food safety system designed to prevent foodborne as well food intoxication associated diseases and therefore a perfect tool in containing the current scourge of foodborne related illnesses [2, 4, 5, 14, 26]. Proper utilization of HACCP within hospitality's restaurant operations may yield an amalgam of positive results, especially in an attempt to contain the spread of foodborne illnesses and intoxications. In this system, all foods are cooled rapidly, covered, and then refrigerated thus making use of temperature control in eliminating micro-organisms. A combination of safe food handling practices and hand washing are critical and therefore must be observed and adhered to the latter for the achievement of effective results. Consequently, according to the HACCP principle, food safety is a continuous and thus ongoing process, yielding the HACCP cycle. In accordance to the seven steps in the HACCP system, food service managers must identify the potential food safety hazard and critical control points (CCPs), establish control and monitoring procedures, take corrective actions, keep accurate records, and verify the system is working properly. Thus, by applying the seven steps, food service business would be able to effectively combat any threat from the micro-world that would cause foodborne illnesses and intoxication.

### **3. Conclusion**

Foodborne related diseases are a threat not only to the hospitality's restaurant operations but to the entire foodservice industry. This is as a result of loss of life, increased production costs incurred in the control of the same illnesses, increased costs incurred in legal tussles, loss of goodwill from clients as a result of the bad reputation these organizations would have with the public. It is therefore important

for organization to apply relevant coping strategies to combat these threats caused by foodborne illnesses and intoxications on a timely basis. Thus, in order to deal with the threat posed by these contagious diseases, hospitality's restaurant personnel can effectively apply five coping strategies in order to battle out this pandemic. These five coping strategies includes temperature and time monitoring which helps in eliminating the micro-organisms, Safe food handling which is key in the control of cross contamination, good employee-clientele hygiene for minimizing and/or eliminating cross contamination and transfer of micro-organisms, cleaning and sanitizing techniques for eliminating the micro-organisms, and lastly the Hazard Analysis Critical Control Points, which is a wide-ranging hazard analysis and critical point prevention-based food safety system that can effectively be applied in the food service cycle to prevent the occurrence of any foodborne diseases based on the identified critical control points. Accordingly, in order for a hospitality's restaurant organization to achieve safety, these five coping strategies must be fully adopted and applied appropriately within their operations. This implies that every foodservice organization has a responsibility while employees as well as clientele within these organizations have an obligation, with the basic principle of care to minimize and/or eliminate the spread of foodborne illnesses and food intoxications. It is therefore a combined responsibility among restaurant employees, the management, clientele as well as the government to ensure that these coping strategies are fully implemented for positive results.


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