INFORMATION NEEDS ON LASSA FEVER SAFETY PRACTICES AMONG GARRI CONSUMERS IN EDO STATE, NIGERIA.

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JANUARY, 2023

CERTIFICATION

This is to certify that the work " Information Needs on Lassa Fever Safety Practices among Garri Consumers in Edo State, Nigeria." was carried out by Otsemaye Bridget EDE (AGR1600022), of the Department of Agricultural Economics and Extension Services, Faculty of Agriculture, University of Benin, Benin City, Edo State, Nigeria.

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DEDICATION

This project is dedicated to God Almighty for his guidance, protection, blessings and provision throughout the period of this work and to my family.

ACKNOWLEDGEMENT

My utmost gratitude goes to almighty God giver of life and knowledge for the successful completion of this project work. With all sense of gratitude, I sincerely acknowledge and appreciate my project supervisor Mrs A.I Kenneth, for her understanding and guidance that made this project a success. I also would not forget the knowledge she has impacted in me helping me to complete this project , may the Lord Almighty continually strengthen you to do more. Special thanks to all lecturers in the department of agricultural economics and extension, Prof. (Mrs) G.O Aluifohai, Prof. C.O Emokaro, Prof. C.I.. Ada Okungbowa, Dr. D.U. Okoedo-Okojie, Dr Mrs. Koyenikan, Dr. J.A Egbodion, Dr. Mrs. Izekor , Dr. Steve Oyenka Konkwo, and others too numerous to mention, may Almighty God richly Bless you all for the knowledge you have impacted in me.

My utmost gratitude goes to my lovely and caring father; Mr.Frank Ede for his unending love and support throughout my academic exercise. I also appreciate my Mother and siblings for their supports and prayers.

May God bless you all.. also I will love to appreciate my friends who helped in the course of this project and those that made my stay in university of Benin a memorable one, to my friends Rossy chidinma Joy and Emma and others too numerous to mention, May God bless you all. Amen.

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ABSTRACT

One of the media through which Lassa fever spread or contracted in recent time is rats through Garri consumption. Garri is an household staple food in Nigeria that is consumed by all. There documenting the information needs of Garri consumers in a State like Edo in Nigeria will help in identifying the pattern of spread of this disease and how it could be curbed. Therefore, this study was conducted to assessed the safety practices information needs among Garri Consumers in Edo State, Nigeria. The study specifically described the socioeconomic characteristics of the respondents, identify the information sources available to the respondents and their preference for the sources, examined safety practices carried out by gari consumers, document safety practice information needs of gari consumers, and analysed constraints faced by gari consumers.

Multi-stage sampling technique was used to sample 150 respondents in Edo state. However, 148 of them eventually formed the valid sample size for the study. Data were obtained through structured and validated questionnaire and interview schedule and analysed with frequency counts, percentages and Binary Logistic Regression Model and Pearson's Product Moment Correction.

Some of the results of the descriptive statistics showed that 37.2% of the respondents were within the age of 40-49, majority (73.6%) were married, most (46.6%) had a household size of less than 5, 34.5% acquired secondary education, and 36.5% had a monthly income between ₦60000 - ₦89000. Results further showed that almost all the

consumers got their information friends and family (95.3%), while the most preferred source of information was from fellow consumers. The most imbibed safety practice by the consumers was to cover their gari properly to prevent contamination from rats, while the highest information need of the consumers was on orthodox or herbal treatments for lassa fever. In addition, it was observed that selected socioeconomic characteristics regressed on information needs, sex (wald =2.134), and age (wald =3.968), were statistically significant at $p \leq 0.05$ while household size (5.044) was statistically significant at $p \leq 0.01$, while a positive, medium correlation ($r = 0.519$) was observed between the lassa fever safety practices and the information need of the consumers. It was concluded that respondents had high information needs for Lassa fever but the available information sources available to them may present unverified information which is not healthy to the society.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of Study

Over the years, different pestilences have plagued mankind amongst which were some notable ones such as, Swine flu, SARS-CoV, Spanish flu, Ebola, as well as Lassa fever. Even presently, the state of the world is still in recuperation from the losses incurred by the outbreak of the Covid-19. Albeit, these diseases cannot be mentioned without stating some of the effects they had on agriculture. It has been speculated that zoonoses will account for up to 60% of human suffering in the 21st century (Abdullahi, Anka, Ghamba, Onukegbe and Salami, 2020). Lassa fever is a re-emerging zoonotic disease and potentially deadly hemorrhagic illness caused by Lassa Virus (LASV), which is a single-stranded RNA as well as a member of the Arenaviridae family (Hallam *et al*, 2018). Lassa fever is an endemic disease in the West African sub-region which comprises of countries like Nigeria, SierraLeone, Liberia and Guinea where up to 3-5 million cases of infection are reported annually (Rine and Gyar, 2016). It was first described in 1969 in the North-East, in the town of Lassa, Borno State, Nigeria (Ajayi and Nwigwe *et al*, 2013), however, several imported cases with hazardous outcomes have been reported in countries where it is not endemic (where the disease is not indigenous) (Atkin *et al,* 2009). The primary host of the disease is the multimammate (many-breasted) rat called *Mastomys natalensis* found in and around homes in most sub-sahara African countries

scavenging for food remains or poorly stored food (Fatiregun *et al*, 2019). People become infected through direct exposure to the excreta of infected rats, or by transmission from person to person via body fluids (Ajayi and Nwigwe *et* al, 2013). Rats transmit the disease to humans mainly from coming in contact with the food humans eat. One of the major food sources of contamination of lassa fever is 'garri' which is obtained from cassava (Usifoh, Ighedosa, Aighewi, Asemota, Odigie and Faboya, 2018).

Cassava has assumed a strategic position as an important staple food in Sub-Saharan Africa including Nigeria. This is made possible by the fact that it can be processed into various products for human and animal consumption. Cassava has a carbohydrate content which is about 40% higher than rice and 25% higher than maize and over 80% of the Nigerian population live in the rural areas and eat cassava meal at least once a day (Esheya, 2021). Some of the products which can be made from cassava include dried cassava chips, cassava flour, cassava paste, 'akpu', 'starch', and garri. Of all these aforementioned products, garri is one of the most preferred (Esheya, 2021). It accounts for 33% of all staple foods produced in Sub-Saharan Africa (Nabay and Abdul *et al*, 2018). Garri is consumed across cultures as different delicacies earning it one of the most preferred products of cassava. However, it has been reported that processed garri is usually subjected to unhygienic handling and storage, thereby increasing the tendency to harbor food borne diseases and vectors. Consumers therefore play a vital role in ensuring the proper preservation and storage of their gari. Garri can attain a shelf-life of about 2-3 years depending on its storability (Esheya, 2021). The production, consumption and

utilization of garri are influenced by its storability, convenience, easy handling, relative cheaper price and high demand (Esheya, 2021). Garri consumers play a major role in ensuring the control of lassa fever spread through garri from cassava. However, the bulk of the garri consumers in Nigeria are unequipped with the necessary knowledge to act proactively towards the prevention of contact between the lassa fever vector and their food. Smallholder cassava processing centers also play an important role in national food industries and must maintain hygiene (International Institute for Tropical Agriculture, IITA, 2012). These processors are responsible for taking the cassava through a variety of activities that constitute the garri production process, and any of these processes can constitute an avenue for contamination by lassa fever through the multimammate vector. In order for this contamination to be avoided, processors and consumers alike, have been advised to maintain good hygiene, in order to protect their health and that of their customers, protect the reputation of the business and processing industry, and also to protect the quality of garri available to consumers. Garri quality can be defined on the basis of its safety and fitness for use by the target consumer (IITA, 2012). However, the safety of garri can be undermined when it comes in contact with vectors of various diseases such as rats. In order for garri consumers to take the adequate steps to ensuring that garri is safe, there is great need for safety practices information on the lassa fever vector as well as ways in which to prevent contamination and inoculation of the disease on garri. To understand information need, it is necessary to understand the context of human needs that created the need for information. Case (2009) described information

need as an individual's or group's desire to locate and obtain information to satisfy a conscious or unconscious need. Information is an indisposable factor in agriculture and it is the basis of extension service delivery (Goldfarb, 2006). Therefore, garri processors need agricultural information on garri safety practices to reduce the incidence of lassa fever contamination.

Information is critical to every society's long-term development since it eliminates uncertainty and expands the range of solutions available for solving challenges. There are information on the means of transmission of lassa fever, the means of prevention, symptoms, and first aid treatments administer to an infected person before arrival at a hospital (Fidelis and Olajolumo, 2019). This information is also vital to garri processors. Therefore, in a country like Nigeria, where garri is by far the most preferred product of cassava, and with Nigeria ranking as one of the leading consumers of garri in the world, the need for an assessment of the lassa fever safety practice information needs of garri consumers becomes relevant.

1.2 Problem Statement

Most agricultural development programs require information, but Nigerian farmers, processors and consumers are rarely aware of the impact of agricultural advances, either because they lack access to such information or because it is poorly distributed (Emmanuel, 2012). This is further aggravated in instances where the required information is concerned with a vector which can be undermined and not regarded as a serious subject,

as observed in a developing country like Nigeria. Rats are ubiquitous and they particular thrive in areas with low hygiene, which can be said to be a characteristic of rural areas where food for future consumption is stored in unhygienic places, processing practices are usually crude, and lack advanced technologies. For instance, cassava flour are usually spread beside the major roads for sun drying in such a way that vehicular dusts, droppings from birds, rodents, and insects are deposited on the product leading to food borne diseases (Badaru, Omoare, and Oyediran, 2017). Food contamination and food poisoning have become an increasingly serious public health challenge all over the world, and more so concerning Lassa fever which its effects can be fatal. It is estimated that up to 70% of cases of food poisoning are associated with consumption of unwholesome food (Mukhopadhyay, *et al*, 2012). In Africa, the incidence of food borne disease is estimated at an average of 3.3 to 4.1 episodes per person per year accounting for 450,000 to 700,000 deaths annually (Apanga et al., 2014). These incidents of unsafe practices amongst merchants, and subsequent food poisoning amongst consumers have been attributed to inadequate knowledge of food borne diseases and improper handling of food (Oladoyinbo *et al*, 2015).

Hence the following questions have been prompted in this study:

1. What are the socio-economic characteristics of the garri consumers in the study area?

2. What are the respondents' sources of information, and preferred information sources on food safety practices in the study area?
3. What safety practices are carried out to prevent Lassa fever contamination?
4. What are the food safety practice information needs of garri consumers in the study areas?
5. What are the constraints faced by the garri consumers in accessing food safety information in the study area?

1.3 Objectives of the Study

The broad objective of this study is to examine the Lassa fever safety practices information needs among garri consumers in Edo State, Nigeria. However, in order to achieve this, the specific objectives would be to;

1. Describe the socio-economic characteristics of garri consumers in the study area.
2. Identify the consumers sources of information and preferred information sources on food safety practices in the study area.
3. Ascertain the safety practices carried out to prevent Lassa fever contamination
4. Identify the safety practice information needs of consumers in the study are
5. Identify the constraints faced by the consumers in accessing food safety practices information in the study area.

1.4 Justification of the Study

Studies show that the number of Lassa fever infection in West Africa each year ranges from 100,000 to 300,000 cases (Badaru, Omoare, and Oyediran, 2017). This clearly reveals that increasingly more persons require basic information on Lassa fever and its activities. However, there is a dearth of information on the assessment of the information needs of consumers of garri on lassa fever. Previous studies such as Economic Analysis of Gari Processing in Ebony State, Nigeria (Esheya, 2021), Economic Analysis of Cassava Flour and Garri Production in Ibarapa Local Government Area, Oyo State, Nigeria (Adesope, *et al, 2020*) and others of the kind have all focused on cost and returns as well as the profitability of processing cassava into garri to increase the shelf life and increase profits. Other studies such as Assessment of Information Needs of Cassava Processors on Food Safety Practices in Ogun and Oyo States, Nigeria (Badaru *et al,* 2017) also focused on assessing the food security status of cassava products in general and also focused on food poisoning. However, this study will focus on the Lassa fever safety practices information needs among garri consumers in Edo State, Nigeria. Hence this study seeks to fill the knowledge gap that exists. The study was beneficial to consumers by making sure that disease free garri is readily available for consumption and hence food poisoning was reduced. It was beneficial to processors by providing them with adequate knowledge on safety practices to engage in during the processing of garri. It will also be beneficial to policy makers in enabling them introduce laws and disseminate information that will prevent an outbreak of the disease.

1.5 RESEARCH HYPOTHESES

The following hypotheses stated in the null form was tested for this study

1. There is no significant relationship between the socioeconomic characteristics of garri consumers and their information needs in the study area.
2. There is no significant relationship between lassa fever safety practices by respondents and their information need.

CHAPTER TWO

LITERATURE REVIEW

2.1 Description and Production of Cassava

Cassava (Manihot esculenta Crantz), a starchy root crop, is a major source of food and industrial crop in Africa because of its ability to grow in low-quality soil, its resistance to drought and disease, and its flexible cultivation cycle (Sanni et al. 2009). Nigerian cassava production is by far the largest in the world with an annual production of about 37 million metric tons of tuberous roots (CBN, 2011). Cassava is a very versatile commodity with numerous uses and by - products. Cassava root is a good source of carbohydrates, and it is also a source for bio-fuel as well as animal feed (Adekanye et al. 2013). Nigerian cassava production is by far the largest in the world; a third more than production in Brazil and almost double the production of Indonesia and Thailand. The crop is produced in 24 of the country's 36 states. In 1999, Nigeria produced 33 million tonnes. In 2004, the estimated cassava output from Nigeria was approximately 34 million tonnes while in 2009; it produced approximately 45 million tonnes, which is almost 19% of production in the world. The average yield per hectare is 10.6 tonnes (FAO, 2013). Cassava has the potential to increase farm incomes, reduce rural and urban poverty and help close the food gap (IFAD & FAO, 2005). Without question, cassava holds great promise for feeding Africa’s growing population. Cassava is available to low-income rural households in the form of simple food products (e.g., dried roots and leaves) which

are significantly cheaper than grains such as rice, maize, and wheat (IFAD & FAO, 2005). Cassava tubers consist of 60–70% water and have a shelf life of 2–3 days (Philips et al.2004). Once harvested, the tubers have to be processed or consumed immediately otherwise the tubers begin to deteriorate. In addition, it is very necessary that the processing commence as early as possible because it influences the market value. Processing of cassava roots before consumption is also essential because it helps to eliminate its cyanide content (Okpeke and Onyeagocha, 2015). processing as a form of value addition appears to be the best method of preserving the highly perishable cassava roots and for removing 'cyanogenic glucosides' which impart toxicity to the roots. The most effective ways of reducing the total cyanide content of cassava products are to adopt the processing methods involving different combinations of soaking, grating, fermentation, boiling and drying/roasting of whole or fragmented roots (Dziedzoave et al. 2010; Adeniyi and Akande. 2015).

2.2 Garri Production

One of the major and most important products of cassava is Garri. Garri is an affordable substitute for most of the carbohydrate food in Nigeria (Abass et al. 2013). The spelling "garri" is mainly used in Nigeria, Cameroon, Sierra Lone, Benin, Togo, but it is called "garri" in Ghana. Garri is a fine grain produced from cassava, a tuberous root with thick skin and dense flesh. According to (Ernesto, Cardoso, Cliff, & Bradbury, 2000) Garri is a gritty, starchy staple food with high energy content which is derived from cassava (Manihot esculenta crantz). It is a convenient product because it is stored and marketed in a ready-to eat forms and can be prepared with hot or cold water depending on the type of meal (Nweke, Spencer & Lynam, 2002). Garri is the most common form in which cassava is sold in Nigeria and many other African countries (Oluwole, Olatunji, and Odunfa, 2004). Garri can be yellow (if fortified with palm oil) or white, although garri can also be processed from bio-fortified cassava for better shelf-life and organoleptic acceptability among the consumers (AJAYI, 2005). An average family of six (6) consumes approximately 50kg of garri per month (this quality requires about 400 cassava roots). It is manufactured as a staple food that is consumed in Brazil and most African countries, especially in Nigeria, where most of its preparations are made using local processing techniques (Makanjuola et al. 2012).

Fortunately, garri production is a relatively low-cost, mostly rural based agro-potential return (Opoku-Mensah et al., 2014). To ensure is circulation, there is a need for massive

production, processing, utilization, and storage. Garri is a widely consumed Nigerian food; an estimated 4.2 million tons were produced in 2009 (NBS 2010). It is consumed principally as a main meal (eba) or taken as a snack when soaked in cold water, sweetened with sugar and consumed with roasted groundnut, coconut and sometimes dry fish. Garri features more frequently up to 2 or 3 times in the daily diet of most households in the producing areas (Komolafe and Arawande, 2010). Cassava's bulk is substantially reduced when processed into garri and thus more suitable for transport. Shelf life is also increased. The cassava roots must be peeled, washed, grated into mash, dewatered, pulverized, sieved, roasted and finally sieved. Peeling represents the most labor-intensive unit operation of the cassava value chain, non-mechanized and traditionally done by women and sometimes children. Moreover, peeling represents a critical stage in terms of food safety as the process removes the outer periderm of the root, where the highest concentrations of cyanogenic compounds lie. When farmers are able to efficiently and effectively chip, grind, and dry cassava, they are better able to trade with bulk purchasers in localmarkets. Farmer incomes will rise when they are able to guarantee processed cassava for products that are high-quality inputs and have a long shelf-life (Hillocks, 2002).

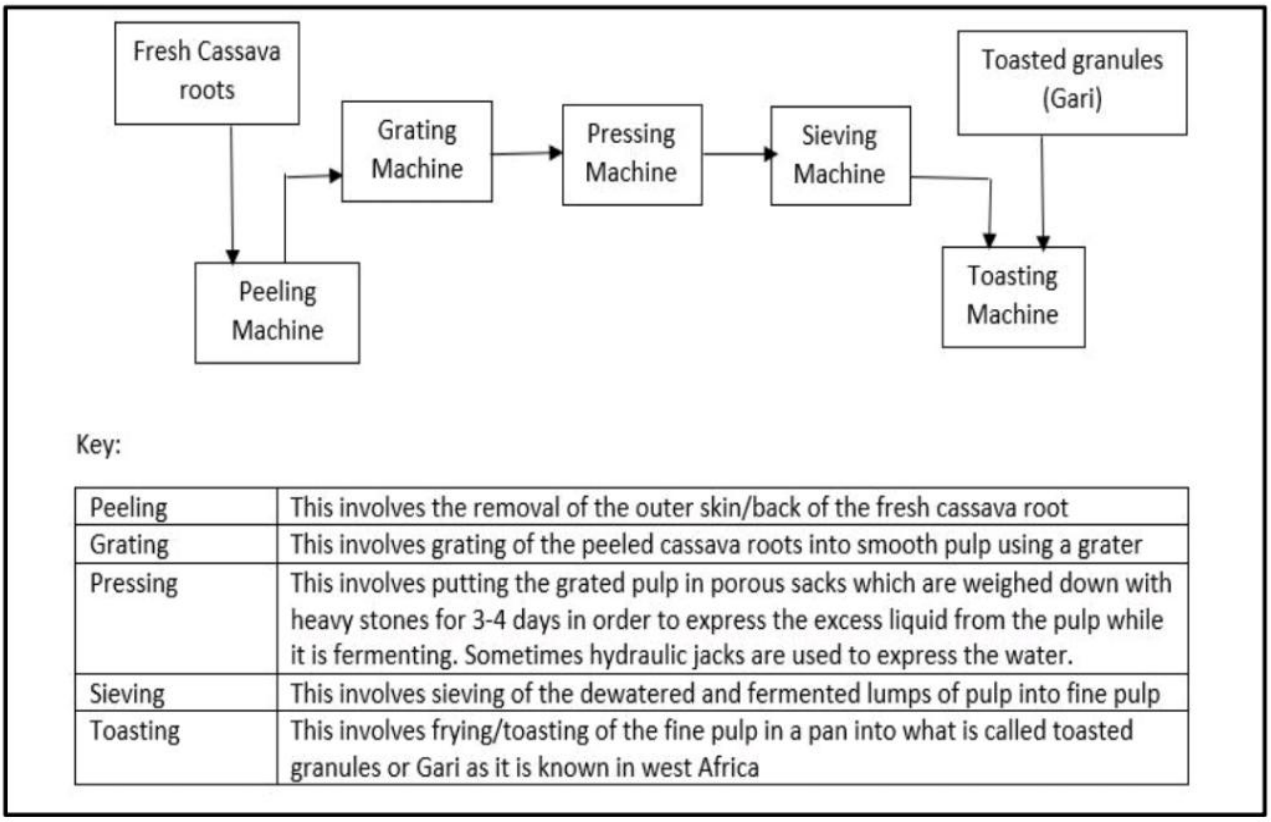
To select the best method, garri production technology has been manufactured at different levels, which include root grating, fermentation, and dewatering (Adedeji, 2012). Garri, which is produced from cassava, tuberous roots with thick skin, is a fine grain that can be made into bread and crackers (Adekanye et al. 2013). To obtain the final product,

six traditional processing steps that will be involved are peeling, washing, grating, drying, sifting, and frying (Albert and Engineer, 2007). Garri is characterized by faintly flavour, sour taste, which is due to the fermentation of new cassava tubers (Albert and Engineer, 2007). For many years, there have been findings into mechanization techniques involving unit operations of peeling and washing of tubers, grating, dewatering, fermentation, sieving, frying, and cooling where garri production will be done (Ani, Ojila & Abu, 2019).

In Nigeria, garri processing been practiced for several decades has been known to occupy a considerable portion of small and medium enterprises that have contributed significantly to national economic growth (Ani, Agbugba & Baiyegunhi, 2013). Several years ago, women fried garri in shallow earthen-ware cast-iron pans over a wood fire using spatula-like paddles of wood and press the sieved mash against the hot surface of the frying pan, while turning endlessly to prevent cake production (Chime, 2018). According to (Erhabor and Emokaro, 2007), garri is consumed by most people, especially in the West Africa sub-region. He further stated its method of processing, which is from peeling to roasting. It is a granulated, white, or yellowish product which is dependent on the production methods.

2.2.1 **Processing stages from cassava to garri and maintenance operation**

The basic processes of peeling, grating, pressing, sieving, and toasting are considered in the scheduling operation in Figure 1. The collected fresh cassava is first and foremost weighed by the firm, which then moves to the peeling section after been peeled. It is grated and then pressed against the sieve using a sieving machine to remove the moisture content (Kehinde and Aboaba, 2016).



Key:

Peeling	This involves the removal of the outer skin/back of the fresh cassava root
Grating	This involves grating of the peeled cassava roots into smooth pulp using a grater
Pressing	This involves putting the grated pulp in porous sacks which are weighed down with heavy stones for 3-4 days in order to express the excess liquid from the pulp while it is fermenting. Sometimes hydraulic jacks are used to express the water.
Sieving	This involves sieving of the dewatered and fermented lumps of pulp into fine pulp
Toasting	This involves frying/toasting of the fine pulp in a pan into what is called toasted granules or Gari as it is known in west Africa

Figure 1: Scheduling operation of garri processing firm (Samuel, 2017)

The processing stages of cassava of cassava into garri include peeling, washing, grating, dewatering, sieving, frying, cooling and packaging (Kyereh, 2013; Adenugba & John, 2014; Samuel, 2020).

- **Peeling:** After harvesting, cassava roots are peeled immediately to prevent the appearance of peel in the final product. The main essence of this first step is to remove the brown peel, which can influence the colour content of the final product (Samuel, 2020).
- **Washing**: To remove dirt, peeled roots are washed thoroughly in water (Adenugba, and John, 2014).
- **Grating**: this process is done by using either motorized cassava or machine or hand graters. It consists of a perforated metal sheet and with a sharp extruding face at the grating zon.
- **Fermentation:** This process involves leaving the grated cassava mash in moisture for between 1 and 5 days to ferment. The preference of garri is to its sourness, which has to do with the quantity of lactic acid or period of fermentation.
- **Dewatering**: The cassava mash been fermented is dewatered by pressing a machine whose fundamental purpose is to minimize the moisture content in the grated mash to minimum percentage. This operation removes cyanogens cyanohydrins together with the waste liquor. For proper dextrinization during roasting, dewatering is crucial.

- **Sieving:** Lumps formation is minimized during frying by sieving.
- **Roasting**: This process is done immediately after sieving. The utilization of mechanical fryers has become very rampant in Nigeria. The first stage is dextrinization, followed by drying. The turning of garri, during roasting, is continuous and gives room for proper gelatinization to occur. The flavour of garri becomes strong during this stage, thereby improving the digestibility. At this stage, the final moisture content of gari is below 10%.
- **Cooling and packaging:** As the garri cools, it becomes drier and more durable. After cooling, the final product is packaged for distribution to the outlet. Garri can be preserved for minimum of one year if it is appropriately packaged under the conditions of ensuring the polyethylene lining is not broken.

2.2.2 Limitation on the production of garri from cassava

Cassava processing has been limited by inadequate constant supply all through the year, high cost of moving to process centers, lack of equipment. Several kinds of cassava processing machines been produced locally have minimal efficiency, and they include cassava grater, sifter, watering press, Garri fryers, cassava chippers, batch dryer, pelleting machines, and cassava starch mill (Ani, Agbugba & Baiyegunhi, 2013). Recent cassava processing operations have been discovered by most of the researcher to labour intensify where the women and children play a vital role in production (Ani, Ojila & Abu, 2019). Furthermore, challenges of labour-intensive noticed with peeling, grating, milling,

dewatering, toasting, sifting, etc. have been mostly from Poor quality of locally produced cassava products. It takes a long time of an average of 90 hours to process 100 kg of Garri per person. The majority of cassava processing machinery is expensive, and as a result, acquiring the readily available machinery constitutes a significant problem. Furthermore, low capital investment of the peasant processors makes them form cooperative bodies that will enable them to buy machinery they lacked, which cannot be owned by a person (Adedeji, 2012). Manufacturers of garri and edible starch are faced with the challenge of seasonal variations in the prices of the product.

Cassava processing using traditional methods is tasking, ineffective, time consuming and also inefficient. Such difficulties arise in the grating and draining of the starchy fluid from the cassava dough since the conventional methods available involve processes that require a lot of labour and man hours. The problem is worsened when the quantities to be produced are very large (Steven and Eric, 2009). Cassava farmers are often unable to process harvested roots and have to sell their crops at a very low price to middlemen who are willing and able to reach them (Nweke, 2004).

2.3 Safety practice among garri consumers

Appropriate preventative measures and good knowledge of the lassa fever virus's routes and modes of infection may help to lower the infection rate among garri consumers. Although food contamination can occur at any point during its preparation, bringing to bear the importance of food safety and hygiene in the prevention of food borne diseases

(Green et al., 2005; Mudey et al., 2010; Ismail et al., 2013), proper storage and preservation of the edible garri by the consumers can aid in controlling the incidence of an outbreak of the disease. Inadequate knowledge of food borne diseases and improper handling of food among others has been reported as some of the causes of food borne illness (Oladoyinbo et al., 2015). Provision of unsafe food can also be attributed to consumer negligence in the form of inadequate coverage of gari, sundrying of gari overnight, lack of financial resources to purchase good quality of gari. Unsafe food containing harmful microorganisms virus, parasites or chemical substances causes more than 200 diseases, ranging from diarrhoea, cholera, vomiting, fever to cancer and meningitis (WHO, 2015). Others problems associated with unsafe food include kidney and liver failure, brain and neural disorders, reactive athirst and death. It could also affect reproductive health and immune systems (WHO, 2013). The WHO (2014) estimates that more than 200,000 people die of food poisoning annually in Nigeria which is caused by contaminated foods through improper food processing, preservation, storage and food preparation. WHO (2015) estimated up to 1.5 billion episodes of diarrhoea and more than 3 million deaths occur in children every year as a result of food contamination. The people who are mostly affected are children, the poor and the rural dwellers.

Diseases arising from food consumption have become serious public health problem globally (Zeru and Kumie, 2007; WHO, 2004). In developing countries, up to an estimated 70% of cases of diarrhoea disease are associated with consumption of unwholesome food (Zeru and Kumie, 2007; Mukhopadhyay et al., 2012; Annor and

Baiden, 2011). For instance, cassava flour (laafun) are usually spread beside the major roads for sun-drying in such a way that vehicular dusts, droppings from birds, rodents and insects are deposited on the product leading to food borne diseases.

Quality processing of cassava roots is highly essential for the reduction of cyanide poisoning upon consumption. Meanwhile, cassava processing is said to reduce the levels of hydrogen cyanide before consumption (Agbor-Egbe and Lape Mbome, 2006). Procedures such as peeling, grating, soaking, fermentation, pressing, roasting or drying, and exposure of cassava products to air have been determined to help allow the cyanide to dissipate out of the food matrix in order to present cassava products with safe cyanide levels. Research has shown that heap fermentation of cassava roots may reduce toxic compounds by up to 96% - 98% in grating (shredding) detoxification method (Tivana, Bvochora, Mutukumira and Owens, 2007). Diet pattern also influences the risks involved in consuming cassava products (Tivana, 2012). When cassava is eaten or fortified with other foods that are rich in sulphuric amino acids, like soy bean, to balance the nutritional value, there is a limited risk of intoxication. Proper cassava processing ensures safer and more marketable products. It reduces cyanide content in the processed products, prolongs shelf life, reduces post-harvest losses, food contamination, environmental pollution and increases the nutritional value of cassava products (James et al., 2012). The common concern is the risk related to the natural toxin that is in the edible cassava roots that are often categorized as either “sweet” or “bitter”, which signifies absence or presence of

toxic levels of cyanogenic glucosides. Cyanogenic glucosides on hydrolysis will release hydrocyanic acid (HCN) which can cause goiter and cretinism in humans and animals due to iodine deficiency; however, HCN content is significantly reduced during fermentation of cassava dough. Some of the clinical symptoms of acute cyanide poisoning include rapid breathing, drop in blood pressure, rapid pulse, headache, dizziness, vomiting, diarrhea, mental confusion, stupor, discoloration of the skin due to lack of oxygen (cyanosis), twitching, convulsion and death in severe cases (FSANZ, 2004; Asegbeloyin and Onyimonyi, 2005). So, information need could be viewed as a mean to an end and not an end in itself.

The knowledge food consumers have about the food borne infections and their safety practices is an important issue in the outbreaks of food borne infection (Fowora, 2012). It is therefore important for cassava consumers to be well equipped with information on food safety practices (FSP) so that they can perform at optimal capacity and provide safe food for family consumption which could help prevent food borne diseases and save many lives (Tologbonse, Fashola and Obadiah, 2008). According to (Oyewole and Obieze, 2005), it is important to know how informed and knowledgeable gari consumers are about safety practices in gari handling.

2.4 Lassa Fever

Lassa fever (LF) is a zoonotic disease and potentially deadly hemorrhagic illness caused by Lassa Virus (LASV), a single-stranded RNA and a member of the Arenaviridae family

(Hallam et al., 2018), first described in West Africa in the 1950s. However, the lassa virus was isolated, recognized and named in 1969 from a missionary nurse who worked in a clinic in a small town, Lassa, in Northeastern Nigeria (Ogoina, 2015). The multimammate mouse, Mastomysnatalensis, is the primary host species for lassa virus and widely distributed throughout West, Central, and East African countries (Lecompte et al., 2006; Richmond and Baglole 2002). Lassa virus is a highly virulent and contagious viral infection (Ogbu, Ajuluchukwu & Uneke, 2007). Rodent-to-human transmission of lassa virus occurs via contact with rodent's body fluids, excreta, urine, tissues, or blood, as well as inhalation of infectious aerosols (Killoram, 2016). Additionally, direct or indirect contact with the blood, urine, faeces, or other bodily secretions of infected person appears to be the route often involved in the transmission of lassa vurus from person to person. All age groups are susceptible and possibly affected by lassa virus (Ehichioya, 2012). The incubation period of lassa fever is usually around 10 days (6–21 days) after exposure to the virus (CDC, 2015; WHO, 2017). Person-to-person transmission may theoretically occur during the acute febrile phase and an infected person may excrete the virus in urine for 3–9 weeks from the onset of illness (Heymann, 2008).

The disease is endemic in West African countries, including Nigeria, Serra Leone, Liberia and Guinea (Ogoina, 2013; CDC, 2018). The mortality rate of hospitalized cases in Africa is 15–20 % (Ogbu, 2007), with reports of up to 50 % in some outbreaks

(Branco et al., 2011). There have been reported cases of suspected Lassa fever in Nasarawa, Edo, Ondo, Gombe, Taraba, Bauchi, Ebonyi, Anambra, Yobe, Rivers and Plateau States of Nigeria (Ogbu et al, 2007; NCDC, 2012; 2014). Despite the epidemic and highly contagious nature of lassa fever in Nigeria and other African countries, the details of outbreaks and subsequent responses to contain it have not been well documented in these places, and it is difficult to learn from these experiences to improve the management of future outbreaks (Ajayi et al., 2013). Since August, 2015 Nigeria has been experiencing a Lassa fever epidemic involving 19 states of the Federation. The Nigeria Centre for Disease Control (NCDC) reported on February 6th, 2016 that the total number of confirmed and suspected cases was 175 with a total of 101 deaths from 19 states of the Federation. The four states with the highest incidence include Bauchi, Edo, Oyo and Taraba, which account for 54% of Confirmed cases and 52% of reported deaths. Unfortunately, 4 (four) health workers had been confirmed infected with Lassa fever and 2 (two) had died (WHO, 2016). According to NCDC there were 10 new cases, Edo state had reported 4 cases of Lassa fever in 2016, of which 3 were confirmed. It is reported that Lassa fever is endemic in 13 out of the 18 Local Government Areas in Edo State (NCDC, 2016).

Socio cultural factors determine to a large extent the transmission and persistence of infections. Edo state is a rainforest area with the traditional practice of subsistence farming involving bush burning during the dry season resulting in the migration of rats from their natural habitat to human dwellings. The sociocultural risk of human contact

consists in practice of gaming, eating food contaminated with excretions and secretions (urine and faeces) of rats infected with Lassa fever virus. In Benin City, the determinants of epidemiological distribution, Zero-prevalence and outbreaks of Lassa fever include poverty, low educational level, deficiencies in home technologies, high demographic density, and rural living. Rat infestation is both a health risk and a source of economic loss because of the possibility of destroying properties and transmitting zoonotic diseases. These occur in many places where hygiene practices are low thereby providing harborage for the rats. Reduction of risk of exposure to Lassa fever, through appropriate behavioral change, in the context of improved housekeeping; safe food processing /storage practices, environmental sanitation; frequent clearance and safe disposal of unserviceable household goods and workplace equipment; rat-proofing of human habitats and occupational environments is advocated.

The Guardian Newspaper of 29th Jan., 2016 gave the statistics of the number of Lassa fever infection in West Africa each year as between 100,000 to 300,000 with about 5,000 deaths. Everyone in the food and agro-processing sector including consumer needs information on food safety practices to prevent food borne diseases and death.

Figure 1 and 2: *Mastomys natalensis* (Lassa fever vector)
Source: google.com

2.4.1 Lassa fever prevention

Treatment involves the use of an antiviral drug Ribavirin that has recorded successes in Lassa fever patients. This is most effective when administered early in the course of the disease, however it should not be in isolation, but involve other resuscitatory measures. Effective prevention measures for Lassa fever involve encouraging good community hygiene that will prevent rodents from gaining access to people's homes and food stuff. These include, "storing grain and other foodstuffs in rodent-proof containers, disposing of garbage far from the home, maintaining clean households, and keeping cats" (WHO, 2005).

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Study Area and Scope

This study was carried out in Edo State, Nigeria located in the forest zone of the country. The state lies between latitudes 4^0 45' and 7^0 40' North of the Equator, and longitudes 5^0 and 6^0 45' East of prime Meridian. It is bounded in the North with Kogi, Delta in the South, Ondo in the West and, Anambra in the East. It covers a land area of 17,802sqkm, a population of 3,497,502 and is divided into 18 local government areas as reported by the national by the national population commission, (2006). There are two distinct climatic seasons in the state: the wet season which typically starts by April and ends early November, and the dry season which begins from late November to March. It has an average temperature of 28 degrees centigrade and average humidity level at 52%.

Edo Central Senatorial District in Edo State covers five local government areas which include Esan South-East, Igueben, Esan North-East, Esan West, and Esan Central. Edo Central LGAs make up about 17.14% of the population (Olanrewaju and Okey, 2020). The senatorial district lies within Latitude $6^o17'$ and $6^o45'$ north of the Equator and Longitude $5^o45'$ and $6^o17'$ east of the Greenwich Meridian. It is bounded to the north by Etsako west and central local government areas, in the west by Owan west and Uhunmwode, in the south by Delta State, and in the east by the river Niger. Garri is a staple food in Edo Central Senatorial District and it is usually consumed by drinking/soaking, or made into a solid coagulate known as 'eba' which is then consumed

with a variety of traditional soups. The inhabitants are predominantly farmers producing various crops and livestock such as arable and tree crops, poultry, aquaculture, and livestock rearing. The target population for the study was garri consumers in the study area.

3.2 Sampling Procedure and Size

A multi-stage sampling technique was used for the selection of respondents in the study area.

Stage 1: This involved a purposive selection of Edo Central due to the increase in number of cases of lassa fever outbreak in the zone.

Stage 2: This involved the selection of all the five (5) LGAs in Edo Central for adequate representation.

Stage 3: The use of simple Random Sampling was used to select thirty (30) garri consumers using household heads. Thus making a total of one hundred and fifty (150) respondents.

3.3 Data collection

The data was sourced from a combination of primary and secondary sources.

The primary data was generated through the administration of a well-structured questionnaire designed in line with the objective of study to garri consumers in the study

area. Secondary data was obtained from relevant literature, agricultural journals, periodicals, texts, bulletins and the internet.

3.4 Validation of Instrument

The questionnaire which was used for collection of data was thoroughly scrutinized and validated by lecturers in the Department of Agricultural Economics and Extension Services to ensure accurate capture of required variables, as well as to prevent errors in the data collection process.

3.5 Measurement of variables

a. Socioeconomic characteristics

Age: The age of the respondents was measured in years.

Sex: This was measured at nominal level using options of female (1), and male (2).

Marital status: This was measured at nominal level using the options of single (1), married (2), and divorced (3), widowed (4) and others (5).

Household size: Respondents was asked to indicate their household size using numerical values.

Level of education: Respondents was asked to indicate their level of education. This was measured with the options of Non-formal (1) Primary education (2), Secondary education (3), Tertiary education (4) and others (5).

Source of information and preferred information sources: Respondents was required to indicate their sources of information. A list of various information sources was used to solicit respondent's responses on the information sources availability by indicating "yes" if they are available and "no" if they are not available. Furthermore, the preferences for these information sources will also be assessed using a four point likert type scale where highly preferred was scored 4, preferred was scored 3, slightly preferred was scored 2, and not preferred was scored 1. A mean score of 2.50 and above was taken to mean that

information sources is preferred while a mean score of less than 2.50 will mean that information is not preferred.

Safety Practices carried out: Respondents was required to indicate "yes" to safety practices which they perform, and indicate "no" to safety practices which they do not perform to.

Safety practice information need: This was measured using a list of possible information needs. A three point likert type rating scale was used with options of highly needed scored 3, needed scored 2, not needed scored 1. A mean of 2.0 and above was taken to mean that respondents have high need for a particular information while mean score below 2.0 was taken to mean that respondents do not have a need for the listed information.

Constraints faced by consumers in assessing food safety practice information:

This was measured using a list of various possible constraints with a 4 point likert type rating scale of very serious scored 4, serious scored 3, not serious scored 2, not a problem scored 1. A mean score of 2.50 and above was taken to mean that respondents encounter serious constraint in assessing safety practice information, and a mean score of less than 2.50 was taken to mean that less constraints occur in assessing safety practice information.

3.6 Analytical Techniques

Objective one: The socioeconomic characteristics of the respondents was analyzed using descriptive statistics such as frequency count, percentages, standard errors and tables.

Objective two: to identify the consumers sources of information and preferred information sources on food safety practices in the study area. This was achieved using mean scores.

Objective three: to ascertain the safety practices carried out to prevent Lassa fever contamination. This was achieved using mean scores.

Objectives four: identify the safety practice information needs of consumers in the study area. This was achieved using mean scores.

Objectives five: identify the constraints faced by the consumers in accessing food safety practices information in the study area. This was achieved using mean scores.

3.7 Test of hypotheses

H_{0_1}: There is no significant relationship between the socioeconomic characteristics of garri consumers and their information needs in the study area. This was achieved using Logit regression of the socioeconomic variables and the information needs of the garri consumers.

The mathematical expression of the model is explicitly specified as:

$Y_i = b_o + biX_i + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + U$…….. (1)

Where:

Yi = Information need (high=1, low=0)

X_1 = Age (number of years)

X_2 = Household size (number of persons living and feeding from same pot)

X_3 = Education (primary education=1, secondary education=2, tertiary education=3)

X_4 = Sex (male =1 and female = 2)

X_5 = Source of Labour (self = 1, family labour= 2, hired labour= 3)

U = Error term

H_{0_3}: There is no significant relationship between lassa fever safety practices by respondents and their information need. This was achieved using Pearson Product Moment Correlation (PPMC).

$$r = \frac{n\sum xy - \sum x \sum y}{\sqrt{n\sum x^2 - (\sum 2)\, 2_{\sqrt{n\sum y^2 - (\sum y)2}}}}$$

Where

X=the value of the X variable(the socio economic characteristics of respondents)

X=mean of X

Y=the value of Y variable(use of information uses)

n=number of pairs of observation of X and Y

CHAPTER FOUR

RESULTS AND DISCUSSIONS

This chapter presents the results of data analysis, interpretation and discussion of findings. Out of a total of 150 copies of questionnaire sent to the field, only 148 copies were found properly filled and analyzable. The remaining two (2) were found t have variables with outliers, therefore, they were removed in order to have a normally distributed data for the analysis. The analysis, interpretation and discussion were done in line with the objectives and hypotheses of the study as outlined below:

4.1 Socioeconomic characteristics

4.1.1 Age

Results in Table 1 indicates the frequency distribution of the respondents. Results of analysis show that about 37.2% of the respondents fell within the age bracket of 40 and 49, while 28.4% aged 30 to 39 years and only 19.6% were less than 30 years of age with a mean age of 47 years. The results of the findings suggest that garri as a stapple food in Nigeria is consumed by all categories of people irrespective of ages and status. This might be attributed to the fact the Lassa fever is not age restricted as it affects both young and old and garri is a common medium of transmission of this disease that has caused many havoc to many families in Nigeria and Edo State inclusive. The presence of this disease in Edo State might have been the main reason while a diagnostic centre is established at Urhua in Edo Central Senatorial District. The fact that all categories of

people consume garri as a stapple food in Nigeria agrees with the findings of Ezeh, Anyiro, and Obioma (2012), who observed that garri is consumed by all tribes in Nigeria across all ages and that garri consumption has contributed to the spread of Lassa fever in Nigeria.

4.1.2 Marital status

Results presented in Table 1 shows that majority of the respondents were married (73.6%), while only 20.9% were single. This means that garri is consumed by both single and married. In fact, it is mostly consumed as a family meal in many parts of Nigeria although in different forms. This result agrees with Nwonwu, Alo and Madubueze (2018), who observed that garri is a universal food with no cultural barrier across Nigeria. This makes it very critical to the spread of Lassa fever and there is need to adequately trained both the processors and the marketers on the preventive practices of Lassa fever in order of reduce the spread of this dangerous disease that has resulted to pandemic in many African countries including Nigeria in the past years. the fact that families largely eat from the same pot in most rural areas may promote the spread of this disease also.

4.1.3 Household size

Data in Table 1 further that most of the respondents (46.6%) had family size of less than 5 persons and 13.9% had a family size of 10 persons and above. This means that respondents had between small to moderate family size and the size of the family could

also determine the number of infected once a member is infected as Lassa fever is a contagious disease that affects human organs and spread quickly with the infected person. This result agrees with Adesope, Olumide-Ojo, and Oyewo (2020), who submitted that consumers in a study on the mode of spread of Lassava fever had moderate household size with a mean of 8. The moderate family members may be a better way to control the spread of this disease if it occurs. Families with fewer numbers of individuals tend to be in better control of their limited resources and hence, may be able to divert funds into procuring better quality of food. This may greatly reduce the risk of coming in contact with inadequately processed gari, and hence, reduce risk of exposure to Lassa fever. Household size of 10 persons and above accounted for 13.5%.

4.1.4 Level of education

Furthermore, results in Table 1 show that about 34.5% of the respondents attained secondary education, while 31.1% acquired primary education, and 25.0% had tertiary education. The findings show that respondents were well educated and this may assist in taking precautionary measured against the spread of Lassa fever as the measured are found in both prints and electronic media for those who could read and write. The high level of education among respondents in this study could be an added advantage to reduce the spread of Lassa fever in the study area. This also suggests that the respondents may exhibit adequate control over the quality of gari they consume, as well as the state in which they preserve their garri. This finding is in agreement with the study of Adesope, Olumide-Ojo, and Oyewo (2020) who submitted that 30% of the garri consumers in the study area had basic education of a minimum of primary education.

4.1.5 Monthly income

Evidence in Table 1 shows that about 36.5% of the consumers earned between ₦60000 and ₦89000, while 27% earned ₦90000 and above as a monthly income from their various livelihood means. The mean income was obtained as ₦85,729.66. This means that respondents are earning above the national minimum wage of ₦30,000 and the implication of this is that they would be capable of purchasing garri as a staple food with special consideration of the state of the environment, thus, reducing the spread of Lassa fever. This result disagrees with Adeniyi (2014), who observe that most garri consumers

earned between ₦30000 - ₦70000. The high percentage of consumers earning above ₦60000 suggests that consumers would possess the purchasing power to buy high quality gari from better processed and cleaner outlets. This would further decrease the susceptibility to contamination by lassa fever.

4.1.6 Preferred garri

On the preference for the different state of Garri in the study area, results show that most of the respondents preferred the yellow gari (65.5%), while 34.5% preferred white garri. However, both yellow or white Garri are known to be media of transmission for Lassa fever. Thus, nature of Garri does not determine the spread but as long as it is exposed to rat.

Table 1: Socioeconomic characteristics of gari consumers

Age in years	**Freq., n= 148**	**%**	**Mean**	**Std. Dev**
<30 years	29	19.6		
30 -39 years	42	28.4		
40 – 49 years	55	37.2	47.61	9.84
50 years and above	22	14.9		
Marital status				
Single	31	20.9		
Married	109	73.6		
Divorced	2	1.4		
Widowed	6	4.1		
Household size				
<5 persons	69	46.6		
5-9 persons	59	39.9		
10 persons and above	20	13.5		
Level of Education				
Non-formal	14	9.5		
Primary	46	31.1		
Secondary	51	34.5		
Tertiary	37	25.0		
Monthly income (₦)				
<N30,000	23	15.5		
N30,000 – N59,000	31	20.9		

N60,000 – N89,000	54	36.5	85,729.66	15,853.91
N90,000 and above	40	27.0		
How often do you consume gari?				
Very often	44	29.7		
Often	61	41.2		
Rarely	27	18.2		
Not at all	16	10.8		
Preferred type of gari?				
White gari	51	34.5		
Yellow gari	97	65.5		

Source: Field Survey, 2022

4.2 Sources and preference of information

Results in Table 2 presented the analysis of availability of information sources and respondents' preference. It was observed that 93.9%, 70.3% and 58.1% of the respondents indicate the availability of fellow consumers, broadcast from radio, and television, newspapers and friends and family as the sources of information available for the prevention of Lassa fever. Also, 54.7% indicated that State Ministry of Agriculture serves as the information source to Lassa fever. Furthermore, 63.5%, 75.0% and slightly below average (48.0% and 49.3%) indicated the availability of health care providers and Non-Government Organizations as available sources of information to Lassa fever among Garri consumers in the study area. In terms of preference for information sources, respondents indicated that fellow consumers (Mean = 3.28), broadcast from radio and Television (Mean = 2.99), friends and family (Mean = 3.05) as well as State Ministry of Agriculture (Mean = 2.52), Internet (Mean = 2.53) and phone calls (Mean = 3.02) were the highly preferred information sources to the respondents on the prevention of Lassa fever in the study area. This implies that respondents in the study area prefer numerous information sources and the implication of this is that they would be adequately update on the news and other relevant information that citizens would need to know on any issue that could cause stability of a society like Lassa fever spread.

Table 2: Sources and preference of information

	**Available, n = 148	Preference

Information Sources	Freq.	%	Mean	Std. Dev
Extension agents	33	22.3	1.12	0.32
Fellow consumers	139	93.9	3.28*	0.19
Broadcast from Radio	104	70.3	2.99*	0.15
Broadcast from television	104	70.3	2.99*	0.15
News papers	86	58.1	2.59*	0.61
Friends and Family	141	95.3	3.05*	0.09
State Min. of Agric.	81	54.7	2.52*	0.29
Internet	94	63.5	2.53*	0.28
Phone calls	111	75.0	3.02*	0.25
Journal	42	28.4	1.14	0.63
Healthcare provider	71	48.0	1.97	0.55
Herb hawkers	17	11.5	1.06	0.27
Pharmacist/chemist	39	26.4	1.16	0.59
Town criers	15	10.1	1.02	0.73
Government Accredited Health Agency (NCDC)	55	37.2	1.68	0.54
Non-Organizational Organization	73	49.3	1.99	0.83
Academic Researchers	37	25.0	1.29	0.49

Source: Field Survey, 2022
*Mean > 2.5 = Highly preferred.
** Multiple response

4.3 Lassa fever safety practices

Several safety practices to the prevention of Lassa fever were analysed and results in Table 3 show that 93.2%, 83.8% and 100.0% of the respondents indicated that they do prevent rats from entering their houses, instantly eliminate rats cover their garri properly to prevent rat contamination in order to prevent the spread of Lassa fever. Also, 81.1% and 65.5% show that they store their garri in containers with lids and do prevent rats from gaining access to the kitchens regularly but about 46.6% indicated that even if they are sick, they still prepare and consume garri while only 33.1% indicated that they clean and disinfect theur kitchen regularly. The findings show that though respondents indicated those practices that could reduce the spread of Lassa fever but there are grey areas where they could easily contact the deadly disease. For instance, irregular cleaning and disinfestation of kitchen may cause the accumulation of rats and their presence may be a medium through which Lassa fever could be spread.

Table 3: Lassa fever safety practices

**Safety Practices	Freq.	%
Do you prevent rats from entering your house?	138	93.2
Do you instantly eliminate rats that have entered your house	124	83.8
Do you cover your garri properly to prevent rat contamination?	168	100.0
Do you wash your hands with soap and water before handling garri?	71	48.0
Do you store garri in containers with lid covers?	120	81.1
Do you spread your garri by the road side to dry?	15	10.1
Do you spread your garri in open places overnight?	19	12.8
Do you spread garri on bare floors?	33	22.3
Do you prevent rats from gaining access to your kitchen tools and equipment?	97	65.5
Do you touch a life or dead rat with bare hands?	12	8.1
Do you prepare garri when you are sick?	69	46.6
Do you clean and disinfect tools and equipment before and after usage?	41	27.7
Do you clean and disinfect kitchen regularly?	49	33.1

Source: Field Survey, 2022.

4.4 Lassa fever safety practice information needs

Information needs of respondents in safety practices on Lassa fever were analysed and results shown that they indicated that they had high need for information on its prevention (Mean = 3.17), spread in Nigeria (Mean = 2.85), general fever emergency (Mean = 2.60), measures to curb the spread of Lassa fever (Mean = 3.11), information on symptoms (Mean = 2.55), information on the medical attention (Mean = 3.09) and information on the statistics active cases, discharged cases as well as fatalities on Lassa fever among others. The implication of this findings is that respondents are concerned about the spread of this disease and ways to curb the spread. This is good for the society as the awareness of the pandemic nature of the disease is good for its prevention through the precautionary measures. Another implication of this finding suggests that consumers were more concerned on immediate strategies within their reach, with which to ameliorate the effects of the disease, rather than sit back and wait for government intervention. Information on herbal treatment for Lassa fever, being the most needed information, reveals that, consumers attempt to give local remedies to sick persons in the advent of an outbreak, before taking them to the hospital. Though this may prove helpful to the sick individual, it may increase the chances of spreading the virus to the local health personnel, and other individuals, as direct contact is one of the potent ways of transmitting the disease (Brosh-Nissimov, 2016)

Table 4: Safety practice information needs

Information Needs	**Mean**	**Std. Dev**
Information on lassa fever prevention	3.17*	0.13
Information on lassa fever spread in Nigeria	2.85*	0.18
General lassa fever Emerging news	2.60*	0.27
Information on measures to curb the spread of the Disease	3.11*	0.15
Information on government policies on lassa fever	1.62	0.58
Information on symptoms of lassa fever	2.55*	0.21
Information on ways of seeking medical help in the incidence of an outbreak	3.09*	0.08
Information on orthodox or Herbal Treatment for lassa fever	3.24*	0.12
Information on suitable diet to boost immune system	2.79*	0.48
Information on statistics of active cases, discharged cases as well as fatalities brought about by lassa fever	2.21*	0.17
Information on existence and importance of lassa fever vaccination.	2.69*	0.31

Source: Field Survey, 2022.
*Mean > 2.0 = Highly needed.

4.5 Constraints to lassa fever food safety practices

Findings in Table 4 show that non availability of information on Lassa fever (Mean = 2.83), too many contradictions with respect to information on Lassa (Mean = 3.19), insufficient power supply to charge phones and listen to news (Mean = 3.15), high cost of data subscription (Mean = 3.16), and poor government policies (Mean 2.79) were the identified constraints that the respondents indicated to be very severe and serious in Lassa fever information. This means that the grand mean scores of the identified variables were equal or greater than 2.50 grandmean used as the benchmark. However, other constraints such as too many fake news, high level of illiteracy among others were also found but not severe. The reason for some of these constraints may be due to the fact that respondents obtained information on Lassa fever from the non-scientific and informal sources like friend and family members. This may encourage fake news and causes problem in the society through unproven rumors.

Table 5: Constraint to lassa fever food safety practices

Constraints faced	**Mean**	**Std. Dev**
I have never heard of lassa fever	2.76*	0.36
Too many fake news about Lassa fever	2.29	0.14
Non available information material on lassa fever	2.83*	0.28
Too many contradicting information on lassa fever	3.19*	0.18
Communication/language barrier	1.67	0.35
Insufficient power supply to charge phones and watch television	3.15*	0.16
High level of illiteracy	2.09	0.42
High cost of Data subscription	3.16*	0.09
Information overloads on lassa fever outbreak	1.26	0.36
Government policies on lassa fever are not publicized	2.79*	0.12
Information on lassa fever are very cumbersome	1.36	0.49
Keeping abreast with statistics of lassa fever since it changes every day.	1.73	0.27

Source: Field Survey, 2022.
*Mean > 2.5 = serious

4.6 Results of the hypotheses

Hypothesis 1: There is no significant relationship between the socioeconomic characteristics of gari consumers and their level of information needs in the study area.

Results in Table 6 were obtained using Binary Logistic Regression model and it was observed that among the socioeconomic characteristics regressed on information needs, age (Wald =3.968), and sex (Wald =2.134) were significant at 5% level of significance, while household size (Wald =5.044) was significant and 1% level of significance. Further analysis showed that the coefficient of age and household size were negative. This implies that an increase in the age and household size of the respondents would lead to a decrease in their level of information needs. This could be attributed to the fact that older respondents may likely have a way of knowing the best sources of information where the correct news on Lassa fever could be obtained, therefore amassing knowledge and experiences on how to prevent the disease, as opposed to younger consumers. Also, with the increase in household size, information tend to increase, as most members of the family may obtain information from friends, social media and other outlets, and disseminate these information to their family members. This result disagrees with Ilesanmi and Omotosho (2015), who observed that age and household size were not significant determinants of information needs residents in lassa fever communities. The log likelihood function of 123.871 indicates that the model is a good fit for this analysis, and the Nagelkerke R square value of 0.7152 shows that 71% of the variations in level of

information needs could be explained by any variation in the socioeconomic characteristics. The entire model could predict 89.71% variation in the level of information needs in the study area.

Table 6: Result of binary logistic regression showing the determinants of level of information needs

Variables	**B**	**S.E.**	**Wald**	**Sig.**	**Exp(B)**
Age (number of years)	-0.261	0.131	3.968*	0.003	0.770
Household size	-0.319	0.142	5.044**	0.000	0.727
Education (Educated=1, otherwise=0)	0.201	0.377	0.284	0.189	1.223
Years of experience in processing garri (years)	2.172	0.984	4.870**	0.000	8.776
Sex (male =1 and female = 0)	0.453	0.31	2.134*	0.050	1.573
Source of Labour (self = 1, others = 0)	0.249	0.363	0.471	0.159	1.283
Error term	-0.982	0.315	9.715**	0.000	0.375

Source: Field Survey, 2022.
Overall Percentage = 89.71%
-2 Log likelihood = 123.871
Nagelkerke R Square = 0.7152
**Sign at 0.01 level of significance.
*Sign at 0.05 level of significance

Hypothesis 2: there is no significant relationship between lassa fever safety practices by respondents and their information need.

Results in Table 7 were obtained using Pearson Product Moment Correlation (PPMC) and it was observed that that the safety practices scores positively correlated with the information needs of the respondents at 0.01 level of significance. The correlation coefficient of 0.519 shows that there is a positive medium correlation between the Lassa fever safety practices and the information need of the respondents. This means that as the consumers imbibe more safety practices, their need for information also increases. This can be attributed to the fact that most of the consumers complained about having too many contracting information about lassa fever, thus, they practice many safety practices without fully understanding them. This is evident in one of the incidental outbreaks, where some of the consumers were advised to bath with salt, which ended up proving to harmful after a few trials.

Table 7: Correlation of information needs

Correlate	**Coefficient (r)**	**Sign**	**Decision**
Safety practices scores	0.519**	0.000	S

Source: Field Survey, 2022.
**Sign at 0.01 level of significance.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary

Lassa fever is one of the contagious diseases discovered in Nigeria in the 70s and it has remained since then. It is highly contagious and one of the best ways to spread rapidly is through the consumption of Garri, which is a staple food to many Nigerians. To curb the spread of this disease, information is required by the garri producers, marketers and even the consumers. However, the information needs of the consumers among the actors is scanty in literature. This study focused on Lassa fever safety practices information needs among Garri consumers in Edo State, Nigeria. In specifics, the objectives of the study described the socioeconomic characteristics of the respondents, identified the available sources of information and preferred information sources on lassa fever by the respondents, examined the safety practices carried out by gari consumers, identified the safety practices information needs of gari consumers, and analysed the constraints faced by gari consumers. A multi-staged sampling technique was used to sample 148 respondents for the study with the use of purposive and simple random sampling techniques. Data were collected with the use of structured and validated questionnaire. Data analysis was done using descriptive like frequency counts, percentages and inferential statistics like Binary Logistic Regression and Pearson's Product Moment.

Some of the results show that that 37.2% of the respondents were within the age of 40-49, majority (73.6%) were married, a little below avegare (46.6%) had a household size of less than 5, 34.5% acquired secondary education, and 36.5% had a monthly income between ₦60000 - ₦89000. Results also showed that almost all the consumers got their information friends and family (95.3%), while the most preferred source of information was from fellow consumers.

The most imbibed safety practice by the consumers was to cover their Garri properly to prevent contamination from rats, while the highest information need of the consumers was on orthodox or herbal treatments for Lassa fever. The findings also showed that among the socioeconomic characteristics regressed on information needs, sex (wald =2.134), and age (wald =3.968), were statistically significant at $p \leq 0.05$, while household size (5.044) was statistically significant at $p \leq 0.01$, while a positive, medium correlation (r =0.519) was observed between the Lassa fever safety practices and the information need of the consumers.

5.2 **Conclusion**

Based on the findings of this study, it was observed that Lassa fever is a menace known by the Garri consumers in Nigeria as they made deliberate efforts in seeking information from different sources, although the most prominent source may be dangerous to the

spread of this disease as it was not a scientific source where information is verified. However, respondents made efforts in the prevention of Lassa fever by taken some precautionary measures such as covering their containers where Garri is kept, and deliberately eliminating rats which are the carriers of this deadly disease but the constraints such as lack of power supply to listen to news and other critical ones may limit the respondents efforts in seeking information to curb the disease.

5.3 **Recommendation**

Based on the findings of the study, the following has been recommended

i. Extension agents should be trained and dispersed to the communities to educate the consumers on the dangers of lassa fever, preventive steps to take towards the disease as well as in the event of an outbreak, and on the safety practices to take towards adequate storage and preservation of their gari.

ii. Information should be made available, accessible and, affordable to the consumers through information technologies such as working internet, stable electricity, so as to promote the flow of information from proper sources, through the proper channels, to the consumers.

iii. Government should carry out public awareness programs towards the sensitization of individuals in the community about lassa fever, utilizing

efficient and sufficient extension workers, properly motivating them to ensure a favourable outcome of the exercise.

iv. Social media handlers, media personnels, as well as government should regulate the various information passed across to the public, so as to mitigate the incidence of contradicting information, which may end up confusing the consumers, resulting in a total disregard for all sources of information.

v. Illiteracy was found to be a constraint in the adoption of safety practices in the study area. Therefore, government and non-governmental agencies should bring information about lassa fever to the grass root levels such as primary and secondary schools, places of worship, and community halls, so as to disseminate the information in the basic and most understandable term possible.

APPENDIX

RESEARCH QUESTIONNAIRE

DEPARTMENT OF AGRICULTURAL ECONOMICS AND EXTENSION SERVICES,

FACULTY OF AGRICULTURE,

UNIVERSITY OF BENIN,

BENIN CITY

Dear Sir/Madam,

I am a final year student of the above named Department. I am conducting research on information needs on lassa fever safety practices among garri consumers in Edo State, Nigeria. I would like you to kindly answer the following questions as correctly as possible, as your honest and sincere response will aid the validity of this study. This research is strictly for academic purposes only and will be treated that way.

Thanks for your anticipated cooperation.

Ede, O. Bridget

SECTION A: Socioeconomic characteristics

1. Age: _____ years
2. Marital status: single ( ), married ( ), divorced ( ), widowed ( ), others ( )
3. Religion: Christian ( ), Muslim ( ), others ( ).
4. Household size: _____
5. Level of Education: Non-formal ( ), Primary ( ), Secondary ( ), Tertiary ( ).
6. Monthly income of household head. ₦_____
7. How often do you consume gari? Very often ( ), Often ( ), Rarely ( ), Not at all ( ).
8. What is your preferred type of gari? White gari ( ), Yellow gari ( )

SECTION B: Sources of information and preferred information sources

Sources of information	Availability		Preference			
	No	**Yes**	**HP**	**P**	**SP**	**NP**
1. Extension agents						
2. Fellow consumers						
3. Broadcast from Radio						
4. Broadcast from television						
5. News papers						
6. Friends and Family						
7. State Min. of Agric.						
8. Internet						
9. Phone calls						
10. Journal						
11. Healthcare provider						
12. Herb hawkers						
13. Pharmacist/chemist						
14. Town criers						
15. Government Accredited Health Agency (NCDC)						
16. Non-Organizational Organization						
17. Academic Researchers						

18. Others							
19.							

Not: HP = Highly preferred

P = Preferred

LP = Slightly preferred

NP = Not preferred

SECTION C: Safety Practices Carried Out

S/N	Safety Practices	Yes	No
1.	Do you prevent rats from entering your house?		
2.	Do you instantly eliminate rats that have entered your house		
3.	Do you cover your garri properly to prevent rat contamination?		
4.	Do you wash your hands with soap and water before handling garri?		
5.	Do you store garri in containers with lid covers?		
6.	Do you spread your garri by the road side to dry?		
7.	Do you spread your garri in open places overnight?		
8.	Do you spread garri on bare floors?		

9.	Do you prevent rats from gaining access to your kitchen tools and equipment?		
10.	Do you touch a life or dead rat with bare hands?		
11.	Do you prepare garri when you are sick?		
12.	Do you clean and disinfect tools and equipment before and after usage?		
13.	Do you clean and disinfect kitchen regularly?		

SECTION D: What Lassa fever safety practice information do you need?

Lassa fever Information needs	Highly Needed	Needed	Not Needed
Information on lassa fever prevention			
Information on lassa fever spread in Nigeria			
General lassa fever Emerging news			
Information on measures to curb the spread of the Disease			
Information on government policies on lassa fever			
Information on symptoms of lassa fever			
Information on ways of seeking medical help in the incidence of			

an outbreak			
Information on orthodox or Herbal Treatment for lassa fever			
Information on suitable diet to boost immune system			
Information on statistics of active cases, discharged cases as well as fatalities brought about by lassa fever			
Information on existence and importance of lassa fever vaccination.			

SECTION E: Constraints in assessing lassa fever safety practices information

Challenges to access and use of lassa fever Information	Very Serious	Serious	Not serious	Not a problem
I have never heard of lassa fever				
Too many fake news about Lassa fever				
Non available information material on lassa fever				
Too many contradicting information on lassa fever				
Communication/language barrier				
Insufficient power supply to charge phones and watch television				
High level of illiteracy				
High cost of Data subscription				

Information overloads on lassa fever outbreak				
Government policies on lassa fever are not publicized				
Information on lassa fever are very cumbersome				
Keeping abreast with statistics of lassa fever since it changes every day.				
Others (specify).....				

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