

EFFECT OF HYGIENE AND SAFETY IN FOOD AND BEVERAGE SERVICE AREA OF CATERING ESTABLISHMENT IN UMUAHIA ABIA-STATE, NIGERIA.

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Abstract

The study deals with the effect of hygiene and safety in the food and beverage service area of catering establishments in Umuahia, Abia- State Nigeria. The specific objectives were; determining the microbial load of foods consumed in catering establishments, examining food safety control measures applied in catering establishments and establishing the viability of implementing a HACCP system as a strategy for quality control in catering establishments among others. To achieve these objectives, a cross-sectional descriptive survey was used, to investigate food safety, hygiene standards and possible implementation of HACCP as a strategy for quality control in catering establishments in Umuahia. The researchers adopted primary source of data through the use of well- structured questionnaire, interview and microbial level on foods prepared and served in the restaurants. An observation schedule was used to supplement data from questionnaires and interviews, which covered the receipt of food materials, storage, preparation, production and service. The findings revealed that there is need to establish HACCP system as a strategy for quality control in the catering establishment. The study concludes that the majority of the catering owners are not or fully aware of the HACCP system in formal set-ups. All foodservice owners did not have a HACCP program in place and many were unsure of what it was or how to apply the principles to their operation. This leads to challenges of implementing these programs and efforts need to be made to overcome these challenges. However, the study recommends that managers, staff and other stakeholders need information and proper training to advocate for food safety issues and for decision-making in food safety control systems within food unit.

Keywords: Hygiene, Safety, Service, Food, Beverage and Sanitation.

Introduction

Hygiene in a catering establishment refers to the general cleanliness of the environment and people in the work situation, while safety involves the concern for providing conditions at work that will protect people from food infection, injury and theft. Concerning infection and infestation kitchens provide all the conditions necessary for the growth of microorganisms such as

food humidity and the right temperature (Lah, 2016). To practice proper hygiene and safety it is important to build it into catering environment right from the point where the site for food service is being examined, through the designing stage of the kitchen, service, storage and disposal areas, to the establishment of procedures for ensuring good food handling practices throughout the meal production and service process. Food is an essential part of life, but if it is contaminated it can cause illness even death, and food can be contaminated with toxic substances from outside or even it is already in the food itself. There are possibilities of contamination with microbiological, chemical and/or physical hazards with or without the growth of microorganisms in each step of food preparations.

Rhodehamel (1992) cited the definition of hazard from The National Advisory Committee on Microbiological Criteria for Foods (NACMCF) as any biological, chemical or physical property that may cause unacceptable consumers health risks.

Food safety plays a significant role in the economic and health development of Nations by safe guarding the nation's health, enhancing tourism and international trade, the production, distribution and consumption of safe food (WHO, 2002). Despite the importance of food safety, there seem to be few quality control systems to guard against food-related illnesses, in developing countries, some of which may be fatal while others can lead to expensive medical care. The magnitude of food borne diseases is illustrated by various statistics (Snyder, 1992). Illnesses from food related diseases outnumber illness from all other environmental factors combined. Over 66% of food-borne illnesses are caused by bacterial pathogens (Byran, 1992).

Worldwide, the incidences of diarrhoeal diseases alone have been estimated to be 400 million cases per year, which indicates a serious underlying food safety problem (Byran, 1992). The direct cost of foodborne illness outbreak can approximate \$75,000 per food service establishment and these can include investigation clean- up, restaffing, restocking, product loss, settlements and increased regulatory sanctions (Hannington, 1992). In Kenya, incidences of food borne illnesses reported from 1997 to 2003 were 1,492,690 cases that caused 604 deaths (Gordon, 2011). In the year 2004, there were 11,849 reported cases. In Thika District Hospital, diarrhoea, intestinal worms and typhoid are among the top ten leading causes of hospitalization.

While these statistics point to the possible hazards of poor food safety guidelines, research shows that the food safety regulations and risk management measures in developing countries are not well-implemented (Dhamija, 1979). Dhamija attributes this to a lack of understanding of the regulations and measures for the food industry by consumers and other stakeholders in society.

FAO/WHO (2002) main objective is to ensure nutritional and safe food for all people at all times for productive and healthy life. Food service operators have a major responsibility since their actions can affect the health

of many people. Food-borne diseases are major public health problem estimated to affect up to 10% or more of the population in the industrialised countries (WHO, 2005). Food and water-borne diseases in the developing countries are prevalent and epidemiological examinations have indicated large proportions of food-borne diseases which result from poor food sanitation and unhygienic handling of foods in restaurants and other eating outlets (Antoria, 2002).

Hazard Analysis and Critical Control Points (HACCP) has been endorsed by the National Academy of Sciences, the Codex Alimentarius Commission which is an international food standard-setting organization, and the National Advisory Committee on microbiological criteria for foods (ICMSF, 1980). It is the best system available for designing programmes to assist food firms in producing foods that are safe to consume (Food Codex, 1995). The biggest advantage of HACCP over the other systems is that it pre-empted all the activities in the food process thus reducing risks of food-borne diseases. According to Taber (1993), the hazard of any material is determined by chemical, physical and biological properties.

Processing and preparing can be a risky business and precautions must be implemented to prevent problems and to correct them if they do occur. HACCP, a system for ensuring food safety, was developed in 1971 in a cooperative effort by the United States Army Natick Laboratories, the National Aeronautics and Space Administration and the Pillsbury Company (Pierson & Corlett, 1992). The system is endorsed as an effective and rational means of assuring food safety from harvest to consumption. Preventing problems from occurring is the basis of the HACCP system. It is termed superior to all the conventional food microbiological quality control procedures in the market because it only addresses significant food safety hazards. Nairobi Airport Services, which serves international airlines on the ground and in the air in Kenya, operates a HACCP system (Personal Observation, 2008).

The system employs several principles to meet the stated goals. These principles include hazard analysis, CCP identification, establishing critical limits, monitoring procedures, corrective actions, verification procedures and record-keeping and documentation. When organizing and setting up the HACCP programme, each step is important and necessary for the assurance of a safe, high quality finished product(s). Estimates of the present value of 20 years of HACCP-program benefits reported range from \$1.9 to \$171.8 billion in 1995 dollars. These are costs saving benefits (Crutchfield *et al.* (1997).

The HACCP system must be developed by each food establishment and tailored to its product, processing and distribution conditions (WHO, 2005). The Codex Alimentarius Commission and its subsidiary bodies have discussed the need for a code of hygiene practices for street foods and restaurants. The Ministry of Health and major local authorities have put very few policies in place to ensure that the risk of disease communication is contained and food safety is enhanced (FAO, 2005). For instance, they have

tended to rely on legislation that seeks to provide a framework for food safety inspection which, unlike a HACCP system, is not proactive and preventive. The Foods, Drugs and Chemical Substance Act, cap 242 of Kenya, may not provide an adequate supervisory framework for food establishments that need to improve on their efforts to enhance product quality.

This may be as a result of inadequate food safety inspections and controls by the government agencies and lack of awareness and participation by stakeholders such as consumers, NGO's, print and electronic media publications that would otherwise facilitate the understanding of food safety. The importance of investigating the possibility of introducing a HACCP system of monitoring and evaluating food safety, in urban restaurants, is clear from their role in the food chain in large urban populations.

Byran (1992) emphasizes that food safety concerns are magnified when an outlet prepares foods from raw materials and points out that foods mostly involved in the outbreaks of diseases include milk and milk products, vegetables, salads and puddings, meat and meat products among others. Perhaps the introduction of a HACCP system could improve and reduce the incidence of food poisoning in urban restaurants. It can also aid inspection by regulatory authorities and promote international trade by increasing confidence in food safety. It provides a more specific and critical approach to the control of microbiological hazards in foods than that provided by traditional inspection and quality control approaches.

Statement of the Problem

The significant role of food safety and hygiene in the economic and health development of the nation, in enhancing tourism, national and international trade is acknowledged (FAO/WHO, 2001). While food safety systems based on HACCP principles have been successfully applied in food service operations and have been universally accepted by government agencies, trade associations and the food industry around the world.

Studies on food safety and hygiene have tended to focus on regulations and measures required to develop and enforce the food safety regulations, education and technical sophistication to be applied by food processors for HACCP to be accomplished (Corlett, 1998). This may suggest a need for a study to determine if urban restaurants are ready to introduce a HACCP system of food safety assurance. The need to investigate the possibility of introducing a HACCP system, for restaurants, aroused from the fact that a HACCP system must be developed by each sector, such as urban food establishments and tailored to their products, processing and distribution conditions.

For a HACCP programme to be successful, management must be committed to the systems which indicate an awareness of the benefits and costs of the system which includes education and training of the employees. The current study provides insight into the possibility of catering

establishments succeeding in implementing a HACCP system of food safety assurance.

Objectives of the Study

General Objective

To examine the effect of hygiene and safety of food and beverage service area in catering establishments.

Specific Objectives

1. To determine the microbial load of foods consumed in catering establishments
2. To examine food safety control measures applied in catering establishments.
3. To establish the viability of implementing a HACCP system as a strategy for quality control in catering establishments.
4. Determine awareness of sanitation standard operating procedure.

Research Questions

- i. The following research questions guided the study
- ii. What are the microbial loads of foods consumed in catering establishments?
- iii. What are the food safety control measures applied in catering establishments?
- iv. Is there a prospect of implementing a HACCP system as a strategy for quality control in catering establishments?
- v. Is there an awareness of sanitation standard operations procedures by workers?

Significance of the Study

The results will be of importance to several parties. First, the management of catering establishments will find the information on the analysis of the manufacturing practices such as food preparation, production and service useful in identifying the critical stages of contamination that require systematic control.

Health regulatory authorities and the urban council will have the information to establish policies for implementing good manufacturing and hygiene practices and a HACCP system of quality control. In particular, the feasibility of a HACCP system may be an indication of the possibility of enforcing laws relating to it being mandatory. The public health offices can also find the results useful in conducting training on HACCP for urban restaurant owners, employees and their suppliers.

Further, policy-makers will also be able to identify factors that influence the slow application of HACCP in the restaurants and also the main resource groups that are required to disseminate the information in form of

training, legal application and research study to the consumer at a time when demands for food safety are increasing and confidence in services of restaurants falling.

To the researchers in food safety, the study could shed more light on the viability of a HACCP system and point at the future direction of inquiry in the discipline. Its exploratory nature will provide a basis for further research aimed at isolating the causality between the various variables considered in the study. For instance, future studies may aim to look at the nature of relationship between the level of microbial contamination and food safety practices of urban restaurants.

Literature Review

Global Perspective on Food Safety

Food safety development (FSD) strives to reduce the serious negative impact of food-borne diseases worldwide (Gordon, 2011). Food and waterborne diarrhoeal diseases are leading causes of illness and death in less developed countries, responsible for affecting 1.8 million people annually. Recent trends in global food production, processing, distribution and preparation are creating an increasing demand for food safety research to ensure a safer global food supply. WHO works closely with FAO (2002) to address food safety issues along the entire food production chain by the use of HACCP system. These methods provide efficient, science-based tools to improve food safety, thereby benefiting both public health and economic development.

To improve food safety and strengthen consumer confidence, concerns over safety and quality for governments, food producers, industrial traders and consumer are increasing. The burden of food-borne diseases is significant in all parts of the world. In the European region, some food safety and quality problems have endangered consumer health. Food can be contaminated by water used as an ingredient (Ilboudo & Traoré, 2005). In theory, food poisoning is hundred percent (100%) preventable. Food sanitation also extends to keeping the preparation area clean and relatively germ-free. Mixing bowls, spoons, paring knives and any other tools used in the kitchen should be washed thoroughly before use. Kitchen countertops and cutting boards should also be cleaned and sterilized from time to time. Keeping a sanitary workplace will also cut down on the chances of some type of foodborne illnesses from developing when people consume a prepared food (Monney *et al.*, 2013).

Food contamination occurs most commonly from excreta on people's fingers, flies etc (i.e. faeco-oral transmission). Food contamination may also occur by skin infection especially the hands of food-handlers (staphylococcal food poisoning), consumption of diseased animals (tape worm, brucellosis etc) or chemicals used as pesticides on crops.

The presence of litter and domestic animals in and around vending areas has been observed in some of these areas where food tested showed

parasitic contaminations. Catering establishments, who did not have adequate means of disposing refuse dumped them in nearby gutters; the end result is the presence of flies at the vending site with inadequate food protection (Lah, 2016). Poor environmental conditions in Nigeria such as the dusty roads along which food vendors operate offer good settings for bacterial growth. Several factors have been found to impact the risk of food contamination. These include but are not limited to food type, pH, a process of preparation, water availability, the degree of handling, exposure temperature, and holding time (Campbell, 2011). It is therefore recommended that food service workers desist from the use of fabrics, cloths, dish towel or apron for hand drying because it can quickly accumulate a large population of microorganism, especially when left moist and their use can actually increase food contamination rather than reduce it.

On issues relating to the use of raw vegetables, it is known that some food vendors treat them with vinegar or salt solution; but most of the time these vegetables are washed with only water or cleaned with napkins. Under such conditions, most of the disease-causing organisms still remain on the fresh vegetables and cause foodborne diseases once they are ingested. In most cases, these food vendors usually do not have training in food handling and on hygienic ways of handling food. This trend of affairs might be attributed to the fact that the majority of the catering establishment were only trained at home from parents or guardians (Esen and Owusu, 2013).

Essential Food Safety and Hygiene Practices Which Must Be Kept in Mind as Stated by (Christy, 2015)

1. Wear proper clothing and footwear

It is always important that employees wear garments that are suitable for their job, which in this case is the food processing industry. Wearing proper clothing and footwear for food processing is the best way to maintain the cleanliness of food which is particularly important when working in an industry such as a hotel where standards need to be kept high. Any employees in the catering establishment who deals with processing food should wear impermeable gloves as they are a necessity that should be kept clean and sanitized at all times to prevent the spread of bacteria. As well as that, all jewelry must be removed when dealing with food, because jewelry could be the main source of negative microorganisms. Wearing proper footwear is a standard followed by any food manufacturing company. Wearing the correct footwear, which is sturdy, clean and comfortable is a must. Any footwear worn in the food processing environment within the hotel must not cross-contaminate areas, therefore it is best to dedicate one pair of shoes to be worn solely in the kitchen and not worn anywhere else. Wearing the proper clothes is also a standard followed by all food manufacturing companies. The proper clothing includes wearing an apron, coat, hairnet and gloves while working to ensure no food gets contaminated or it could make customers ill. If a uniform is required to be worn in the kitchen of the hotel, then more than one uniform

should be purchased for each person so that the uniform is cleaned regularly. Finally, you must also ensure that you have hair and facial hair protection on at all times when cooking and preparing food as this is another basic hygiene practice that must be followed at all times. By ensuring that you do these, you can keep yourself, customers, as well as the food you are manufacturing, clean and uncontaminated.

2. Keep your hands clean

Keeping your hands clean is an absolute must in any industry as it is a daily process for us all. Predominantly, keeping your hands clean in food processing within hotels is required as it can prevent the spread of diseases and hotels to ensure clean environments. Cleaning your hands is a way for you to combat possible bacteria and contaminating agents inside the workplace. It is also a basic method to avoid diseases coming from other workers in the area. Because of this, if you work in the food processing industry then you must ensure that you wash your hands before working, after lunch, after a toilet break or any time that your hands touch food or cigarettes. In other words, all workers in the industry must wash their hands before revisiting their workstations in the kitchen. All catering establishments should place the process of handwashing around the facilities to ensure that all staff, particularly the ones working in the food industry, and all customers wash their hands properly with soap and warm water to prevent contamination and prevent anyone from getting ill.

3. Ensure that the tools and equipment are clean and sanitised

Another practice that must be kept in mind is ensuring that the tools and equipment used within food processing in hotels are clean and sanitised. Usually, bacteria are present in tools and equipment that are not cleaned and sanitised regularly, particularly in such a big industry whereby tools and equipment are continuously used. Not only are the bacteria present in tools and equipment that are used daily, but are also present in the carts, hoses and other supplementary materials which are used inside the food processing industry.

Bearing all of that in mind, the best way to keep all of these objects clean is by regularly sanitising them with an antibacterial agent. As well as that, ensure that all of the tools and equipment within the hotel or hospitality kitchen are sanitized with the use of chlorine tablets to help minimize the risk of an outbreak of diseases. These chlorine tablets can be used safely within kitchens and food preparation areas, as well as in washrooms and bedrooms and is highly recommended to disinfect any body fluids and also disinfect cloths and mop heads.

4. Make use of food safety equipment and metal detectable equipment

Making use of metal detectable and food safety equipment in the kitchens of hotels are standard measures followed by food manufacturing industries to make sure no contaminants are being brought into the workplace. Also, these are of best use because contaminants, especially plastic contaminants, cannot be detected with the naked eye. So, utilising these food safety equipment and metal detectable equipment is a must.

5. Step on the footbath: One of the best ways to make sure you do not bring bacteria and contaminants into the kitchen of catering establishments is by stepping on the footbath. Even though this act is the simplest among the practices mentioned, it is an effective way for self-sanitation. Just ensure that the footbath present in the workplace contains enough sanitising agents so that it will not become a ground for bacteria to form. With the large number of workers stepping on it, make sure that the footbath contains sufficient anti-bacterial agents, and it is cleaned every time.

It was observed that most catering establishment in Umuahia, do not practice the essential hygiene and food safety practices stated above, employees do not wear the appropriate uniform and footwear in the production area due to lack of fund and training by the management without considering the risk involve. Most of the staff do not wash their hands before touching raw food, safety equipment and metal dectable equipment among others were not available in some catering outfit.

Research Method

The study used a cross-sectional descriptive survey to investigate food safety, hygiene standards and possible implementation of HACCP as a strategy for quality control in catering establishments

Presentation of Finding

Environmental Hygiene

Observation (n=30)	Status	%
Compound	Clean = 23	77
	Dirty = 7	23
Liquid waste	Well collected = 27	90
	Not well collected = 3	10
Solid waste	Well collected = 19	63
	Not well collected=11	37
Grooming of staff	Good = 27	90
	Bad = 3	10
Crockery and Utensils	Dirty = 12	40
	Clean = 18	60
Hot water - non cooking	Available = 12	40
	Not available = 18	60
Health & safety license (2005)	Issued = 30	100
	Not issued = 0	0

Food stores and cold rooms	Dirty = 7	23
	Clean = 23	72
Hand wash basins	Available = 29	97
	Not available = 1	13

The researchers observed that 77% of the operators had clean compounds, liquid and solid waste was well collected. Smoking in both kitchen and dinning rooms was silent but somehow allowed in the premises. Staff grooming was good and they had proper uniform as required by the public health law. Crockery, utensils and some equipment were dirty (12%) and (18%) clean. Hot water not always available when required by customers, health & safety license among others observed were available. This implies that majority of the catering establishment, especially hotels have clean compounds where food and beverages are prepared. The implication is that it will attract more customers to the establishment and as well boost the image of the industry by generating more revenue.

The findings of this study also revealed that there is need to establish HACCP system as a strategy for quality control in the catering establishment. This study correlate with the study of WHO (2005) which state that the HACCP system must be developed by each food establishment and tailored to its product, processing and distribution conditions. *General hygiene standards should be properly observed.* This finding is in tandem with a study carried out by Monney (2013) about knowledge, attitude and practice concerning food poisoning in Okene metropolis of Kogi State where they discovered that the knowledge of food poisoning amongst indigenes was very high (100%). World Health Assembly declared that prevention and control of food borne diseases was a public health priority in 2000. Food handlers play a very important role in the aetiology of food borne disease outbreaks (WHO, 2005).

A research done on consumer attitudes on food safety by Holly in Kentucky, U.S.A showed that knowledge of food safety concepts did not generally correspond to practicing the procedure (Anant and Anjali, 2011); this correlate well with the findings of this study in which there was generally good knowledge of food hygiene, but the practice was only fair. For this reason, assessing the effect of food safety and hygiene in food and beverage service area of catering establishment is very essential in a bid to preventing food borne diseases. A complete HACCP study cannot be done for every type of catering establishment in Umuahia. If possible, epidemiological data should be used to set or establish priorities. Foods that are commonly implicated as sources of food-borne diseases should be given first priority; however, Nigeria does not have food-borne surveillance programmes which could provide data. Therefore, priorities can be based on the following risk factors: Intrinsic

properties of the foods involved, preparation and handling, volume of food prepared and susceptibility of consumers.

Results and Discussion

Food Safety Control Measures

The study was conducted, using the structured interview method and microbial level on foods served in the restaurants was done. Thirty (30) food business operators in Umuahia Abia state were interviewed by means of a questionnaire. The results were 22 (74%) of these restaurants were ready to eat' establishments and 8 (26%) were to prepare and wait restaurants.

The study established that 19(63%) of the business operators have knowledge on quality control measures for food establishments. Only 3 (8%) apply these controls in the kitchen, while 29 (86%) indicated that the food contains ingredients that may present microbiological hazards if poorly handled. The findings of the study suggested the need to establish implementation of HACCP system as strategy for quality control in the restaurants. This is to enhance food safety and includes better use of resources and more timely response to problems.

Knowledge on HACCP application is low 9 (30%) in catering establishments in Abia state probably due to lack of enforcement from the relevant authorities. There is lack of credible source of information and standards with only 12 (40%) of some establishments trying to adapt a safety standard not associated with HACCP. This fairly low knowledge is similar to what other studies in Europe had found.

Weighing and sorting of food materials in most restaurants was used as a critical point which covered a total of 80%. Preservation of food perishables was used as a critical point by 15% of the restaurants. This is due to the low number of raw foods purchased because of inadequate storage facilities and financial constraints. Most catering establishments stored their dry foods very well because these foods can stay longer without spoilage.

Proper food storage was fairly practiced in most catering establishments (70%) in high temperatures after cooking then holding. This was due to the high level of literacy with the customer demands for hot food. General hygiene standards were not well-observed and a similar study done, showed that 70% of catering outlets were below the deserved hygiene standards yet they were operational. HACCP is more superior to all the conventional quality control procedures as it focuses on identifying and preventing hazards from contaminating food, sound science based, permits efficient and effective government oversight, ensures food safety on manufacturer/distributor, world market competition and reduces barriers to international trade. The main purpose of this study was to investigate hygiene practices in urban restaurants

Level of Understanding on Quality Control Strategy

Staff interviewed knew of some quality control strategy (37%), but with no specification of any application while 63% had no understanding of any quality control therefore, this shows that there is need for the staff to be taught on specific methods of food safety and hygiene standards.

Quality is the composite of characteristics that differentiate individual units and have significance in determining the degree of acceptability of that unit by the user and the compound characteristics of quality are both measurable and controllable. A complete sanitation program should consist of HACCP system which can be incorporated in a quality assurance program because it applies to a zero defects concept to food production.

Methods of Food Storage

This was fairly applied in most restaurants, only 10% were leaving the food not covered or well-stored thus no precaution observed. Catering establishments storing food in high temperatures were 60% while those in cold temperatures were 30%.

All foods should be well stored accordingly to avoid contamination which can occur from the soil, sewage, live animals, external surfaces and internal organs of meat animals. Storage facilities should provide adequate space with appropriate control and protection against contamination which can be reduced by having organised storage layouts with appropriate stock rotation.

Application of Quality Control Strategy

Most of the catering establishments quality control strategy at the receiving area where sorting and weighing were used as critical point (92%). Cooking was also used as a CCP but with no specific monitoring of time and temperatures (8%) as shown in figure 4.8. The quality control strategy is frequently applied while receiving the food stuff according to the respondents where they check the weight, quality in terms freshness, cleanliness and also quantity according to the specifications given on the purchase order. Hot food should be kept hot while cold food should be under refrigeration.

Preservation methods

The food preservation methods used in the restaurants vary depending with kind of facilities available. They store dry foods in well ventilated rooms with normal room temperature while other perishable foods are stored in cold rooms.

Most catering establishments used refrigeration as a means of food preservation. Dry storage for nonperishables and freezing was done as a means of food storage covering 15% of all the restaurants for dry foods storage and 15% of the restaurants for freezing respectively, Refrigeration was done 70% of the catering establishments. This indicates a sign of some critical control points used in the systems. Perishables should be received at 40°F and stored in the same state under refrigeration if not to be used immediately. Dry

foods should be stored at 50°F or more. Food should be cooked at a temperature of 165°F if it is meat and serve at a temperature above 70°F. For freezing it should be between 0°F and 18°F.

Receiving of perishables (meats, milk and vegetables)

The total respondents received food materials in bulk (20%), while 80% received in small quantities from the suppliers. This shows that most of the catering establishments do not have adequate storage facilities.

Receiving of both perishables and non-perishables (dry foods)

Most of the restaurants which received perishables (meats, vegetables and milk) from the supplier/market were (92%) and those who received non-perishable (dry foods) materials were (8%) as shown. Therefore, there is a lot of quality control system used here because the food store-staff check the details of the material specifications on quality and quantity.

Meat and poultry contamination can occur during slaughter, processing, distribution, and foodservice cycle because they are handled frequently often as many as 18 - 20 times. Anything contacting these perishables can serve as a contamination source and the risks of this condition occurring rises the more they handled. If the handling is careless and ineffective, the microbes win.

Conclusion

The Majority of the catering owners are not well or fully aware of the HACCP system in formal set-ups. All foodservice owners did not have a HACCP program in place and many were unsure of what it was or how to apply the principles to their operation. There appeared to be challenges of implementing these programs and efforts need to be made to overcome the challenges. There is little knowledge on HACCP as a strategy for quality control among the proprietors, managers and staff of catering establishments. This has made the food procedures and processes so routine that they do not document any fact on the food chain. The management of catering establishments do not observe adequate precautions in the entire food processing and therefore programs and materials related to HACCP need to be presented in a practical, realistic and step by step manner. A key focus area would be on motivating employees to follow standard operating procedures related to food safety.

Foods that are commonly implicated as sources of food-borne diseases should be given first priority; however, Umuahia does not have food-borne surveillance programmes which could provide data. Therefore, priorities can be based on the following risk factors: Intrinsic properties of the foods involved, preparation and handling, volume of food prepared and susceptibility of consumers by adhering to HACCP Standard. Adequate training is important for overcoming barriers related to human resources. This should include both employees and enforcement officials, should lead to behavioural changes, enhance competency along assessment thereafter. This is to change the traditional role of food safety agencies and food inspectors

since the system is making headways in the food industries. Educating food handlers to adhere to good personal hygiene and proper handling of food is an essential component of the National Food Safety Programme.

Food-borne diseases have been introduced as an imperative health problem in different countries. Food codex has classified meat and protein-rich foodstuffs and salads in high risk foods. The production of safe food products requires that the HACCP system be built upon a solid foundation of prerequisite programmes which most of the restaurants do not have. These prerequisite programmes have an impact upon the safety of food and are concerned with ensuring that the foods are wholesome and suitable for consumption. Many establishments which use HACCP system have preventive maintenance procedures for processing equipment to avoid unexpected equipment failure and loss of production. The application of HACCP is compatible with the implementation of quality management systems, such as the ISO 9000 series, and the system of choice in the management of food safety within such systems.

Recommendations

Managers, staff and other stakeholders need the information to advocate for food safety issues and decision-making in food safety control systems within food units.

Based on the findings of this study, responsibility for food safety lies within those that process the food, to ensure that the food they produce and serve or sell is well-received, stored and well prepared and satisfies the relevant requirement of food law. They should verify that such requirements are met and fulfilled because this will assist the authorities assigned the duties of advocating for HACCP implementation in catering establishments in introducing it and supervising the way the system is being operated.

The Ministry of Health through the public health authorities educate adequately all catering establishments and other foodservice owners, managers, staff, and other stakeholders on system implementation and more so the street foods which are a threat to the public because of the way they are prepared and served. The health authorities should also have a system of monitoring food-borne outbreaks associated with specific premises because as it is now, you cannot have specific data showing food poisoning attributed to homes, restaurants, hospitals, hotels, schools and others etc.

Proper training will ensure correct passage of information to the employees and customers and therefore increase participation in HACCP implementation which is an expensive exercise, to begin with but a cost-saving in the long run to the sector. The public health authorities should also take the challenge and not leave the catering colleges alone to be the only source of HACCP information. The public health authorities in urban restaurants should extend their periodical spot checks and random sampling together with the sensitization on food safety standards to the Staff and managers of the food establishments

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