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Research Article

FOOD HYGIENE AND HANDLING PRACTICE AMONGST FOODS VENDOR'S IN BORNO STATE

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Dr Umar Mohammed Ali
Lecturer City University Cambodia Africa Campus, Cambodia

Suleiman Shuaibu Musa
Msc Student National Open University Of Nigerian, Department Of Public Health, Nigeria

ABSTRACT

Food hygiene is a subject of great concern to anyone who cares about eating healthy and staying alive because the import of food borne illness can occasionally is grave.

This research work was carried out among food handlers in Borno State of Nigeria; it sought to assess the level of knowledge of food hygiene among food handlers, attitudes of food handlers towards hygiene, practice of food hygiene by food handlers, the nature and frequency of medical examination(s) the handlers undergo and to also to screen the food handlers to detect those who might be Harbouring salmonella species in their alimentary canal, an organisms that can cause food poisoning under favourable conditions. It was concluded that practice of food hygiene was fair and a lot of effort had to be put in the areas of medical examination of the food handlers and personal hygiene like hand washing and wearing of protective cover-clothing.

KEYWORDS

Handling Practice, Food, Hygiene, Vendor, Concept, State.

INTRODUCTION

Food hygiene practices is a subject of wide scope and it is a broad term used to describe the preservation and preparation of foods in a manner that ensures the food is safe for human consumption. Food hygiene deals

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with the prevention of contamination of food stuffs at all stages of production, collection, transportation, storage, preparation, sale and consumption.

Food borne illness is defined as a disease, usually either infectious or toxic in nature, caused by agents that enter the body through the ingestion of food. This process of kitchen safety includes proper storage of food items prior to use, maintaining a clean environment when preparing the food, and making sure that all serving dishes are clean and free of bacteria that could lead to some type of contamination. The food storage aspect of food hygiene is focused on maintaining the quality of the food, so that it will be fresh when used in different recipes Food safety is a scientific discipline describing handling, preparation, and storage of food in ways that prevent foodborne illnesses.This include the number of routines that should be followed to avoid potentially severe health hazards. Food can transmit diseases from one person to the other as well as serve as a growth medium for bacteria that can cause food poisoning.

Debates on genetic food safety include such issues as impact of genetically modified food on health of further generations and genetic pollution of environment, which can destroy natural biological diversity. In developed countries, there are intricate standards for food preparation, whereas in lesser developed countries, the main issue is simply the availability of adequate safe water, which is usually a critical item. 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.

General principle of food hygiene which basically are:

1. Prevent contaminating food with pathogens spreading from people, pets and pests.
2. Separate raw from cooked foods to prevent contaminating the cooked food.
3. Cook food for the appropriate length of time and at the appropriate temperature to kill pathogens.
4. Store food at the proper temperature.
5. Use safe water and raw materials.

CONCEPT OF FOOD HYGIENE.

Food hygiene is an increasingly important public health issue. Governments all over the world are intensifying their efforts to improve food safety. These efforts are in response to an increasing number of food safety problems and rising consumer concerns. The action of monitoring food to ensure that it will not cause food-borne illness is known as food safety.Food safety continues to be a public health problem worldwide because food borne illnesses are widespread. Consequently, consumers are increasingly concerned about food safety and quality; and demand more transparency in production and distribution. Reports have it that food borne and waterborne diarrhoeal diseases together kill about 2.2 million people each year. food contamination may occur at any point from production, processing, distribution and preparation, food handlers and other people responsible for food preparation have a critical role in the occurrence and spread of food borne illnesses as their hands and other body parts may harbour micro-organisms and their actions as well, may compromise the chain of safety from "farm-to-fork". Indeed, previous studies have

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implicated food handlers and have shown improper food preparation practices in domestic kitchen, contaminated equipment and food, to be a significant origin of most of these cases. Other factors that have been cited as contributing to food borne diseases include unsafe keeping of food (temperature and time), poor personal hygiene and food from unsafe sources.

Attitude of food handlers towards food hygiene is intricately related with food handlers" knowledge and practice of food hygiene.

The Likert"s type rating scale is mostly used in preparing questions to assess attitude of food handlers towards food hygiene in which the scale ranges between two ends of a spectrum of choices. At one end the handler the scale connotes strong acceptance of a stated fact and at the other end it connotes strong rejection of same point. Depending on the researcher"s discretion, there can be 3, 4, 5 or even more choices.

Example include:

(1) strongly agree

(2) agree

(3) unsure

(4) disagree or

(5) strongly

Disagree.

Some of the studies above stated their findings with regards attitude of food handlers/vendors towards food hygiene. For example the study by Nigusse and Kumie11 to assess food hygiene practices and prevalence of intestinal parasites among two hundred and seventy seven (277) food handlers working in Mekelle university students" cafeteria, Addis Ababa showed that 195 (70.4%) of them stated that they had a habit of hand washing with soap or plain water particularly after using the toilet. Almost half of the respondents, 51.5% wash their hands after blowing nose, coughing and sneezing. 72.9% claimed that they wash their hands before preparing food in any circumstance. 36.5%, 23.8%, 7.2% and 1.4% of the respondents stated that they cut their nails once, twice, thrice and more than thrice weekly. 79.1% of the food handlers stated that the take a bath at least once every three days. 92.8% of them wash their clothing at least once every week.

Another study carried out by Mizanur, Muhammad Taha and Kamaluddin in Malaysia titled: food safety knowledge, attitude and hygiene practices among the street food vendors in northern Kuching city, Sarawak, Malaysia discovered that only 19.1% of the food vendors had good attitude towards food hygiene whereas 62.9% had fair attitude. They also discovered that there was no significant association between knowledge and food safety training ($p>0.05$). But training itself increased the food safety attitude and practice ($p<0.05$). Their recommendation was that continuous monitoring and periodic training incorporating basic principles of food safety and microbial surveillance of foods is essential to optimizing food hygiene in the food vending business.

Food hygiene practices among food handlers are the observable activities which the food handlers engage themselves in as they acquire raw food items, prepare food or serve food to consumers. This is the crux in all studies done by researchers to assess knowledge, attitude and practices of food hygiene by food handlers. To ascertain the actual practice of food hygiene, observation of food handlers" activities while doing their bid in the food establishment is crucial and

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this involves the use of observational checklist. Some of the studies discussed earlier made some observations regarding food hygiene practices of the studied populations. Here are some examples:

The study by Nigusse and Kumie to assess food hygiene practices and prevalence of intestinal parasites among two hundred and seventy seven (277) food handlers working in Mekelle university students" cafeteria, Addis Ababa showed that there was good practice of food hygiene (63.9% of the respondents having more than 16 mean score value).

The noted that the parasite prevalence rate was 49.3% with Entamoeba, histolytica being the most common parasite. They concluded that the practice of food hygiene among the study group was poor and they recommended improvement in food handlers" personal hygiene, frequent medical check ups and provision of conveniences for the handlers and consumers.

The study carried out by Margaret, Judith and Paul titled ,,knowledge in food hygiene and hygienic practices differ- in food handlers at a hospital in Nairobi, Kenya"12 that was earlier mentioned stated that observation on correct hygienic practices showed that 16 out of 26 (62%) of primary level respondents kept short nails followed by 12 out of 27 (44%) college level respondents then 18 out of 42 (43%) of secondary level. 14 out of 27 (52%) college respondents wore clean uniform followed by 11 out of 42 (26%) secondary respondents and lastly 6 out of 26 (23%) of primary level. 9 out of 27 (33%) college respondents were found not chewing gum or other substances over uncovered food compared to 13 out of 42 (31%) secondary respondents and 3 out of 26 (12%) of primary level. 5 out of 26 (19%) of primary level were found to wear head gear compared to 3 out of 27 (11%) of college level and 1 out of 42 (2%) of secondary level respondents, the rest never covered their heads. Coughing / sneezing over uncovered food was a rare practice, however it was noted in 4 out of 27 (15%) of college level, 7 out of 42 (17%) of secondary level and 6 out of 26 (23%) of primary level respondents.

Cleaning of hands after using the toilet and before handling food was observed mostly on college level respondents who were 7 out of 27 (26%) followed by primary respondents 6 out of 26 (23%) and lastly 5 out of 42 (12%) of secondary respondents. 10 out of 26 (39%) of primary level were observed as having discharge from the eyes while working in the kitchen, 6 out of 27 (22%) of college level , and then 6 out of 42 (14%) of secondary level respondents.

Discharge from the nose was noted mostly on primary level respondents at 9 out of 26 (35%) then 12 out of 42 (29%) of secondary level and lastly 7 out of 27 (22%) of college level respondents. Discharge from the ear was also not common where 5 out of 27 (19%) of college level, 3 out of 26 (12%) of primary level and 1 out of 42 (2%) of secondary level respondents were victims. Lastly 25 out of 42 (60%) of secondary level, 16 out of 27 of college level (59%) and 13 out of 26 (50%) of primary level respondents were found to be using the same chopping board for raw and cooked food without cleaning.

The research work by Musa and Akande on "food hygiene practices of 185 food vendors in secondary schools in Ilorin,"which was discussed earlier has these findings: Pre-employment medical examination practice was high 141 (76%) but periodic medical examination was low 30(16%).

Sixty-one (33%) and seventy-two (39%) respondents prepared food well in advance and reheat food before sale respectively.

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Vendors who prepared food well in advance (over 4 hours) were found to practise food re-heating more than those who prepared food within 4 hours before sale, and this is statistically significant.

The major unhygienic practices observed among the food vendors were poor care of used utensils 100(54%), use of previously used water for washing and cleaning, lack of covering apron among the vendors 128(69%) and lack of wash hand basin for immediate cleaning 61(33%). Only 85(46%) of the respondents used soap and water to clean their utensils while the rest 100(54%) used unhygienic methods to clean their utensils.

It was observed that respondents who used soap and water for cleaning, vended food at locations that were relatively closer to water source, compared to other vendors who used other methods to clean their utensils.

This is also statistically significant. Unkempt fingernails, skin lesions and poor food protection from flies were some of the food contaminating risk factors observed in the study. They concluded that there was the need for food vendors and other food handlers to be trained on basic principles of safe food handling and they should be closely supervised.

The study by Isaac, Dominic and Wellington14 titled ,,hygienic practices among food vendors in educational institutions in Ghana: the case of Konongo summarizes thus findings on food hygiene practices: attributable to the influence of school authorities and the level of in-training of food vendors, the study points out that food vendors in educational institutions generally adhered to good food hygiene practices, namely, regular medical examination (93%), protection of food from flies and dust (55%); proper serving of food (100%); good hand hygiene (63%); and the use of personal protective clothing (52%). They asserted also that regulatory bodies legally mandated to efficiently monitor the activities of food vendors lacked the adequate capacity to do so and then concluded by saying that efforts should be geared towards developing training programmes for food vendors as well as capacity building of the stakeholders.

The study by Mizanur, Muhammad Taha and Kamaluddin in Malaysia titled: food safety knowledge, attitude and hygiene practices among the street food vendors in northern Kuching city, Sarawak, Malaysia, which was earlier discussed noted that, out of the 361 street food vendors recruited, only 10. 8% of them practices good food hygiene, 71.5% had fair practice whereas 16.9% had poor practice.

They found out also that training increased the food safety attitude and practice ($p<0.05$). They finally recommended that continuous monitoring and periodic training incorporating basic principles of food safety and microbial surveillance of foods is essential to optimizing food hygiene in the food vending business.

Looking the previously discussed study by Mulugeta and Bayeh16 captioned ,,"the sanitary conditions of food service establishments and food safety knowledge and practices of food handlers in Bahir Dar town, Ethiopia, the following observations were made, after investigating the 455 subjects: 66% of the establishments had flush toilets whereas 5.9% of the establishment had no toilet.

Only 149 (33.6%) of the establishments had a proper solid waste collection receptacle. The study also noted that there was statistically significant difference between trained (professional) handlers and non-trained handlers with regard to food hygiene practices ($p<0.05$). While more than 50% of the handlers prepare meals ahead of the peak selling time, more than 50% of

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the left over was poorly managed. They concluded that food hygiene practices among the studied group was poor likewise the sanitary conditions under which they practice and recommended that educational programs aimed at improving the attitude of handlers be made available coupled with licensing of food establishments and regular inspection of activities of such establishments.16 The study by Elizabeth et al17 on "assessing food hygiene standard practices among small scale food handlers in central Accra, Ghana" observed that 40% of the food handlers were located in unkempt places, whiles 60% were located in an acceptable area.

28% of the food handlers did not comply with cleanliness of their cooking utensils. With regards proper storage of raw and cooked foods, only 70% of the food handlers had compliance, and 64% used equipments to serve. Cleanliness of cutleries for service recorded 65% of non-compliance. 58% had neat appearance and used cleaned napkins for service whilst 42% of them did not. 31% of the food service establishments did not put correct measures in place for the control of flies in their service area, and 5% cleaned their hands before serving food.

They concluded that there is the need for more effective information and creative ways to disseminate food hygiene principles to these small scale food service providers.

In most of the literatures reviewed above, it could be noted that most of the food handlers interviewed had good knowledge of food hygiene but this did not translate into good practice of food hygiene. From observation too, majority of these handlers had unacceptable practices especially with regards hand washing at the right time and with the right materials, wearing of protective apparels, proper cleaning of cutleries and utensils, knowledge of when not to handle food and good behavior while handling food, location of eating establishment in the right place, meeting the correct standard of a restaurant and provision of adequate and well maintained facilities for convenience. Most of the researchers recommended regular on-the job training for the food handlers. Regular monitoring of the activities of the food establishment by designated authorities will ensure that high standards are maintained at all time.

Food hygiene is such an important issue because the import of improper food handling both at home or away from home can be devastating where facilities are not readily available to tackle the challenge. Food poisoning or food borne illnesses, which often results from improper food handling, is a broad topic and should be discussed in another forum.

An overview of food poisoning is however necessary to make this review complete.

Food poisoning:

Food poisoning is an illness affecting our digestive system that result from eating food or drinking water contaminated by bacteria, bacterial toxins, or less commonly by residues of insecticides (on fruits and vegetables), or poisonous chemical such as lead, mercury, etc.

it can also be caused by ingestion of fungi, berries, etc. that irritates the digestive system.

Causes of food poisoning can be broadly classified into (1) the infectious agent such as bacteria (food poisoning bacteria), viruses and parasites and (2) the toxic agents such as bacteria (food poisoning bacteria), viruses and parasites.

Signs and symptoms from most common types of food poisoning generally start within 2 - 6 hours (the

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incubation period) of eating the food. This time may be longer (even a number of days) or shorter, depending on the cause of the food poisoning.

The severity of food poisoning also depends on the infectious dose of the microbes ingested. Common symptoms include Abdominal cramps or pain, diarrhoea (may be bloody), fever occasionally (food poisoning fever), headache, nausea and vomiting, weakness (may be serious and lead to respiratory arrest, as in the case of botulism).

Common signs include lethargy, dehydration (mild to severe), shock and restlessness. Treatment for most cases of food poisoning involve replacing fluids and electrolytes (such as sodium, potassium, magnesium, and chloride). In the event of vomiting and diarrhoea, subjects should avoid solid food but increase clear liquids.

In more severe cases, a person may need help either breathing or stopping vomiting. In most cases, antibiotics are not prescribed because they may prolong diarrhoea. After ingestion of certain toxins (such as from mushrooms or shellfish), gastric lavage is done with administration of activated charcoal, which can help absorb the remaining toxin. Depending on the symptoms, cause, and severity of food poisoning, certain drugs may be prescribed; more often on an in-patient basis.

These drugs include oral rehydration salt (ORS), intravenous fluids, antibiotics, antitoxin for Clostridium, botulinum poisoning, ipecac, atropine for mushroom poisoning etc.

It must be noted that proper handling, storing and preparing is essential to prevent any food borne illnesses.

STANDARD FOOD HYGIENE PRACTICES, FOOD HANDLERS' HYGIENE AND ENVIRONMENTAL HYGIENE.

Food hygiene includes all practices, precautions and procedures involved in:-

a. Protecting food from the risk of biological, chemical or physical contamination.
b. Preventing any organisms multiplying to an extent that would expose consumers to
c. Risk or result in premature decomposition of food.
d. Destroying any harmful bacteria in food by thorough cooking or processing of the food.

Benefits from high standards of food hygiene include:-

a. Reduced risk of food poisoning, foreign body contamination and spoilage.
b. Economic advantages, including increased shelf life and reduction of waste.
c. Consumer satisfaction and enhanced reputation.
d. Increased morale of personnel.

Food Hygiene Strategies

a. The maintenance of good food hygiene shall be achieved through ensuring that:
b. Food preparation, handling and storage areas are kept clean and food handlers
c. A maintain good standards of personal hygiene at all times.
d. All foods are cooked properly, especially meat.
e. Foods are kept at the right temperature with chilled foods maintained cold and hot foods cooled as quickly as possible and then chilled.
f. Raw foods are prevented from cross-contaminating ready-to-eat foods21

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Food Hygiene Procedures

(a) Staff and other food handlers

Personal Hygiene

All food handlers should:-

a) Thoroughly wash (using warm water and liquid soap) and dry (using disposable towels or air, not apron) their hands regularly when handling food, in particular:
- Before handling food

Immediately after handling raw food, especially raw meat or poultry.

- After going to the toilet.
- After handling money.
- After blowing their nose, sneezing or coughing.
- After breaks (i.e. on returning to the restaurant after a break)

b) Wear clean clothes, apron and, where practicable, protective food handling gloves and food handling tongs (to reduce direct contact with food).
c) Tie hair back and use a hair net or cap.
d) Cover cuts or sores with clean waterproof dressings.
e) Avoid wearing jewelry, false nails or other items that might fall into food.
f) Avoid touching their face or hair.
g) Not cough or sneeze over food.
h) Not smoke

Training and Supervision

Food business owners and license holders are responsible for ensuring that all food handlers receive adequate supervision, instruction and training in food hygiene.

Illness

Food handlers with symptoms of food poisoning, such as diarrhoea, vomiting or stomach

Pains, must not handle food and must leave food preparation areas immediately. All other

Illnesses and skin conditions must be reported to a manager or the license holder who then

Needs to determine if these conditions pose a risk of spreading bacteria or disease should the person continue to handle food.

Food Preparation

Food should be handled so as to prevent contamination and handlers should:-

- Observe good personal hygiene.
- Use different chopping boards/work surfaces, equipment and utensils for raw and ready-to-eat food.
- Clean equipment and surfaces thoroughly before and after use.
- Avoid unnecessary handling of food.
- Minimise the time chilled food remains out of the fridge.

Cooking All poultry, pork, minced/chopped meat (including burgers and sausages) should be cooked thoroughly with the centre of the meat maintained at:

- 60 degrees Celsius for at least 45 minutes; or
- 65 degrees Celsius for at least 10 minutes; or
- 70 degrees Celsius for at least 2 minutes; or
- 75 degrees Celsius for at least 30 seconds; or
- 80 degrees Celsius for at least 6 seconds21

Where cooked food is not being kept hot until serving, it should be cooled as quickly as possible. Reheated food should be piping hot all the way through and should not be reheated more than once.

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All probes, skewers and thermometers should be maintained clean and disinfected between foods.

Transporting Food Contamination of foods during transportation shall be prevented through ensuring that:

- All food types are transported in packaging or containers
- Chilled or hot foods are maintained at the correct temperature
- Raw foods and ready-to-eat foods are kept apart
- Vehicles used to transport foods must be maintained in good repair and clean with separate storage for food and non-food products.

E. Food Handling Areas/Eating Premises

Design Food handling areas must be designed to permit food handlers to work hygienically and keep the premises clean. All areas should be adequately protected from pests.

Cleanliness Food service facilities, equipment and surfaces must be kept clean and where necessary disinfected according to an established cleaning schedule.21 Waste shall:

- Not be permitted to build up in food areas
- Be stored in a clean area
- Be removed frequently
- Not cause a tripping, slipping or obstruction hazard

Facilities Suitable facilities (including hot and cold water supply) for staff to wash their hands, food and equipment shall be provided:

- Separate basin stocked with liquid soap and hot air dryer or disposable towel facility
- Separate sink for washing food
- Sink for cleaning premises, equipment, utensils, etc

Pest Control

Pests are known to carry a number of pathogenic organisms that can be transmitted to humans through contaminated food. In addition, pests will damage food stocks causing financial loss.

It is therefore important that food premises are kept pest free. The Prevention of Damage by Pests Act 1949 and the FS(GFH)R impose legal duties on owners and occupiers of buildings to keep their premises free from infestation.20 A wide variety of insect and rodent pests will enter food premises for a number of reasons:

a) Food: even in small quantities, food will enable pests to survive and multiply. Regular and thorough cleaning of spillages is therefore imperative.
b) Warmth: pests of all types are attracted to buildings, which offer even limited warmth away from outdoor conditions. A few degrees increase in temperature will provide conditions in which breeding is enhanced and proliferation encouraged.
c) Shelter: almost every building provides a variety of harbourages for pests. Contrary to common belief, it is the newer buildings with suspended ceilings, panelled walls, service ducts and enclosed electrical trunking, which are more likely to create a problem, than older buildings without such features. Access must be provided to these spaces for the effective control of pests.

Refuse Disposal

External refuse containers are to be clean and in good repair, and have tight fitting lids. Waste food containers must be washed out before being stored outside. The FS(GFH)R require that food waste and other refuse must not be allowed to accumulate in

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food rooms, except so far as is unavoidable for the proper functioning of the catering department. It is recommended that systems of work are in place to ensure that refuse containers in food rooms are not over filled and are emptied regularly. All waste is to be removed at the end of the working day

Mobile/Temporary Premises

Mobile and temporary premises for storing, preparing and handling food are, as far as is practicable, subject to the same provisions as other food service facilities.

In particular these premises must ensure that:

- There are adequate facilities to store, prepare and serve food safely in accordance with the provisions of this policy.
- Adequate washing facilities are accessible

REGULATORY AGENCIES

General overview

It is essential to have a well drawn-up and comprehensive "Food Safety Policy" that evokes national commitment and ownership of the policy implementers from various sectors. Clear mechanisms, structures and institutional arrangements for implementing food safety plans of action and activities are needed as part of policy implementation. Providing consumers with a system to easily recognize safe food items is an effective way to improve food safety.

National Agency For Food, Drug Administration And Control"s (NAFDAC"s) registration number on packaged food items in Nigeria and the Smiley Scheme in Denmark are success stories in this area.At the international level, the Codex Alimentarius plays a major role in achieving food safety. It is a collection of standards, codes of practice, guidelines and other recommendation regarding food safety. The Codex Alimentarius commission works on protecting health of the consumers, ensuring fair trade practices in the food trade, and promoting coordination of all food standards work undertaken by international governmental and non-governmental organizations. For an accepted level of pesticide and heavy metal residues in food, good agriculture practices (GAP) should be strictly enforced, especially in developing countries. The issue of pesticide and drug residues in food requires a joint effort by the agriculture as well as food safety and quality sector.

Food safety is difficult to achieve especially regarding sub-standard and fake products as well as the unorganized sectors where no attention is paid to standards. Therefore, it"s most important to tackle the issue of substandard/fake products headlong and institutionalize street food vending/open markets.

Below are some regulatory agencies concerned with food hygiene in Nigeria

The implementation of food safety is ensured by the three tiers of government: Federal, State and Local Government. The Federal Ministry of Health is responsible for formulating the national policy on Food Hygiene and Safety (under the Nigerian National Health Policy) and control of food borne disease, as well as other national and international matters relating to food.

The National Agency for Food and Drug Administration and Control (NAFDAC), a parastatal organization under the Federal Ministry of Health is responsible for the formulation of guidelines and regulations on food hygiene, safety, and nutritive value, as well as of now for dairy, seafood, water and drinks production).

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The Standards Organization of Nigeria (SON) establishes standards and codes of hygienic practices for food and food products in Nigeria.

The States and Local Government Authorities (LGA) in collaboration with the National Primary Healthcare Development Agency are responsible for street food vending, catering establishments and traditional markets, environmental sanitation, prevention and monitoring of food environments and handlers and the quality of public water.

The Ministry of Agriculture and Water Resources is responsible for good agricultural practices and monitoring and development of new technologies.

FUTURE DIRECTIONS FOR FOOD SAFETY AT THE WORLD HEALTH

ORGANIZATION (WHO)

In partnership with other stakeholders, WHO is developing policies that will further promote the safety of food. These policies cover the entire food chain from production to consumption and will make use of different types of expertise.

The Work of the WHO Department of Food Safety and other WHO programmes and departments includes strengthening food safety systems, promoting good manufacturing practices and educating retailers and consumers about appropriate food handling. Education of consumers and training of food handlers in safe food handling is one of the most critical interventions in the prevention of food-borne illnesses.

WHO is promoting in-country laboratory-based surveillance of priority food-borne diseases in humans and animals, as well as the monitoring of pathogens in food. In co-operation with its Member States, WHO is working to support the development of internationally agreed-upon guidelines for data collection in countries.

i. WHO is also compiling outbreak and surveillance databases, and is broadening its epidemic surveillance capacity to include food-borne disease outbreaks.
ii. WHO is expanding its global network of participating institutions to monitor chemical contamination of the food supply, particularly in developing countries.
iii. WHO is promoting the use of all food technologies which may contribute to public health, such as pasteurization, food irradiation and fermentation.
iv. WHO has undertaken an important new initiative to strengthen the scientific basis of food safety activities through the establishment of a WHO/FAO (Food and Agriculture Organization) expert advisory body to assess microbiological risks in food.
v. WHO is increasing its involvement in the work of the FAO/WHO Codex Alimentarius Commission, whose standards, guidelines and recommendations are regarded as the international reference for food safety requirements by the World Trade Organization. WHO and FAO is initiating a thorough review of Codex primo 2002.
vi. Biotechnology has become a major public issue in developed as well as developing countries. WHO, jointly with FAO, will convene a series of expert consultations to assess the safety and nutritional aspects of foods derived from genetically modified plants, micro-organisms, and animals. WHO has initiated work to establish a knowledge base focusing on a broader evaluation of risks, benefits and other

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considerations related to the production and consumption of foods derived from biotechnology.

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