

Survey on Post-harvest Handling Practices among Farmers and Grocers: Yardsticks for Household and Society Food Security in Oshimili South Local Government Area, Delta State

Okafor, Patience (PhD)¹, Eze, Joan Nneamaka (PhD)^{2*} and Okonkwo Grace Anane¹

¹Department of Home Economics, Federal College of Education (Technical) Asaba, Delta State, Nigeria.

²Department of Agricultural Education, Federal College of Education (Technical) Asaba, Delta State, Nigeria.

Corresponding author Email: oantreasure45@gmail.com

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ABSTRACT: This study equipped food producers and grocers with fundamental information and abilities in safe food handling procedures that guarantee food security in Oshimili South LGA households and public dining establishments. This study was led by three (3) objectives and three (3) research questions. The researchers employed a survey research design, the population for the study consisted of all food producers, public eateries, and household grocers. Purposive sampling techniques were used to select twenty-five (25) respondents from each category. Two questionnaires were used for data collection; the first was designed for food producers while the second was for food handlers. Both were structured in four (4) point Likert scales. Data generated from the field was analyzed using mean statistics. The result revealed in Research Question 1, a grand X of 2.3, Research Question 2 (AB) a grand X of 2.4, and Research Question 3, a grand X of 2.4. Based on these findings the researchers recommended that the local government through the office of the Agricultural Extension Department of the Ministry of Agriculture should organize workshops for farmers to orientate them on the dos and don'ts in crop production to enhance food security in the home and the society. The local government through the health centres, should also organize seminars to sensitize its citizens on the importance of hygienic practices in food handling to prevent food-borne diseases and infections.

Keywords: Post-harvest, handling practices, food security, grocer, farmers

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INTRODUCTION

In the realm of food production, it is crucial to recognize that the quality of foods cannot be enhanced post-production and harvesting. However, it is within our capacity to uphold and preserve the existing quality. This underscores the significance of ensuring that foods cultivated on farms receive proper care throughout the stages of production, harvesting, and transportation from the farm gates to the dining tables. This comprehensive approach is fundamental in safeguarding the integrity of

the food supply chain and ultimately delivering high-quality products to consumers. The impact of food production practices on post-harvest product quality cannot be understated, as it directly affects the storage life and ultimately the health of consumers (Food and Agriculture Organization (FAO) 2016). It is imperative that food handlers, including producers, food sales professionals, and household grocers, possess the necessary knowledge and skills in food handling

practices to ensure food safety and minimize instances of spoilage, poisoning, and infection in the community. These issues pose significant threats to human health and are detrimental to food security, as availability and affordability do not guarantee suitability for consumption and sustaining proper health.

According to Ogeh (2019), it is crucial to recognize that food safety measures must commence in the field where produce is cultivated. This is particularly significant as numerous instances of foodborne illness outbreaks have been linked to contamination of agricultural products at the source. Therefore, it is imperative to prioritize food safety protocols at the agricultural level to mitigate the risk of such outbreaks and safeguard public health. Specifically, FAO (2016) advocated that farmers should apply common sense preventive measures to check-mate food contamination in the field by several dos and don'ts, such as:

1. Do not apply raw dairy or animal manure to a field where vegetable crops, such as leafy lettuce are growing.
 2. Do not apply manure to an area immediately adjacent to a field nearing harvesting maturity.
 3. Do not forget to clean equipment that has been used to apply manure to one field before moving it to another field in production.
 4. Do not irrigate with water from a farm pond used by livestock.
 5. Do not harvest fruits from or charred floor for human consumption as whole fruits or no pasteurized juices especially if animals are allowed to graze in the field.
 6. Do not accumulate harvested produce in areas where birds roost.
- The marketers must have clean storage tools and equipment to keep the food safe before its sales.
 - The marketers must have appropriate preservative equipment to control temperature and rodent attacks while the food products are in their store among others.
 - The market store sales personnel must also ensure good sanitation and hygienic practices to prevent food spoilage and contaminations during sales and purchase of foodstuffs.

This allows the produce to lose field heat or cool down before packing into containers for transportation off the farm site (FAO, 2013). Furthermore, it is crucial to separate damaged and infected produce from whole produce to prevent the spread of contaminants before proper packing for transportation to the market. The use of proper packaging materials and ensuring that transportation means/vehicles are in good condition are also encouraged to maintain the quality of the produce during transportation and prevent delays in reaching the marketplace (FAO, 2013). Ultimately, farmers must ensure that their produce reaches sales outlets in good condition to maintain its quality. As the produce gets to the market, or selling points, the middlemen who purchase produce in bulk also have a role to play to ensure food supplied by farmers remains wholesome and safe for consumption by the do's such as:

Food distribution relies heavily on the individuals who supply meals to households and eateries. These grocers play a vital role in preventing food insecurity by ensuring the availability of quality food products. Grocers need to possess a fundamental understanding of the indicators of food spoilage and decay, as well as knowledge of nutritious food options. This knowledge empowers them to make informed decisions when purchasing food items, ultimately contributing to the overall quality and safety of the food supply chain.

In addition to considerations regarding production practices, harvesting methods, and the use of tools and equipment, it is important to carefully consider the timing and seasons for harvesting to maintain the quality of produce. According to the World Health Organization (WHO) (2014), each type of crop has its specific maturity period and optimal time for harvest, particularly in the case of perishable foods. Therefore, careful attention to harvesting timing and seasons is essential to minimize the risk of damage to the quality of the produce.

During the harvesting process, it is essential to ensure that the tools used do not cause unnecessary injuries to the produce. Such injuries can create entry points for spoilage agents, leading to deterioration and spoilage of the food (WHO, 2014). Additionally, it is important to provide suitable space, such as shaded areas, for gathering and evenly spreading harvested produce.

Food retailers must possess the ability to discern high-quality food items and refrain from purchasing products that show any indication of spoilage, regardless of their affordability. It is advisable to procure manageable quantities of food at a time, particularly in the absence of appropriate preservation methods, rather than opting for bulk purchases solely for cost-cutting purposes. It is important to acknowledge that the signs and causes of spoilage vary across different types of food, each with its perishability classification, namely perishable, semi-perishable, and nonperishable. In its 2016 report, the Food and Agriculture Organization (FAO) emphasized the importance of having a good understanding of nutritious food items when making purchasing decisions. When selecting foodstuffs for purchase or use, various factors come into play. These factors may include considerations such as nutritional value, freshness, cost, availability, and personal dietary preferences.

It is essential for consumers to be well-informed about the quality and health benefits of the food they choose, to make informed decisions that promote overall well-being.

Meat

- i. Meat should be firm and elastic to the touch
- ii. The colour should be bright (purplish or blood red) not dull.
- iii. The flesh should be moist and not wet
- iv. The fat should be pale yellow in color and of firm texture
- v. The smell of the meat should be pleasant

Poultry

- i. A live bird should be active
- ii. The eyes should be clear and they should stand firm on their own
- iii. The feathers should cling firmly to the skin
- iv. The comb and wattle should be brighter, and free from fungal attack
- v. The legs should be smooth and pliable
- vi. The feet should be supple and beak pliable.
- vii. The breast should be plump
- viii. The weight of the body should be more than that of the feathers
- ix. The age of the bird on which the degree of tenderness depends should also be considered.

Fish

- i. There should be no unpleasant smell.
- ii. The fish must be firm and elastic to touch iii The tail must be stiff
- iv. The gills must be bright red
- v. The eyes must be bright and clear-looking
- vi. The scales on the fish such as herrings must be plentiful
- vii. There should be no indication of an odor or decomposition

Egg

- i. When held to a strong light, there should be no solid particles
- ii. Placing in brine solution: if the egg is fresh, it will sink, if it is stale, it will float because gasses have been produced inside the shell.
- iii. When shaken, no sound should be produced

Legumes and Cereals

- i. They should be fresh

- ii. They should be free from insects, especially weevils
- iii They should be free from mold which can arise due to incomplete drying
- iv They should not have any husk (hull).

Vegetables

Leafy vegetables e.g. spinach, lettuce, water etc.

- i. The colour should be attractive and they should look crisp and fresh
- ii. The mid-ribs of large leaves should snap sharply when broken
- iii. They should be free from insect attacks
- iv. The leaves should not drop when the bunch is shaken. This is a sign that the is not fresh

Fruits vegetables

cucumber, peppers, okra, garden egg, pumpkins, etc.

- i. Medium-sized vegetables should be chosen in preference to very small or very large ones
- ii They should not be overripe
- iii. They should be free from insect attack
- iv They should be fresh, okra for example should snap sharply when broken
- iv. Onions should be firm and well-covered with the scale's leaves

Root

Carrots, tubers, etc.

- i. They should be free from soil
- ii. Skin should be smooth, unwrinkled, and firm.
- iii. They should be free from bruises caused by cuts of spades
- iv. They should be free from signs of decay (FAO 2016),

In addition to the fundamental knowledge outlined above, food grocers need to have a thorough understanding of proper food selection when making purchases. The World Health Organization (2019) emphasizes the importance of personal hygiene and medical fitness for food handlers to prevent the spread of foodborne contaminants. Furthermore, maintaining the cleanliness of the kitchen and cooking tools, ensuring a reliable supply of clean water, and upholding environmental sanitation are crucial measures to safeguard prepared foods from potential contamination. A comprehensive understanding of food additives and the appropriate quantities for specific food items, as well as

adherence to generally regarded as safe (GRAS) guidelines, is also imperative for food grocers.

Statement of the problem

Food insecurity resulting in food poisoning or infection is a significant concern within households and society as a whole. Both individuals and the government have been troubled by this issue. Government health management and scientific research have indicated that foodborne diseases can be prevented or minimized through the implementation of healthy food-handling practices. While complete eradication may not be possible, the adoption of guidelines recommended by the Food and Agriculture Organization (FAO) and the World Health Organization (WHO) by food handlers, including those in households and public eateries, can significantly reduce the challenges posed by food insecurity. The fundamental issue at hand is whether food producers and handlers possess the necessary knowledge and consistently apply safety measures in providing food for human consumption.

Purpose of the study

The main purpose of this study was to establish if food handlers (producers and grocers) have basic knowledge and practices of safety food handling practices provided by FAO (2016) as food safety standards in production, purchases, and preparation stages. Specifically, the study established if:

1. Farmers have basic knowledge of production practices that can prevent food insecurity in homes and society.
2. If grocers have basic knowledge of signs of high-quality foodstuffs that can guide their purchasing practices.
3. If grocers observe sanitary practices in food preparation to enhance food safety.

Research Questions

The following research question guided the study:

1. Do farmers in Oshimili-South LGA have basic knowledge of the FAO suggested don'ts in crop production practices?
2. Do household and public eateries grocers (food handlers) have basic knowledge of signs of wholesome foodstuffs to guide them in the selection of high-quality foodstuffs during food purchasing?
3. Do grocers observe adequate hygiene and

sanitary practices during food preparation and service practices to ensure food safety?

METHODOLOGY

Research design

The researchers utilized a survey research design for their study, as outlined by Abanobi and Ajaye (2021). This particular research design involves the collection of information from sampled respondents without manipulation of study variables. The focus is on gathering opinions, knowledge, or practices related to the study subject, analyzing the generated data, and drawing conclusions based on the information provided by the respondents.

Population of the study

According to the records from the Oshimili South Local Government Area Secretariat in 2023, the population under study consists of all farmers who are officially registered with the Ministry of Agriculture office, as well as those registered with food canteens and household grocers within the area. Specifically, there are a total of 113 registered farmers who are recognized for supplying food products to various outlets in the markets within Oshimili South LGA. In addition, there are 18 registered canteens/public eateries and household grocers, although specific details about these establishments are currently unknown. These figures provide a comprehensive overview of the entities involved in food production and distribution within the local government area.

Sample and sampling techniques

A purposive sampling technique was used to randomly select twenty-five (25) participants from each category of the identified food handlers in the population, namely the food producers, household and public eateries food handlers. The total sampled participants were seventy-five (75) respondents only.

Instrument for the study

The instrument for the study was two different questionnaires. The first questionnaire was structured for the food producers while the second questionnaire was for the household and public eateries grocers. Both questionnaire was structured on four (4) point modified Likert scales with close-end items; strongly agree (SA), Agree (A), Disagree (D), and strongly disagree (SD).

Validity of the Instrument

The validity of the instrument was carried out by one Ph.D. lecturer in Crops Science, Department of Agricultural

Table 1: The don'ts in crop production practices

Items	SA	A	D	SD	Total	WTD Scores	X	RMK
Don't apply raw dairy or chicken manure to a field where leafy vegetable crops are grown	04	06	08	07	25	57	2.3	RTD
Don't apply manure to an area immediately adjacent to a field near harvesting maturing	03	07	10	19	25	58	2.3	RTD
Don't forget to clean equipment that has been used to apply manure to one field before moving to another field in production	04	09	09	03	25	52	2.1	RTD
Don't irrigate crops farm with water from a farm pound used by livestock	0	07	11	07	25	50	2.0	RTD
Don't harvest fruits from the orchard floor for human consumption as whole fruit for non-pasteurized juice	02	05	12	06	25	50	2.0	RTD
Grand mean							2.4	RTD

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Education, one chief lecturer in the Home Economics Education Department, and another lecturer from the Measurement and Evaluation Department. All in Federal College of Education (T) Asaba, the validation was based on construct and content items in eliciting valuable information on the subject matter. All suggested corrections were appropriately effected before the production of final copies used on the field survey.

Reliability of the Instrument

The reliability of the questionnaires was established by the researchers administering ten (10) copies of the instrument to food handlers in Oshimili North LGA within two-week intervals, data generated on the two occasions was subjected to Cronbach alpha and was found to be 0.87; at an alpha level of 0.05 significance. Indicating high reliability.

Method of data collection

The researchers visited the registered farmers during their monthly meeting in their chairman's compound and administered their questionnaire to

them. Guided appropriate completion of the questionnaire item and retrieved the needed twenty-five copies on the spot. The researchers also visited public food canteens and eateries and administered the questionnaire to eatery managers, food purchasing officers, and those in the preparatory section and retrieved twenty-five copies on the spot. Finally, on data collection, twenty-five copies were administered to working-class women who are married and provide meals to their households within the society. A total of seventy-five questionnaires was distributed to different categories of respondents and all expected number of complete questionnaires were retrieved

Method of data analysis

Data generated from the field survey was analyzed using mean statistics. A mean of 2.5 and above indicated acceptance of opinion, while a mean less than 2.5 and below indicated rejection of opinion.

Key

Strongly Agree - SA = 4 points

Agree - A = 3points
 Disagree - D = 2points
 Strongly Disagree - SD = 1 point
 Total = 4 + 3 + 2 + 1 = 10/4 = 2.5

RESULTS

Demographic data revealed that forty-six (46) females and twenty-nine (29) males participated in this study. Twenty-five (25) were farmers (food producers), eleven (11) were eateries and canteen managers and thirty-nine (39) were food purchasers, people in preparatory sections, and food sales point (serves).

Research Question: Farms/food producers

Research Question 1: Do farmers in Oshimili South LGA have basic knowledge of FAO's (2016) suggested don'ts in crop production practices?

Table 1 above, revealed a grand X of 2.02, lower than the acceptance $x = 2.5$. This indicates that the farmers (crop producers) in Oshimili South LGA do not have the basic knowledge of the don'ts in crop production practices.

Table 2A: Qualities of wholesome (healthy) foodstuff (Animal products).

Items	SA	A	D	SD Total	WTD Scores	Mean X	RMK	
Meat::The meat should be firm and elastic to touch	06	11	21	13	50	108	2.2	RTD
The colour should be bright (purplish red or blood red) not dull	06	13	19	12	50	93	1.9	RTD
The smell of the meat should be pleasant	11	22	10	07	50	131	2.6	Accepted
Poultry: A life bird should be active	10	28	07	05	50	139	2.8	Accepted
The eyes should be clear and stand firm on its own	11	20	11	08	50	131	2.6	Accepted
The comb should be small, bright red, and free from fungal attack	09	16	15	10	50	130	2.6	Accepted
The weight of the body should be more than that of the feathers	08	21	12	09	50	128	2.5	Accepted
Fish :There should be a noun pleasant smell	11	19	12	08	50	133	2.6	Accepted
The eye must be bright and clear-looking	10	18	13	09	50	129	2.5	Accepted
The gills must be bright red	08	13	17	12	50	117	2.3	RTD
The tail must be shift	05	12	21	12	50	109	2.1	RTD
There should be no indication of an odour or decomposition	110	22	09	08	50	136	2.7	Accepted
Egg: Hold it to a strong light, there should be no solid particles	09	18	11	12	50	124	2.5	Accepted
When shaken, no sound should be produced	10	21	11	08	50	133	2.6	Accepted
Place in a brine solution, if the egg is fresh it will sink but if stale it will float	08	17	16	09	50	120	2.4	RTD
Gram mean							2.3	RTD

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Research Question B1: Food handlers/grocers

Research question 2: Do household and public eateries grocers have basic knowledge of signs of wholesome foods that can guide the purchase of high-quality foodstuff?

Table 2A above revealed a gram man of 2.3 lower than the acceptance X of 2.5. This indicates that food grocers in Oshmili South LGA do not have adequate knowledge of the qualities of foodstuffs that guide their choices during purchasing. Table 2B above, revealed a ground X of 2.4 lower than the acceptance mean of 2.5. This indicates that food grocers in Oshimili South LGA do not have adequate knowledge of the best quality of legumes, cereals, and vegetables that could guide them in choosing high-quality food stuff during purchasing practices.

Research Question 3: Do grocers observe adequate hygiene and sanitary practices during food preparation and services to ensure food safety?

Table 3 above revealed a ground X of 2.4 lower than acceptance x of = 2.5. This indicates that the grocer does not observe adequate hygiene and sanitation practices in food handling to ensure food safety.

DISCUSSION

Section: A

Findings of the study revealed that forty-six (46) females and twenty-nine (29) males participated in the study. Twenty-five (25) participants were

farmers, eleven (11) were eateries and canteen managers and thirty-nine (39) were food handlers.

Section B: Research Question

Research Question 1: Revealed grand X of 2.3 lower than the X of acceptance of 2.5

Research Question 2: revealed a grand X of 2.4 lower than the acceptance X of 2.5

Research Question 3: Revealed a grand X of 2.4 lower than acceptance X 2.5

The findings of this study, in research question 1, which examined the food producer (farmer) practices in the observations of FAO (2016) don'ts for prevention of produce contamination during production in the field, revealed a grand X of 2.0. This indicates that the food producers do not observe food production safety rules, and this has

Table 2B: Qualities of wholesome (healthy) foodstuff (legumes and vegetables).

Items	SA	A	D	SD Total	WTD Scores	X	RMK	
Legumes and Cereals: Legumes stuffs should be fresh	06	13	17	14	50	111	2.2	Rejected
They should be free from insects, especially weevils	10	15	12	13	50	122	2.4	Rejected
They should be free from molds	09	14	18	09	50	123	2.5	Accepted
They should not have much musk (hull) cases	11	19	16	04	50	137	2.7	Accepted
Leafy Vegetables: The colour should be attractive, crisp, and fresh	12	21	13	06	50	142	2.8	Accepted
The mid-rib of large leaves should snap sharp when broken	08	17	19	06	50	124	2.5	Accepted
They should be free from insect attack	10	16	12	12	50	124	2.5	Accepted
The leaves should not drop when the bunch is shaken	07	15	18	10	50	118	2.4	Rejected
Root Vegetables (Carrot, trumps, tubers) They should be free from soil	08	16	17	09	50	123	2.4	Rejected
The skin should be smooth, unwrinkled, and firm	10	15	13	08	50	111	2.2	Rejected
They should be free from bruises or cuts my spades	09	13	16	12	50	119	2.3	Rejected
They should be free from signs of decay	11	17	09	13	50	126	2.5	Accepted
Other vegetable (pepper, okra, cucumber) should not be overripe	10	18	11	11	50	127	2.5	Accepted
Onions should be firm and well covered with the scale leaves	08	15	12	15	50	116	2.3	Rejected
They should be fresh e.g. okra should snap sharply when broken	11	17	10	12	50	127	2.5	Accepted
Ground mean							2.4	Rejected

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Table 3: Hygiene and sanitary practices of food grocers (food handlers).

Items	SA	A	D	SD Total	WTD Scores	X	RMK	
Food handlers in homes, public eateries, and canteens take their bath before handling food daily	12	17	11	10	50	131	2.6	Accepted
Food handlers cover their hair, open wounds, and soar properly before touching foodstuff	09	14	18	09	50	123	2.5	Accepted
Food handlers wash their hands with soapy water and rings in clean water after using the toilets	10	13	12	15	50	118	2.3	Rejected
Food handlers cut their nails short and remove all jewelry from their finger during food preparations	08	15	13	14	50	118	2.3	Rejected
Food handlers clean up all tools and equipment used in food preparation immediately after each use	07	14	18	11	50	117	2.3	Rejected
Food handlers store foodstuff purchased in clean and disinfected conditions that could prevent spoilage	11	18	12	09	50	127	2.5	Accepted
Food handlers preserve meals at the right temperature and serve them with clean plates always	12	21	10	07	50	138	2.7	Accepted
Food handlers preserve meals at the right temperature and serve them with clean plates always	10	18	12	10	50	128	2.5	Accepted
Food handlers always sanitize both the cooking and eating environments to prevent microbial activities	09	16	15	10	50	124	2.4	Rejected
Food handlers use food additives under NAFDAC recommendations of GRS (Generally regarded to be safe) levels	07	13	18	12	50	115	2.3	Rejected
Gram means							2.4	Rejected

the potential to cause food poison and infections and society. These findings are in line with Ogeh (2019) who advocated for the application of common sense practices which many farmers neglect due to the detriments to the health of

people who consume the food produced.

Research questions 2A and 2B that have to do with food handlers' (grocer) knowledge of wholesome foodstuffs revealed a grand X of 2.3 for legumes and cereals and a grand X of 2.4. This indicates that food handlers (grocers) do not have adequate knowledge of the wholesome qualities of foodstuff that can guide them to healthy foodstuff choices during purchasing practices. Their limited knowledge of foodstuff's best quantities can lead them to make wrong foodstuff choices by choosing foodstuffs that already have signs of contamination and spoilage potential even before the preparation of the food. Uko-aviomoli (2012) reported that food insecurity may not result from the non-availability of foodstuff for consumption in homes and society, but that the available foods may have chemical consistency that might be harmful if consumed. Research question 3, which has to do with hygiene and sanitary practices of food grocers (food preparatory and services personnel) revealed a grand X of 2.4 indicating that their sanitary and hygiene practices are not adequate to prevent food poisoning and infection from people who consume their meals. This was revealed in six (6) in terms of their questionnaire items, that is they do not wholly follow the sanitary standard suggested for food including security measures. This finding is in line with Anyakoha (2013) who remarked that household food safety is highly dependent on individuals who see to the nutrition and home management needs of the individuals in the home and therefore home makers need to be informed on the necessities of good health and well-being to maintain a healthy and happy home.

From the foregoing discussion, food security, both in the home and in society should not be left in the hands of people who are not properly educated on the necessary knowledge and skills needed for effectiveness in their duty post. Therefore there is a need for necessary action to enhance the level of nutrition knowledge and practices of food handlers for better food security in the home and practices.

Conclusion

Food security at both the household and societal levels is of utmost importance, as the food we consume plays a crucial role in maintaining overall health. The implications of this study underscore the significance of ensuring that food handlers at every stage of the food supply chain possess and rigorously adhere to proper food handling practices. This is essential to guarantee and uphold food security within both individual households and public eating establishments.

Recommendations

Based on the findings of this study, the researchers

recommend the following:

- i. The local government should use the office of agriculture extension to organize workshops where farmers in the localities will be oriented on crop production practices like the don'ts of FAO (2016).
- ii. The local government, through the office of health centers, should organize workshops to educate both outdoor patients (OPC) and those admitted for one illness or another, on the importance of hygiene practices and sanitation in the home and environment in preventing ill-health challenges.
- iii. The Federal government through the office of the Ministry of Education, encourages curriculum planners to build food security information into their general studies to enable every individual who passed through schooling can have basic knowledge on food security to enable them to live healthily, irrespective of their areas of academic specialization.

REFERENCES

- Abanobi, C. C. & Ajaye, O. (2021). Measurement and Evaluation in Research Methodology Asaba, Delta State. Rup.pub
- Anyakoha, E. U. (2013). Food handling practices: panacea for healthy households. Nigeria Journal of Home Economics Research (ARAN) 1 (3) 159 – 162.
- FAO, (2013). Food security in the developing world. [Hit/www.altra.org.htm](http://www.altra.org.htm). Retrieved 2022
- FAO (2016). Safety issues in food produce handling practices and food security rules. [Http://www.agent.org/libhtm](http://www.agent.org/libhtm). Retrieved 2022.
- Ogeh, J. A. (2019). Food production conditions and safety issues. Journal of Agriculture extension publication. 5 (1) 137 – 141
- Uko-Aviomoh, E. E. (2012). Produces qualities and food handler's practices: A concern. Nigeria Journal of Education, Health and Technology Research (NJEHETR) 8 (1) 39-43.
- World Health Organization (WHO, 2014). Causes of double Barden of diseases in the underdeveloped world. <http://www.eaced.org/abtooecd.54/42/40847088.pdf>
- WHO (2019). Food security: Handlers knowledge and skill practices for concerned regions. www.2d-health-prn//org.htm.pdf