# USING THE LEVESQUE MODEL OF ACCESS TO CARE TO IDENTIFY ENABLING FACTORS AND BARRIERS TO LASSA FEVER PREVENTION AND CONTROL IN NIGERIA

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**Using the Levesque model of access to care to identify enabling factors and barriers to Lassa fever prevention and control in Nigeria**

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**Declaration**

Where other peoples' work has been used (either from a printed source, internet, or other source), this has been carefully acknowledged and referenced in accordance with departmental requirements.

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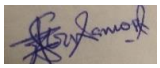
Signature…  …

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## Table of Contents

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To my beautiful, supportive, and amiable mum. You are truly special and always desired the best for me. All I ever want is to keep making you proud for all your sacrifices.

Phil. 4:13

## Dedication

This thesis is dedicated to Oyinkansolami, Odunayomi and Olufisayomi for their outstanding sacrifices during my academic pursuit.

## ABSTRACT

**BACKGROUND**: Lassa fever, an emerging acute illness of viral origin is common in west Africa. In Nigeria yearly outbreaks occur, but peaks during harmattan. Viral transmission occurs primarily via ingestion of poorly processed diets contaminated by rodent excreta and less commonly from contact with infected objects and persons. A recent outbreak in 58 districts resulted in 67 mortalities. Outbreaks are precipitated by large population, poor hygienic practices, culture, non-availability of vaccines and diversity of viral genome resulting in diagnostic and treatment difficulties. High financial burden associated with treatment occurs in numerous households.

**METHODS:** A review of literature on the demand and supply determinants of access to care on Lassa fever prevention and treatment in Nigeria and other Lassa endemic countries was done using the conceptual framework described by Lavesque et al. (2013), and recommendations on policy were made to Nigerian Health Ministry using national and regional literature.

**FINDINGS:** Inadequate knowledge, stigma, discrimination, high user fees, poor provider attitude, sociocultural factors such as myths, misconceptions and religious beliefs, inadequate screening services, few treatment centers, geographical location of health facilities were found to be barriers to access to Lassa fever prevention and treatment while the media, health providers and acquaintances were enablers of access to care.

**CONCLUSIONS:** Improving the health literacy in all populations through regular empowerment with the media, strong political commitment, elimination of vectors, reducing direct costs, in-service training, provision of adequate screening services and rehabilitation of treatment centers were found to be most promising and feasible interventions to reduce mortalities and morbidities from Lassa fever.

**Key words:** Lassa fever, Enabler, Barrier, Nigeria.

**Word count: 11,268**

## LIST OF ABBREVIATIONS

| | |
|---|---|
| AfDB | AFRICAN DEVELOPMENT BANK |
| CDC | CENTER FOR DISEASE CONTROL |
| CFR | CASE FATALITY RATE |
| DHMT | DISTRICT HEALTH MANAGEMENT TEAM |
| ELIZA | ENZYME LINKED IMMUNOSORBENT ASSAY |
| FMoH | FEDERAL MINISTRY OF HEALTH |
| GDP | GROSS DOMESTIC PRODUCT |
| HCW | HEALTHCARE WORKER |
| IFRC | INTERNATIONAL FEDERATION OF RED CROSS &CRESENT SOCIETY |
| IPC | INFECTION PREVENTION AND CONTROL |
| IPCC | INFECTION PREVENTION AND CONTROL COMMITTE |
| KIT | KONINKLIJK INSTITUUT VOOR DE TROPEN |
| LASV | LASSA FEVER VIRUS |
| LMIC | LOW MIDDLE-INCOME COUNTRY |
| MIC | MIDDLE-INCOME COUNTRY |
| MMR | MATERNAL MORTALITY RATIO |
| NCDC | NIGERIA CENTER FOR DISEASE CONTROL |
| NTA | NIGERIAN TELEVISION AUTHORITY |
| PHC | PRIMARY HEALTHCARE |
| PPE | PERSONAL PROTECTIVE EQUIPMENT |
| RT-PCR | REVERSE TRANSCRIPTASE POLYMERASE CHAIN REACTION |
| SMoH | STATE MINISTRY OF HEALTH |
| UNESCO | UNITED NATIONS EDUCATIONAL, SCIENTIFIC & CULTURAL ORGANISATION |
| USAID | UNITED STATES' AGENCY FOR INTERNATIONAL DEVELOPMENT |
| VHF | VIRAL HEMORRHAGIC FEVER |
| WHO | WORLD HEALTH ORGANIZATION |

## BACKGROUND

Nigeria, with a population of over 214 million people is described as Africa's most populous country (USAID, 2012). Located on the western part of sub-Saharan Africa, it shares a boundary with Cameroon and Chad to the east, Republic of Benin to the west and Niger to its North (Fig. 1). It has a land mass of over 900,000 $km^2$, lies between latitude 4 16'N and 1352' N; and longitude 249'E and 1437'E respectively. There are two climatic conditions, wet (rainy) and dry (harmattan). The rainy season is sparse in the north (450mm yearly) and intense in the south (3500mm) while during harmattan, temperatures ranges of 30°C to 45°C in the north and south respectively have been reported (Oday, 2010).

Nigeria is diverse in culture and ethnicity comprising 36 states and a Federal Capital Territory, Abuja. It is divided into two main regions- the northern region inhabited predominantly by Muslims while its southern part is dominated by Christians. At least sixty percent of the population resides in the rural communities and literacy rates vary by sex and region. Overall, it is higher in the southern part and in males compared with females (NPC, 2012). Annual growth rate is 2.6 per cent and the average life expectancy is 55 years. The population is predominantly youthful and total fertility rate is 5.3 births per woman (USAID, 2012).

Nigeria is rich in mineral resources, having the largest deposit of oil and gas in Africa. As of 2013, it has progressed to a middle-income (MIC) status with a gross domestic product (GDP) of $510 billion. However, the country is challenged by perennial obstacles to economic development such as rising unemployment rates, insecurity, communal clashes, poor infrastructures, inequalities, and impoverishment (AFDB, 2020)

Health indicators in Nigeria are worse than most sub-Saharan countries(Aregbeshola, 2017). Consequently, WHO ranked Nigeria 187$^{th}$ among 191 member states in health system performance (NCDC, 2019). Due to rapid population growth and overcrowding, less than ten percent of households in Nigeria had access to improved water sources in 2017 while over sixty percent had poor sanitation services in 2018 (AFDB, 2020). In addition, favorable climatic and environmental conditions have encouraged the proliferation of vectors of infectious agents. This has resulted in disease outbreaks leading to high morbidity and mortality (Isere et al., 2015).


Fig 1. Map of west Africa showing boundaries of Nigeria. (Source: Maps model online, 2019)

## Health system

Nigeria's health system is decentralized into federal, state, and local governments, respectively. The Federal Health Ministry (FMoH), through the directive of the federal government allocate funds and coordinates activities of all tertiary hospitals, while all state governments through their respective State Ministries of Health (SMoHs) govern state specialists' hospitals and all the primary health centers (PHCs) in collaboration with the local governments. All three tiers of care provide basic preventive, promotive and curatives services. Specialized care is in addition provided by secondary and tertiary facilities. Furthermore, policies, supervision, monitoring and evaluation of the PHCs are provided by the FMoH (Abimbola et al., 2015).

Health care provision to the populace occurs through formal and informal providers (Timothy et al., 2014) Formal health providers are divided into public and private providers (Timothy et al., 2014)(Irinoye et al., 2015).

Nigeria allocates less than 5% of its GDP on healthcare despite its commitment to the Abuja declaration of 2001 (Aregbeshola, 2017)(Irinoye et al., 2015). Consequently, its health indicators rank among the worst globally. For example, maternal mortality ratio (MMR) is 545 per 100,000 births. Also, out-of-pocket (Timothy et al., 2014) spending exceeds most countries in sub-Saharan Africa(Aregbeshola, 2017). Other challenges facing the Nigerain health system are inequalities and inequities in resource allocation between the rural and urban communities, corruption, shortage of qualified health personnel, inconsistent health policies, and weak governance (Irinoye et al., 2015)(Aregbeshola, 2017) .

## CHAPTER 1: INTRODUCTION

Viral hemorrhagic fevers (VHFs) are a group of viral illnesses resulting from a direct spillover from rodents and arthropods to man. They are usually of sudden onset causing fever, body aches and bleeding from multiple organs and tissues of the body. They are classified under four families of RNA viruses- *Arenaviridae, Filoviridae, Bunyaviridae* and *Flaviviridae* with varying degrees of mortalities. Common examples include Lassa fever, yellow fever, Ebola (Tambo et al., 2018).

VHFs are included in epidemic prone diseases in Nigeria. Consequently, an integrated disease and surveillance system (IDSR) guideline by The Nigerian Center for Disease Control (NCDC) has been produced to strengthen weak surveillance system in the country (NCDC, 2019).

Lassa fever is a highly contagious infection that is associated with hemorrhage from bodily tissues (WHO, 2018). The etiological agent is a single stranded ribonucleic acid (RNA) virus that belongs to the family *Arenaviridae* (CDC, 2014). Three out of four serotypes of the virus have been discovered in Nigeria, and the fourth in other Lassa endemic countries (Ogoina, 2013). Humans become infected through direct and indirect contact with food and household items contaminated with the urine or feces of a specific type of rat (*Mastomys natalensis*) (Asuke et al., 2019).

The vector of Lassa virus i.e., *Mastomys natalensis* (Fig. 2) was discovered about fifty years ago. It is a domestic rodent, malodorous, with multiple breasts on its belly, hairy, and widely distributed in most rural communities in sub-Saharan Africa(Babalola et al., 2019)(Leski et al., 2015)(Orji et al., 2020) (Ogoina, 2013). Other vectors such as *Hylomyscus pamfi* and *Mastomys erythroleucus* have been implicated in a minority of studies on Lassa fever (Babalola et al., 2019).

Lassa fever is endemic in West African countries especially in Nigeria, Liberia, and Sierra Leone where outbreaks occur regularly(Musa, 2019) (Fig. 3). Also, it is estimated that 100,000- 300,000 new cases occur yearly with 5000 deaths (CDC, 2014). Among endemic countries, Nigeria has the highest incidence of reported cases (Tuite et al., 2019). Estimates of Case fatality rate (CFR) of 1% has been described; (WHO, 2018). Due to migration, sporadic cases have been reported in Europe and America (Brosh-Nissimov, 2016). Although, all age groups are at risk of developing infection, there is no sexual predilection (Ogoina, 2013). In addition, the incubation period ranges between one and three weeks.

Direct contact or primary transmission occurs when humans consume improperly prepared foods and grains contaminated by the infected urine and or feces of *Mastomys natalensis*. Indirect or secondary transmission occurs during contact with infected surfaces, bodily fluids and secretions of infected individuals either through sex or during care of sick individuals(Fig. 4) ( Fatiregun et al., 2020).

Figure 2: Mastomys natalensis, vector of Lassa virus (Nasri and Sani, 2015)

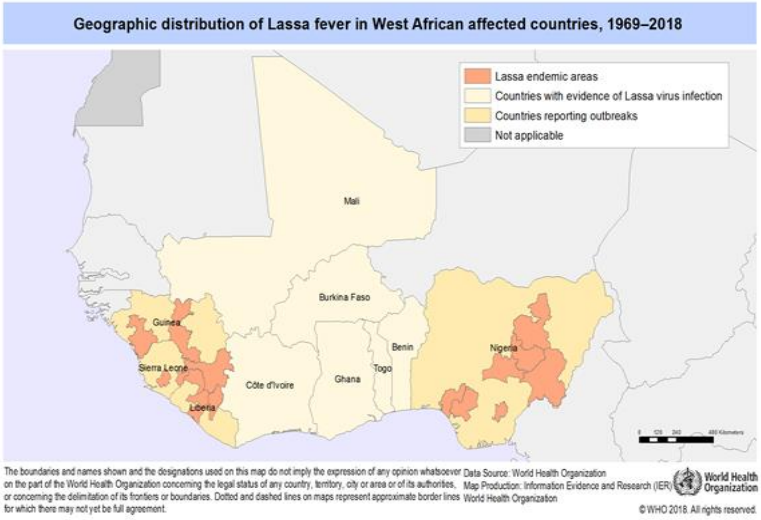


Figure 3: West African geographical distribution of Lassa fever (Source: WHO,2018)

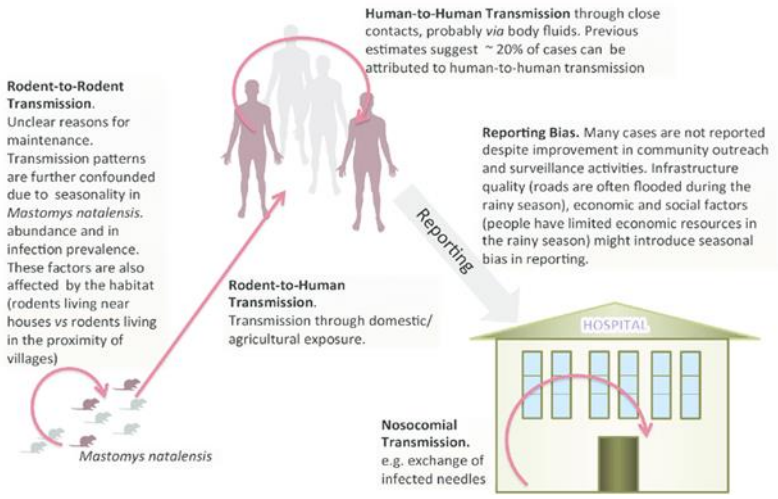


Figure 4: Transmission cycle of Lassa fever (Source: Giovanni et al., 2016)

In majority of cases, presentation is non-specific, mild, and mimics other viral and bacterial infections which are unresponsive to conventional antimalarial and antibiotic treatments culminating in poor detection rates and high mortalities in Africa (Brosh-Nissimov, 2016). Non-specific symptoms reported include headaches, myalgia, abdominal pain, and malaise. However, persistence of a high grade fever (>38C), sore throat, conjunctivitis, bleeding from orifices, vomiting, and diarrhea are highly suggestive of Lassa fever infection (Ilesanmi et al., 2015). Moreover, to enhance uniformity in diagnosis and treatment among all health providers, Lassa fever is classified into alert, probable, suspicious, and confirmed cases (NCDC, 2018) .

## Problem statement

Following the detection of Lassa fever in Lassa, a rural community in Borno State about five decades ago, the disease has spread to many states in the country causing yearly outbreaks (Amakiri et al., 2020). For example, in 2013, thirty out of a total of thirty-six states of the federation and the Federal Capital Territory (FCT) reported outbreaks (Ogoina, 2013); presently, 58 local districts in fourteen states reported a confirmation of at least one case of the disease(NCDC, 2021). This is likely to worsen due to the high population density of the country and the transmission dynamics of the virus. Moreover, all countries around the world risk sporadic outbreaks due to international migration and asymptomatic presentation of the disease in majority of individuals (Brosh-Nissimov, 2016). Currently, 67 mortalities have been recorded from the disease with a case fatality rate of 21%. (NCDC, 2021). Also, the absence of preventive vaccine to induce herd immunity against the disease has been reported(Burki, 2018)(Nasir & Sani, 2015).

In Nigeria, specialized centers for management of Lassa patients (treatment centers) are limited as well as screening services. Further challenges reported are the diagnostic difficulty of the disease due to at least three different genetic sequences associated with the Lassa virus (Boisen et al., 2020). Notwithstanding, the cost of care is enormous and predisposes most households with low socioeconomic status to financial burden and impoverishment (Asogun et al., 2016). Furthermore, climatic changes in the country favors the proliferation of the vectors of the virus (Burki, 2018). Other risk behaviors (such as overcrowding, poor hygiene, gaming of rodents, and roadside exposure of grains) predisposing to viral transmission via vector-man contact have also be reported (Ogoina, 2013).

Cultural norms ranging from bathing the dead to traditional autopsies and ingestion of waste water from deceased also occur (Vincent-Osaghae & Idehen -Agho, 2018). Studies have reported poor health literacy about the disease among residents(Ilesanmi et al., 2015) (Olowookere et al., 2017) and health providers (Ajayi et al., 2013). Further contributory factors are limited surveillance and case detection rates precipitated by poor resource allocation (WHO, 2018). Also, weak governance and apathy towards controlling outbreaks by successive governments have been reported (Akpede et al., 2018).

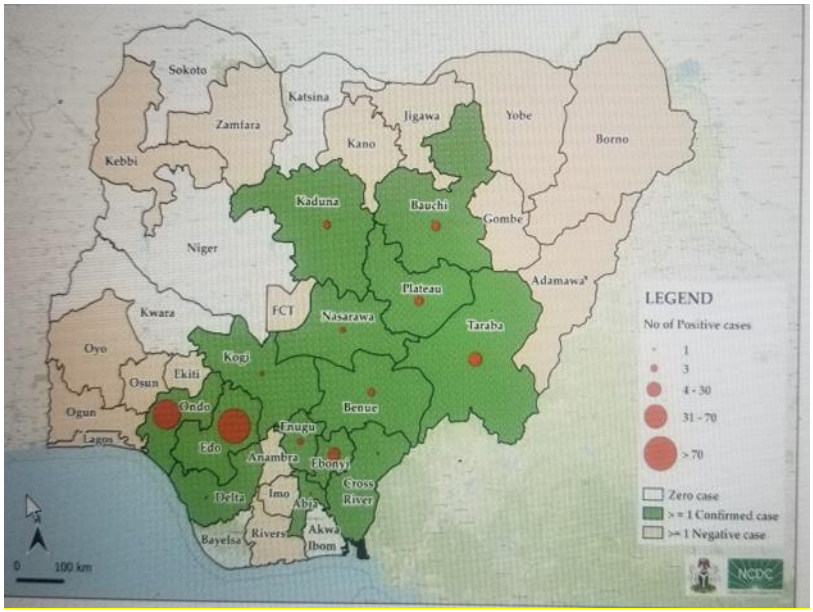


Fig.4: confirmed cases of Lassa fever in Nigeria (Source: NCDC, 2021)

## Justification

Recognizing the continuous threat emerging and re-emerging diseases pose to all countries, member states of WHO developed a blueprint for the prevention of epidemics through the services of experts (Si et al., 2020). Due to its significant risk of transmission, Lassa fever, one of the priority diseases has gained attention by the Nigerian government in the last three years. This involved the approval of Ribavirin for the prophylaxis and treatment of confirmed cases in addition to other supportive measures. Moreover, in the absence of vaccines for primary prevention of Lassa fever in Nigeria, other public health measures were introduced by the NCDC. For example, healthcare workers from three states were trained on Infection Prevention and Control (IPC) and use of personal protective equipment (PPEs). Also, a national Lassa Fever Emergency Operation center is in the FCT for coordination of national surveillance activities. Other control measures involve 'isolation and confinement' of confirmed cases from the general population (Amakiri et al., 2020).

Border control measures such as limiting tourists from other countries on the Lassa fever belt have also been tried with minimal success (Amakiri et al., 2020). Nigeria has also collaborated with other countries on the Lassa fever belt on surveillance and development partners for support in the last two years (Ben-Enukora et al., 2020)(Kakai et al., 2020)**.** Despite these control measures, cases continue to be detected, and epidemics occur yearly with associated case fatalities in Nigeria. Also, studies have been conducted on knowledge, attitude, and practices (KAP) and other social determinants contributing to Lassa fever infection in Nigeria. However, limited data exists in literature on enabling factors and barriers that determine accessibility to preventive and treatment care of Lassa fever in Nigeria. Consequently, this thesis aims to address this gap in knowledge.

## General objective

To assess enabling factors and barriers that determine access to preventive and treatment care to Lassa fever in Nigeria to strengthen policies on prevention and treatment of Lassa fever.

## Specific objectives

To determine demand factors influencing access to prevention and treatment of Lassa fever.

To explore supply factors associated with access to Lassa fever prevention and treatment.

To make recommendations to Ministry of Health (MoH) to strengthen policies on prevention and treatment of Lassa fever in Nigeria.

## Methods

This research, essentially a literature review, was based on the retrieval of articles from an elaborate online search of literatures relating to enabling factors and barriers to Lassa fever prevention and treatment in Nigeria and other countries on the Lassa fever belt. Peer-reviewed and grey literature was identified using a search protocol and databases search engines such as PubMed, KIT, VU library, Google Scholar, ResearchGate and Google. Furthermore, websites of World Health Organization (WHO), Center for Disease Control and Prevention (CDC), African Development Bank (AfDB), United States Agency for International Development (USAID), UNESCO and Nigeria Center for Disease Control (NCDC) were searched for relevant literatures. Also, the "AND", "OR" Boolean operators were also included in the combination of keywords (refer annex 2).

## Search strategy

Articles utilized for the provision of evidence in the study were retrieved following an initial search with the following (Lassa fever prevention OR control) AND Nigeria) as combination using Google Scholar, PubMed, and Google search engines. Subsequently, an advanced search was done using various combinations of component keywords of demand and supply side of Levesque's framework:

(Approachability, transparency, outreach, information, screening, acceptability, professional values, gender, male or female sex, culture, availability and accommodation, geographical location, opening hours, costs of health care, technical expertise, guidelines, coordination, health literacy, health belief, personal and social values, cultures, housing conditions, environment, family support, social support, health insurance, income, empowerment, treatment adherence).

Many articles retrieved during the search were sorted according to relevance after a quick scan of their titles and abstracts. Further articles were derived through snowballing technique on primary articles. Grey and peer-reviewed literatures written in English language from Nigeria within the last ten years were prioritized for the search. However, to put Nigeria in context, relevant articles from

other Lassa endemic countries were also utilized in the study. Articles written more than ten years ago as well as those not in English language were excluded.

## Conceptual framework

The conceptual framework described by Levesque et al. (2013) (Fig. 5) was selected because it provided an in-depth explanation of the enabling factors and barriers (demand and supply) determining accessibility to preventive and treatment care in the health system and the population. This framework describes access in terms of various dimensions in relation to the geography, economic and social status in addition to providing options of studying important determinants relating to health care access (Levesque et al., 2013). Specifically, there are three interconnected layers within the framework; the first layer (supply side) comprises five dimensions of approachability, acceptability, availability and accommodation, affordability, and appropriateness respectively; the middle layer is the layer of access. The third layer is the demand side. It is composed of five abilities corresponding to the five dimensions (Levesque et al., 2013).

Approachability implies that a population is aware of its health needs, where to access healthcare and its overall effect on its wellbeing. Its principal determinants are transparency, screening, information. Furthermore, acceptability describes the sociocultural determinants influencing a populations acceptance of specific services. For example, professional ethics, gender norms and culture are key components. Availability and accommodation relate to timely presentation for specific services by users. It is influenced by such factors as type of appointments, duration of service, health facility location and attitude of providers. Affordability refers to the economic costs (financial or time) incurred by users of specific health service. It may be direct, indirect, and opportunistic. Appropriateness describes a balance in the expectation of health service between the user and provider (Levesque et al., 2013). It involves technical expertise, coordination, quality and use of guidelines.

On the demand side, factors such as health literacy and beliefs, trust and expectations determine the ability to perceive, while other social determinants of health such as individual, culture, gender, living conditions, environmental factors, income, family support, information adherence are influenced by the abilities to seek, reach, pay and engage, respectively.

Studies have shown that in low-middle-income countries (LMICs), over 8.6 million deaths have resulted from problems associated with poor access or quality of care (Cu et al., 2021). While the yearly epidemic of Lassa fever in Nigeria has resulted in increasing mortality and morbidities, the Levesque's conceptual framework provides the best strategy for analysis of the objectives of this research with a view to proffering useful and practical recommendations.

Despite a wide variety of accessibility frameworks existing, Levesque's conceptual framework was most appropriate for this research due to its comprehensiveness and its consideration of the demand and supply factors in relation to accessibility" (Cu et al., 2021).

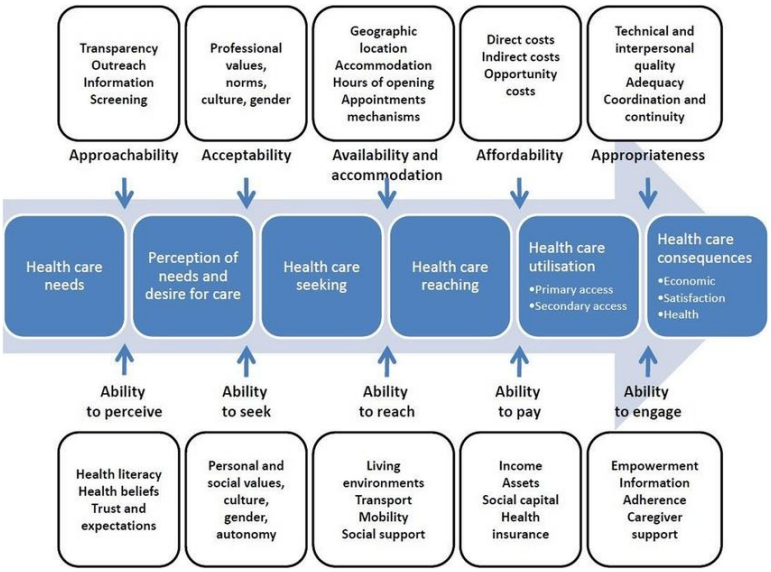


Fig 5: Conceptual framework for access to care (Levesque et al., 2013)

## Limitations of Methods

The validity of study findings could have been improved if additional qualitative techniques such as focus group discussion or interview with key Lassa fever control officers in Nigeria was conducted. However, this was impossible due to the ongoing challenges of COVID-19 pandemic in Nigeria.

## CHAPTER 2: RESULTS.

This chapter contains a detailed report of findings retrieved after conducting a meticulous search of literatures described earlier in the methods section. Specifically, it elaborates on the specific objectives of this study. The framework described by Levesque at al. (2013) is used for the explanation of the demand and supply determinants influencing access to care. In summary 190 literature from grey, peer-reviewed literature and reports retrieved. These were subsequently reduced to 80 following scanning of abstract and utilized in writing the results.

### Demand factors influencing prevention and treatment of Lassa fever.

#### 1.1. Ability to Perceive.

The perception of individuals influenced by literacy, their beliefs, trust, and expectation from health providers are important determinants encouraging access to prevention and treatment.

Health literacy involves having knowledge about health, and its application for ones' wellbeing. It is primarily influenced by ability to communicate effectively in clear and simple language information related to health. Largely relevant for the prevention of diseases and seeking treatment during periods of ill-health, health literacy strongly relates with knowledge, personal motivation (Hamilton-Ekeke et al., 2020) and individual literacy rates. Poor literacy directly correlates with poor health literacy and vice versa (Nwafro-orizu, 2015). Health literacy is divided into three closely inter-related components of health promotion, communication, and information, respectively. Generally, health literacy rates are low in Nigeria which contributes to its burden of diseases (Nwafro-orizu, 2015). Apart from Ghana, literacy rates are low in other Lassa endemic countries (UNESCO, 2017).

Although specific Lassa-related preventive data are limited, general data on Knowledge, Attitude and Practice (KAP) about Lassa fever conducted in various geographical locations reveal different findings. For example, Fatiregun et al. (2019) in a cross-section study conducted among heads-of-households in Ondo state, southwestern Nigeria reported that knowledge on preventive care was poor. Further details revealed that enablers of knowledge were the radio, health providers, television, and acquaintances. Also, the feminine gender, having at least secondary education, divorced, or being married, and being resident in Lassa fever endemic local government areas (LGAs) were predictors of knowledge of the disease.

However, in another study conducted among 323 respondents in a university community in Federal Capital Territory (FCT) Abuja, northcentral geographical region, knowledge about preventive care was good in majority (90%) of respondents. Further findings in the study revealed knowledge on preventive care was positively influenced by gender, religion, marital status, age, and university education ($p<0.05$). On the contrary, there were no identified barriers. (Egenti et al., 2019).

Also, in a study conducted among 122 consenting residents in a rural community of Owo southwestern region, findings revealed that despite majority of respondents lacking knowledge on Lassa fever, a minority with knowledge of preventive care translated such into good hygienic practices which was evident among respondents with university education. Access to information from the media was an enabler of preventive knowledge whereas no barrier was identified (Ilesanmi et al., 2015)(Adesoji et., 2016).

Prior to this study, in 2012 following the successful containment of an outbreak of Lassa infection in Oyo state, a comparative study on knowledge about Lassa fever was conducted in two neighboring communities; the first with the outbreak and rural while the second was within an adjoining tertiary institution. Findings revealed university participants were more knowledgeable about preventive care and the difference was statistically significant (p=0.01). However, only a third of the total respondents (39/130) had satisfactory knowledge of preventive care. Access to information from broadcast (Awosanya, 2018)(Olalekan, 2015) media, health providers, friends and places of worship were identified enablers although tertiary education was an additional source of knowledge for university participants. There were no identified barriers to knowledge (Awosanya, 2018).

Most indigenous Africans believe in the power of a supernatural being during periods of illness. More importantly, spirituality has been reported to ease the trauma associated with sickness (Afolabi et al., 2013)(Tobin et al., 2020). Consequently, religion is an integral part of African culture that influences peoples' choice to access health care. (Ajima & Ubana, 2018)(Afolabi et al., 2013). For example, in one study on belief and information sources on Lassa fever almost 50% of participants believed it was a demonic attack, a third believed it was a form of affliction, and a quarter believed it was a retribution for sinful acts. A minority of respondents (3.3%) believed it was from the developed world, others believed it could be cured spiritually (20%) or indigenously (6%). Enablers of knowledge were broadcast media (radio, television), social media (magazines, newspapers), health providers, friends, relatives, churches, schools, and work environments (Adesoji et., 2016). However, literature search from other countries on the Lassa belt yielded no results on all components of "ability to perceive", as well as "trust and expectation" in Nigeria.

### 1.2. Ability to Seek: personal and social values, culture, gender, autonomy.

Individual behaviors are elicited in response to perceived risks associated with contracting a disease (Usuwa et al., 2020). Such behaviors may not be elicited unless the beneficial effects clearly supersede the dangers. Preventive measures such as quarantining of Lassa fever patients during outbreaks results in their social withdrawal from services (Tobin et al., 2020). Consequently, the fear of neglect, discrimination, and uncertainties associated with curative care present as barriers to seek care during

ill-health from Lassa fever(Tobin et al., 2020). In Sierra Leone following mortalities of inpatients from Ebola virus disease in health facilities, most residents refrained from accessing care from providers due to fear, lack of trust, and poor quality of services (Koch et al., 2021).

Examples of psychosocial consequences such as stigma and discrimination preventing access to health care have been reported (Usuwa et al., 2020)(Ujewe, 2019). While stigma construed as 'shameful' inhibits effective social interaction; quarantining and suffering are other consequences attributed to Lassa fever. Usifoh et al. (2019) evaluated the perceived impact of stigmatization on survivors of Lassa fever among 300 staff and students respectively in a university community in Edo state. Findings revealed stigmatization to be higher among students (n=162: 57.9%) compared to staff (n=112: 39.9%). Staff were more emphatic than students ($p<0.001$) and no association was reported with demographic characteristics. However, significant association was reported between gender ($p<0.012$), knowledge ($p<0.013$) of students and stigmatization. Knowledge of preventive care was higher in staff in comparison with students.

Country-wide studies conducted by various researchers have documented poor knowledge about Lassa fever among citizens (Usifoh et al., 2019)(Ighedosa et al., 2016)(Akinwumi et al., 2016). According to Afolabi et al. (2013), individual factors influencing health seeking behaviors include user fee, time costs, provider attitude, drug shortage and improper communication (Afolabi et al., 2013). Although, males and females are equally affected (Ogoina, 2013)(Tobin et al., 2013) by Lassa fever, one study reported a higher incidence of the disease among males compared to females following laboratory screening (Ilori et al., 2019). However, a contrasting finding of higher incidence in females at a treatment center was reported in Sierra Leone (Shaffer et al., 2014).

Cultural norms, values and gender influence the choice of individuals and groups on healthcare access (Ujewe, 2019). For instance, in Nigeria, the traditional norm of patriarchy still exists. More specifically in northern Nigeria, women are subjected to men's permission before seeking healthcare. Other barriers of northern women to health care access include permission from religious and community leaders (Sinai et al., 2019) (Azuh et al., 2015).

### 1.3. Ability to Reach: living environment, transport, mobility, social support.

Transportation facilitates easy access of the population to health facilities and is most important during emergencies because it ensures timely access to services. In rural communities, transportation challenges delay and prevent timely access to preventive and curative services (NCDC, 2017)(Usman & Sulyman, 2013)Also, cost of transportation, types of transportation, and road networks are other determinants of healthcare access. High cost of transportation to health facilities worsens financial burden of low socioeconomic earners (Usman & Sulyman, 2013).

In the countryside, where more than 60% of the total population of the country resides (Muhammed et al., 2013), travelling time, location, and inelastic demand for services serve as barriers (Hulland et al., 2019). Moreover, treatment centers for specialized care (including HCWs and laboratory services) are in urban centers posing additional barriers to access during emergencies. In Sierra Leone, cases of Lassa fever (suspected or confirmed) detected in health facilities located in endemic communities are referred by free transport to improve access to curative care (Shaffer et al., 2014).

Social support results from any assistance from relatives, acquaintances, and member of the community that optimizes health. Although it can either be emotional, religious, financial, societal, or educational, it is critical for self-esteem, optimism, confidence and improving access to health services (Agbor et al., 2017). It may also have a positive or negative effect. Family support has been reported to optimize wellbeing during ill-health (Idigbe et al., 2020). Conversely, withdrawal of support by relatives following confirmation of Lassa fever has been associated with shame and fear (Tobin et al., 2020). Furthermore, emotional, financial, and professional support were reported to have beneficial effect in one study on the mental health needs of caregivers of hospitalized Lassa fever patients. However, in the same study, fear of contacting the disease by health providers and some relatives resulted in a discriminatory attitude against Lassa fever inpatients (Tobin et al., 2020).

### 1.4. Ability to Pay: income, assets, social capital, health insurance.

Accessing healthcare either preventive, curative or rehabilitative in a timely manner is important for human wellbeing. However, payment for these services when in need serve as a barrier to many households, especially the poor. Specifically, it inhibits their access and worsens their financial burden (W.H.O, 2010a). According to Essue et al. (2014) as cited by Asogun et al. (2016), most residents of developing countries (including Nigeria) incur a huge financial burden because of out-of-pocket payment for healthcare. This results from poor financing of the health sector by government. Although accessing care for prevention is uncommon, funds for curative and rehabilitative services for Lassa fever are sourced through private sources. i.e., direct out-of-pocket by patients and their caregivers in Nigeria (Asogun et al., 2016).

Payments for curative care (direct payments) by users include hospitalization fees, screening tests, pharmaceuticals, medical consumables (Asogun et al., 2016). Other private sources of funding include contributions from social networks and colleagues (Tobin et al., 2020). Occasionally, funds are pooled through donor agencies such as WHO and International Federation of Red Cross and Red Crescent (IFRC) during outbreaks to support emergency services (IFRC, 2012) (WHO, 2018).

Despite Nigeria having a National Health Insurance Scheme (NHIS), only a small fraction of the population i.e., five per cent, are covered (Aregbeshola, 2017) which further contributes to a barrier in

terms of ability to pay. A similar contributory barrier to payment occurs in Ghana where a larger population i.e., 60% is uncovered by the NHIS (Sogoba et al., 2012). however, unlike the earlier mentioned countries, curative care for Lassa fever in Sierra Leone occur at no cost to users of the service (Dahmane et al., 2014).

In a study by Asogun et al. (2016) to evaluate the costs incurred by patients and caregivers for curative services on Lassa fever in a treatment center Edo state southern Nigeria, two categories of payments were compared. In the first, subsidy was provided for drugs and investigations while the second had no subsidy. However, other costs common to subsidized and unsubsidized categories i.e., costs of admission, medical consumables, oxygen therapy and dialysis respectively were maintained. Unsubsidized costs ($262) were almost twice subsidized costs ($174). In both instances, cost of care was still unaffordable for patients and caregivers because the national minimum wage was a sum of $36 monthly. Such catastrophic spending of more than 40% household income on health may contribute to impoverishment (WHO, 2010), reduce access, and worsen health inequities. However, it should be noted that other indirect costs which may be incurred such as duration of man-hours lost, psychological and emotional impact of provision of care were not evaluated in this study.

### 1.5. Ability to Engage: Empowerment, information, adherence, caregiver support.

Empowerment is strategic to WHO's plan of promoting health and wellbeing among populations. For effectiveness, empowerment must be tailored to individual and communal needs. This will involve several stages of social interaction to improve their "understanding and control" over their wellbeing. Consequently, changes in sociopolitical situations will improve overall health outcomes and result in equitable societal inclusion crucial to empowering individuals politically, mentally, and materially(W.H.O, 2010b). Furthermore, it is the primary responsibility of government that all patients, caregivers, associates, and support groups are empowered through their communities, professional, educational, and civil society organizations to respect health as a right.

While individual empowerment promotes development, autonomy, responsibility, fulfilment, and self-esteem, communal empowerment encourages stakeholder unity in health decisions and equitable resource allocation (W.H.O, 2010b). In Nigeria, community leaders are empowered on Lassa fever to educate all residents and promote health seeking behavior by formal public health providers (Ajayi et al., 2013) (Asogun et al., 2012), DHMT, NCDC (NCDC, 2018), mass media (Johnson et al, 2020)(Ekwueme & Asogwa, 2020). and donor agencies (IFRC, 2012)(WHO, 2018). Similarly, in Liberia empowerment of communities and health providers by WHO and MoH occurred via print and broadcast media following containment of Lassa fever outbreak in several counties (Woyessa et al., 2019). Furthermore, individuals are also beneficiaries of the aforementioned categories (Tobin et al.,

2020). For example, following an outbreak of Lassa fever in a tertiary health facility in Ebonyi state, health providers conducted a health education on Lassa fever to all communities within the state. This was achieved through social, print and broadcast media. Also, individuals, stakeholders (religious and traditional leaders), and district health providers were educated and empowered on preventive measures, health promotion and referral of suspected cases of Lassa fever respectively. This was to forestall a future recurrence of the outbreak (Ajayi et al., 2013). Prior to this, in 2012 during an outbreak of Lassa fever in five states in Nigeria, IFRC recruited volunteers to empower local residents of affected communities on preventive measures against Lassa fever and promote health seeking behavior among confirmed cases to reduce transmission of the virus (IFRC, 2012).

Also, the broadcast media are used by government for empowerment of communities about Lassa fever. Specially, broadcast media are used to communicate health promotive messages in local dialect to a large audience on the disease, its dangers and prevention. In a study to determine the effectiveness of Nigerian Television Authority (NTA) on health promotion activities on Lassa fever within Ekiti state, more than 60% respondents reported they were educated by the messages from NTA (Johnson et al., 2020).

Information asymmetry between health providers and patients influences adherence to health services (Boluwaduro, 2021). In a study conducted among market women on factors influencing adherence to preventive practices, it was reported that knowledge of Lassa fever contributed to adherence to preventive practices against Lassa fever (Aro, 2020). As earlier reported, caregiver support may either promote or discourage access to preventive or curative care (Agbor et al., 2017).

## Supply factors associated with access to Lassa fever prevention and treatment.

### 2.1. Approachability

Approachability implies that potential users of health service realize it exists, is reachable and impactful (Levesque et al., 2013). Its determinants include transparency, outreach, information, and screening services. Following an outbreak of Lassa fever in a community, active surveillance, awareness campaigns and outreaches are conducted in the affected and at-risk communities respectively by health providers, DHMT and the state Ministry of Health (SMoH)(Ajayi et al., 2013). This is meant to improve their knowledge and access to preventive and curative services.

However, studies conducted to assess the knowledge among health providers has shown different results. For example, in a study conducted by Ijarotimi et al. (2018) in Ondo State among healthcare workers (HCWs), it was observed that knowledge of prevention measures on Lassa fever as well as its presentation was poor. Specifically, out of 190 sampled HCWs in 50 primary and 9 secondary health

facilities respectively, less than fifty percent had appropriate preventive knowledge on the disease. Despite this, registered nurses were more knowledgeable (OR: 10, 95% CI: 5.06- 15.0) compared to other cadres- health assistants (OR: 5, 95% C.I: 1.27-19.6), community health workers (OR: 2.5, 95% C.I; 1.07-5.60). In registered nurses, pre-service training, working in public hospitals were identified as contributory to knowledge (Ijarotimi et al., 2018).

Corroborating this finding on poor knowledge, another study conducted in Sokoto state northern region among 298 healthcare workers (HCWs; doctors, dentists, nurses, laboratory scientists, and radiographers) reported that less than one-fifths of respondents had good knowledge on preventive care against Lassa fever (P=0.006, df=8) (Fidelis & Olajolumo, 2019). Also, in a recent KAP study by Asuke et al. (2019) conducted among 131 formal public and private-for-profit providers (doctors, nurse-midwife, nurse, midwife, community health officers (CHO) and other allied staff) in Kaduna state, knowledge of prevention of Lassa fever was poor in more than 50% of participants enrolled within the study.

On the contrary, in a study conducted among 300 formal public health providers (doctors, nurses, community health extension workers, CHOs) working in primary healthcare facilities in Osun state, 60% of the respondents had good preventive knowledge about Lassa fever (Adebimpe, 2015).

Another reason for the lack of approachability for preventive and treatment services is lack of trust in the services rendered by formal health providers (Ujewe, 2019) (Iyalomhe, 2014). Effective communication with affected communities during outbreaks will increase trust, improve demand for services and reduce barriers to approachability(Nancy Kass et al., 2019).

An additional determinant of approachability is the presence or absence of screening. Screening for Lassa virus (LASV) is performed in specially designed laboratories (biosafety 4). According to World Health Organization (WHO, 2018) and Center for Disease Control (CDC, 2014*)*, Enzyme Linked immunosorbent Assay (ELIZA), the Reverse Transcriptase Polymerase Chain Reaction (RT-PCR), antigenic tests and viral culture respectively are screening tests performed to improve diagnosis. However, in countries on Lassa fever belt, screening tests are limited to antigenic tests for LASV using immunoassays or PCR (Boisen et al., 2020). Furthermore, in Nigeria, only the RT-PCR test is available for screening in treatment centers (NCDC, 2018)(Ajayi et al., 2013)(Babalola et al., 2019).

Hitherto, screening on LASV samples collected in Nigeria was conducted in Kanema, Sierra Leone, another endemic country. Fifteen years ago, Nigeria had two laboratories; currently, screening services are conducted in five laboratories (Chandra et al., 2021)(Tambo et al., 2018). Unlike Nigeria, in other Lassa endemic countries, screening services are conducted in fewer laboratories. For example, while LASV samples from Benin Republic are sent to other countries (Yadouleton et al., 2020), other neighboring countries like Sierra Leone and Guinea possess two laboratories respectively for screening services (Dahmane et al., 2014)(Magassouba et al., 2020). Despite this, approachability to screening

services is restricted by lack of reagents, poor handling of samples, limited human resource, improper storage of samples, excessive demand on services, and travel time to treatment centers. (Babalola et al., 2019) (Chandra et al., 2021)(Dahmane et al., 2014). Also, funding challenges and sustainability of existing laboratories are other identified barriers (Naidoo & Ihekweazu, 2020).

## 2.2. Acceptability

Acceptability relates to users' satisfaction with services rendered by providers (Muhammed et al., 2013). It is influenced by culture, religion, ethics, and gender. Health care providers must communicate in simple, clear, effective, appropriate language to clients about diseases, the mode of transmission and prevention. This is especially important during periods of epidemics because it enhances trust and improves acceptability of services (Nancy Kass et al., 2019)(Tobin et al., 2020).

All health care providers (doctors, nurses and other allied health staff) are guided by professional ethics in the provision of care to patients (Nancy Kass et al., 2019). Specifically, professional ethics of justice, autonomy, beneficence, and respect are important determinants of an acceptable health service. Respect requires equality in provision of services to patients irrespective of social status, religion, race, and gender. Justice implies equitable provision of healthcare to all users of specific service while autonomy is non-interference in the decision of users of a service. Beneficence, i.e., doing no harm is the moral basis for public service. This ensures promoting individual and communal behaviors that prevent ill-health in healthy individuals and encouraging empathy for ill patients irrespective of availability of curative care. During outbreaks of Lassa fever, beneficence also implies appropriate containment measures devoid of stigma and discrimination (Nancy Kass et al., 2019).

Provider attitude also influences acceptability of service delivery in Nigeria (Afolabi et al., 2013)(Asuke et al., 2020)(Ibrahim et al., 2014). Poor attitude has been associated with anxiety, hatred, avoidance, and lack of confidence in HCWs(Ibrahim et al., 2014)(Tobin et al., 2020). On the contrary, empathy promotes acceptability. In a qualitative study conducted in a referral center in Edo state, two conflicting attitudes were reported about health providers. In the first group of health providers working in the emergency unit of the facility, attitude was poor and discriminatory to Lassa patients because of fear resulting from poor knowledge about the disease, while the second category of health providers working in the treatment center demonstrated satisfactory attitude of empathy regarding inpatients (Tobin et al., 2020). In another study conducted by Raab et al. (2020) among public health providers in rural and urban communities respectively in Guinea, more than 95% of respondents demonstrated empathy and non-discrimination towards perceived patients and survivors of Lassa fever.

## 2.3. Availability and Accommodation

Availability and accommodation implies provider organization of services to meet demands of clients (Muhammed et al., 2013). They include such factors as location, time, opening hours, and mode of appointments. In Nigeria, the geographical location of health facilities and treatment centers (referral centers for specialized care) differ between the northern and southern regions. Despite the nation's policy on health facility location to be within a 5km radius or half-hour distance from residential areas (Muhammed et al., 2013), most facility locations do not conform to policy guideline. For example, in most southern states most health facilities are reached within 2hours while northern and few coastal states are reached much longer (Hulland et al., 2019). Also, more than two-thirds of population reside in the rural communities with few health facilities. Paradoxically, health facilities are concentrated in the urban cities therefore posing a geographical barrier to access (Iyalomhe, 2014)(Hulland et al., 2019). For example, most providers on the NHIS are in the urban communities, limiting the access to quality service by enrolled rural clients. Furthermore, inadequate number of trained providers (doctors and nurses) in public health facilities is a recognized barrier to availability of services in the rural communities (Abimbola et al., 2015) (Omonona et al., 2015)(Raab et al., 2020). Nevertheless, attrition of the few health providers in rural to urban communities also worsens availability of services. Specifically, doctors and nurses' attrition were thrice in rural facilities than urban facilities, and primary health facilities were most affected. Other notable barriers to access include poor roads and transportation, and climatic conditions(Otu, 2018).

All endemic states possess specialized treatment centers with isolation wards for treatment and containment of LASV transmission (Dan-Nwafor et al., 2019). According to the NCDC (2018), fourteen treatment centers are in the country (Adamawa, Bauchi, Ebonyi, Edo, Federal Capital Territory, Abuja, Kano, Kogi, Lagos, Nasarawa, Ogun, Ondo, Oyo, Plateau and Taraba states respectively). However, only three are fully functional, worsening geographical accessibility; and are overburdened by the referral of cases. Unlike Nigeria, in Sierra Leonne, only one treatment center exists (Kanema General Hospital, KGH), which serves as a hub for referrals from other health providers (Shaffer et al., 2019). For example, Lassa fever cases are transported via ambulance from a secondary facility to KGH which is more than 60km from the referring facility (Dahmane et al., 2014). Curative care is provided daily to all Lassa patients by scheduled appointments in clinics and on emergency basis following referrals from primary, secondary and private for profit health facilities respectively (Asogun et al., 2012)(Shaffer et al., 2019).

In a qualitative study conducted in a treatment center in Edo state, Tobin et al. (2020) reported that HCWs were not available to attend to the needs of in-patients in the treatment center. Although it was a stressor to relatives, this also indicates the ongoing challenges related to availability of HCWs to provide necessary services.

## 2.4. Affordability

Affordability is a measure of costs provider charges for services rendered and the capacity of users' to pay for those services (Muhammed et al., 2013). Unfortunately, providing health care that is accessible, affordable and of good quality has remained a bane of the Nigerian health system due to poor funding. For instance, despite signing the 2001 Abuja accord mandating all African countries to allocate 15% of national budgets on healthcare, Nigeria budgeted 4.14% to the health sector in 2020 (Nghargbu & Jumare, 2020). Subsequently, provision of basic infrastructure such as health facilities, laboratories, and employment of adequate HCWs has remained a challenge. (Irinoye et al., 2015)(Nghargbu & Jumare, 2020). Due to this fact, health providers charge some fee for curative care for Lassa patients.

However, in contrast Sierra Leone another Lassa endemic country, a study reported that all direct costs of care are borne by public and private health providers (Dahmane et al., 2014). Occasionally, providers subsidize curative care on drugs and screening tests in Nigeria (Asogun et al., 2016). Also, at risk communities are supplied with PPEs (masks, boots, gowns, and gloves), disinfectants, and mattresses. Moreover, the DHMT and health providers incur cost of surveillance for primary and secondary contacts. Consequently, this minimizes financial risks, promotes efficiency and equitable access to services during outbreaks. Other indirect costs (number of man-hours for provision of curative care to patients and caregivers) are borne by health providers (Asogun et al., 2016). Also, studies have reported health providers funding the total costs of curative care for Lassa patients. For example, in a prospective study to determine the clinical outcome of confirmed Lassa fever patients on treatment conducted in Owo, all consenting participants had their direct costs of care funded by the health providers (Duvignaud et al., 2020) (Erameh et al., 2020).

## 2.5. Appropriateness

Appropriateness implies a match between demand and supply for services (Levesque et al., 2013). It involves expertise, adequacy, and coordination of health services. The NCDC is statutorily responsible for the coordination of all public health responses to Lassa fever, other emerging and re-emerging diseases in the country. Similarly, in neighboring west African countries (Benin and Togo), coordination of public health responses is done by their respective MoHs (Ben-Enukora et al., 2020). In addition to aforementioned role, Ghana MoH also provides governance on all formal health providers (GMoH, 2020). For a successful public health response, NCDC collaborates with all states to improve case detection, information gathering and surveillance activities (NCDC, 2019). Also, WHO advocates that all countries must have infection prevention and control (IPC) protocols in all facilities to ensure safety of providers, users, and caregivers. Specifically, preventing transmission of emerging and re-emerging diseases of high virulence is crucial for global safety (WHO, 2019). Furthermore, to ensure

quality health care that is appropriate and tailored to the needs of the population, IPC protocols are developed for all HCWs especially those involved in direct provision of care (WHO, 2019)(NCDC, 2019)(Gborgblorvor et al., 2018). These protocols minimize risks of infection transmission, promote safety and ensure efficiency in service delivery (NCDC, 2020) (Umar et al., 2020).

IPC are preventive measures done to eliminate person-to-person or nosocomial transmission of infection within a health facility and ensure safety of all health workers and users of health service (Odegbemi et al., 2019). Other guidelines have also been produced to strengthen surveillance activities nationwide (NCDC, 2019).

The governance structure in all treatment centers is provided by the hospital management which coordinates the activities of hospital Infection Prevention and Control Committee (IPCC) and IPC team. Moreover, other aspects of governance include monitoring and evaluation, policy making, staff welfare and resource allocation. The IPCC team provides surveillance, infection prevention and control within the hospital environment. Membership of the IPC is composed of trained health providers of various cadres (NCDC, 2020).

Only qualified providers (doctors, nurses, and laboratory scientists) are directly involved in care for Lassa patients in treatment centers. However, for preventive services such as health education, other allied health staff are engaged. For effectiveness and efficiency in service delivery, all providers undergo regular in-service training of sufficient quality on IPC including use of personal protective equipment (PPEs) by specialists on infection prevention (NCDC, 2020)(Woyessa et al., 2019). Thereafter, proficiency tests are done to ratify professionalism of all trained providers. Furthermore, to ensure 24-hour service availability, appropriate staff are recruited to prevent work overload (NCDC, 2020)(Dahmane et al., 2014)(Shaffer et al., 2019).

In a survey conducted among 451 HCWs to determine the level of preparedness of formal public health institutions in the country to manage Lassa fever and other emerging diseases, 80% participants reported in-service training, 63% confirmed the presence of guidelines for management of the disease (Umar et al., 2020) (Odegbemi et al., 2019). Despite this, the lack of access to PPEs was a barrier to standard IPC practice in the health institutions studied. Uvieroghene and Bird (2021) in a cross-sectional study to confirm technical quality evaluated knowledge of IPC among doctors in four specialties (internal medicine, pediatrics, obstetrics and gynecology, and surgery) in a referral facility. They noted that overall knowledge on IPC was good although gaps existed in IPC practices (Uvieroghene and Bird, 2021).

However, in another study conducted among public and private health providers in primary, secondary and tertiary health facilities in Edo state on knowledge, attitudes as well as IPC measure, it was reported that IPC was poor across all tiers of care; doctors and nurses had poorer IPC measures compared to

CHEWs. Further findings revealed that PHCs had the highest IPC measures while the tertiary facilities had the lowest (Ireye et al., 2019). Ijarotimi et al. (2018) in a study conducted among primary and secondary providers in Ondo state, reported poor IPC measures which were due to lack of in-service training and unqualified health providers in the health facilities.

Studies from Guinea conducted among 102 formal public providers in rural and urban communities, revealed high knowledge (100%) in all respondents despite a third lacking training on IPC. Further findings revealed better IPC practices among rural providers in comparison to urban providers (Raab et al., 2020).

Also, another study conducted in Ghana to determine the preparedness of public providers to treating infectious diseases, it was reported that more than 80% of respondents had technical expertise following in-service training and 87% affirmed the availability of treatment protocols (Gborgblorvor et al., 2018).

# CHAPTER 3: DISCUSSION

This chapter will provide explanations on the results retrieved from literature search in the previous chapter. Findings are discussed according to the specific objectives of this study.

## Demand factors influencing prevention and treatment of Lassa fever.

Every year Lassa fever outbreaks occur in both rural and urban communities in Nigeria with associated mortalities and morbidities. This is attributable to a lot of determinants that influence accessibility to health care services. Unlike Nigeria, in some west African countries, yearly outbreaks are not reported. For example, in Ghana the first outbreak occurred in 2011 and subsequent outbreaks occurred after four years (Woyessa et al., 2019). Also, except for Ghana, literacy rates are low in the general population among all countries on the Lassa fever belt. However, there are notable observations about literacy rates; health literacy is a function of individual efforts and personal motivation. This is probably the reason why higher health literacy has been strongly associated with university education. Having an in-depth knowledge on Lassa fever disease and its risk factors will improve hygienic practices of the population i.e., prevention, and promote health seeking behavior during ill-health since majority of Lassa fever present without symptoms. Consequently, higher literacy rates in Ghana may contribute to the infrequent outbreaks that occur in the country although absence of surveillance and poor reporting of cases may also be contributory.

Other sociocultural determinants have been reported to influence health care access. For example, in some Nigerian households, religion has a huge impact on peoples' perception of illness. Specifically in relation to Lassa fever, while some households believe that Lassa fever is a demonic attack, others believe it's a retribution for sinful acts and few others believe it's a western disease. Therefore, these categories of people believe in only a spiritual remedy for curative care. Such myths, beliefs and misconception can pose as barriers to prevention and treatment consequently leading to person-person transmission and outbreaks in the communities. However, in other endemic countries, the perception of religion on Lassa fever poses a challenge due to the non-availability of literature.

Despite no sex differences in incidence of Lassa fever, one Nigerian study reported more males in comparison with females following screening tests. This observation probably results because more males in comparison with females are exposed to improperly processed foods contaminated with vector excreta when they patronize multiple food handlers. However, in Sierra Leone more females had a higher incidence of Lassa fever compared to men. This finding may result from the domestic gender roles of the females which increases their risk of contact with the vector of LASV. Moreover, it may also result from better health seeking behavior of gravid women due to free costs of care for health services(Shaffer et al., 2014).

In Nigeria, gender discrimination against women is common as most communities encourage masculinity and patriarchy. This implies that women cannot take prompt decisions about seeking healthcare in the absence of their husbands. In northern Nigeria, it has been reported that in the absence of husbands, women need to seek permission from religious or community leaders before accessing healthcare(Sinai et al., 2019). This implies that an infected woman poses an increased risk of transmission of Lassa fever within her household and community.

Stigma and discrimination are psychosocial consequences of emerging and re-emerging diseases globally. However, in majority of Lassa fever patients' discrimination, social and self-stigma that occur following detection results in fear and anxiety. This results from poor knowledge about the disease within the communities. Public health interventions such as quarantining aimed at limiting the transmission of the diseases in the community also contributes to the apprehension. These negative consequences worsen the suffering of individuals, encourages non-disclosure of ill-health, promotes self-therapy, and patronage of informal health providers, ultimately serving as barrier to accessing curative care. Also, avoidance of health facilities and providers occurred due to fear and poor service during the Ebola crisis in Sierra Leone. Such costly delay in seeking curative care has the propensity to increase the prevalence of the disease in the community, render surveillance activities ineffective and inefficient. Moreover, anxiety and fear within endemic communities may result in discrimination and non-disclosure of information to health providers. Stigmatization is commoner among young persons in comparison to adults due to their relative inexperience and poor knowledge about the disease.

In comparison to the urban communities, rural communities have fewer health facilities and health providers despite a greater demand for health services since more than 60% of the entire population are resident there. This implies that most users of health care travel long distances to health facilities. Even when transportation is available, the long distances to the health facilities present a barrier to accessing prompt healthcare in emergencies. For example, in Sierra Leone, despite the availability of transport, Lassa patients travel about 60km to access curative care. In Nigeria, the shortest travel time to health facilities is about 2hours in the southern region and more than 2 hours in some northern counties. Likewise, bad terrains are additional challenges to reaching the facilities. Consequently, these results worsen inequalities and inequities in access to health services because most rural households are in the low socioeconomic class.

In Sierra Leone, curative care occurs at no cost to the Lassa patient. However, in some countries with national health insurance (Nigeria and Ghana), the proportion of the population that is covered with the scheme is very low. Therefore, in these categories of patients, payment for curative care presents as financial burden to their households. Apart from the immediate economic impact on the household, most patients lose their jobs, colleagues, and relations when they are infected with Lassa fever. Even when direct costs are subsidized, costs of health care still present as barrier to most households living

on the meagre national wage. For example, one study estimated direct cost to be between $174 and $262 while the national minimum wage was $36. Most households are impoverished due to out-of-pocket spending of more than 40% of their income on medical bills. This burden may be reduced if adequate social support is available. Social support system may be financial, emotional, and professional. Usually, positive support system has a beneficial effect on the Lassa fever patients. On the contrary, negative support system worsen outcomes. As earlier enumerated, payment barriers to health access may lead to barriers in seeking care which may result in untreated Lassa fever cases which can increase the transmission of viral infection within the population.

However, to achieve good health and wellbeing, empowerment of individuals and communities with key messages and risk communication on Lassa fever prevention and treatment must occur. This occurs following the containment of outbreaks by health providers, the NCDC, donor agencies. Community and religious leaders and other stakeholders are empowered with knowledge about Lassa fever. Once empowered, knowledge is transferred to residents of the communities. Other sources of empowerment include the print, social and broadcast media. Studies on empowerment in other Lassa endemic countries are limited from literature search. However, in Liberia, following the death of two confirmed inpatients of Lassa fever, empowerment of health providers and communities on surveillance was done by WHO and MoH to improve their knowledge on prevention and detection of cases (Woyessa et al., 2019).

These findings were corroborated in other Lassa prevention studies that were reviewed where the media (broadcast, print and social) was one of the most important sources of empowerment. Specifically, the media is used because of its cost effectiveness in reaching a large audience, communicating in the local dialect and its wide coverage and availability all day. The radio is particularly useful in empowerment in regions with low literacy rates (Ben-Enukora et al., 2020). An example of the successful intervention through the media occurred in 2014 following outbreak of Ebola viral disease, another viral hemorrhagic fever which had caused 8,000 and 7,000 mortalities in Sierra Leone and Liberia respectively; in Nigeria the media was used to empower over 130million citizens with health promotive messages although 20 mortalities were recorded (Ekwueme & Asogwa, 2020). The media is also used to dispel rumors and misconceptions about the disease. Moreover, populations that are most at risk of developing Lassa fever i.e., farmers, hunters, food handlers are easily reached with informative messages on prevention. However, inappropriate use of the media also causes anxiety and discrimination during emergencies occasioned by Lassa fever. Health providers were also enablers of knowledge of preventive care because of the pre-service and in-service training they received. Other enablers of knowledge were friends, relatives, personnel from donor agencies and NCDC.

## Supply factors associated with access to Lassa fever prevention and treatment.

Studies conducted in northern and southern regions in Nigeria revealed different findings on knowledge among health providers. While findings from three studies showed that health providers had poor knowledge about prevention, one study reported a contrary result, i.e., good knowledge about preventive care. However, one outstanding finding about the study in Ondo state was that the level of health literacy was higher among the professional nurses who were in formal public health sector and had in-service training in comparison with other cadres of staff (community health workers and health assistants). This finding is significant considering the fact that service delivery in most primary health facilities are rendered by community health workers (Abimbola et al., 2015). Moreover, majority of the population reside within the rural communities. Therefore, all health providers with poor knowledge on prevention on Lassa fever are more at risk because they provide care to numerous users of health services (such as patients and caregivers), other colleagues, and may be exposed to spillages from body fluids, aerosols, or infected surfaces. Consequently, they could be infected through their contact from these various sources and serve as risks for person-to-person transmission of the virus resulting in outbreaks within the health facilities or communities.

The availability of screening services is another factor determining access to services. In Nigeria, only the treatment centers located in the urban communities offer screening services. Presently, only five out of thirty-six states have laboratories offering screening services for LASV. In other Lassa endemic countries, fewer laboratories render screening services. An example is observed in Sierra Leone where only one treatment center conducts screening services on all LASV samples in the country. Despite this, not all laboratories are fully functional for screening services resulting in greater demand than supply of services. Moreover, poor sample storage and handling, limited human resource, long travel times to laboratories and prolonged processing of samples are other recognized bottlenecks. All these challenges result in diagnostic delays of cases, serve as barriers to access and increases the risk of viral transmission within population.

Furthermore, equality, equity, respect, autonomy are professional ethics that attract users of health facilities during service provision. Therefore, in the context of Lassa fever, this will promote health seeking behaviors, early containment through surveillance activities and reduce the risk of transmission within communities. On the contrary, discrimination and stigmatization by health providers are demoralizing to caregivers and Lassa fever patients. This may result to avoidance of care in health facilities, self-medication, and transmission of the disease within the community resulting in outbreaks.

Although the FMoH through the NCDC has constructed eleven additional treatment centers increasing the total number to fourteen to cope with the demand for curative care within the country, only three centers are fully functional and providing services. However, in Sierra Leone, only one treatment center

has been providing curative care for more than thirty years (Shaffer et al., 2014). Consequently, the inadequate supply to meet the population demand for curative care will increase the incidence and prevalence of Lassa fever in the community. Moreover, an increase in workload on HCWs in treatment centers result in stress, ineffectiveness, and inefficiencies in provision of care. Also, inequality and inequity in HCW distribution due to high attrition from rural to urban facilities makes service availability difficult resulting in delay in diagnosis and referral of suspected cases of Lassa fever.

Universal coverage of services has been unsuccessful due to poor resource allocation to the health sector from the national budget. Even though a NHIS is available, its poor coverage of the total population has remained a challenge (Nghargbu & Jumare, 2020)(Owusu-Sekyere & Chiaraah, 2014). Therefore, most providers demand a user fee for services rendered pushing most households into impoverishment because they spend more than 40% of their monthly wage to pay for medical bills. Although direct cost of care is free in Sierra Leone, in countries where user fees are charged (Nigeria), this may result in self-therapy for the impoverished increasing the risk of transmission within households and communities.

Recognizing the threat to global safety due to the virulence of emerging and re-emerging diseases, the WHO in collaboration with countries developed protocols to ensure efficient, effective, and holistic care to all Lassa fever patients. Moreover, most Lassa endemic countries have adaptations to these protocols based on contextual factors. For example, in Nigeria, NCDC provides technical support to all state MoHs, in-service training to public health providers, strengthen surveillance activities of DHMTs and support risk communication. Furthermore, it also collaborates with other endemic countries on technical expertise and surveillance activities (Kakai et al., 2020). Although studies conducted on HCWs on IPC in most endemic countries confirms technical expertise due to in-service training, gaps exist in the practices rendered. These gaps may result from poor coordination, supervision, and monitoring by the MoH, NCDC and IPCC respectively resulting in increased risks of LASV transmission. Furthermore, non-availability of PPEs produces a dual risk. It increases the risk of LASV transmission from infected HCWs to the patients and vice versa. Also, the observation of poor IPC practices among doctors, nurses and tertiary health facilities may result from the aforesaid, although a reduced quality of curative care due to a higher workload in the treatment centers may also be contributory. Consequently, there is an increased risk of outbreaks in these centers.

## Reflection on Framework

Levesque's framework was relevant to this study due to detailed component of its demand and supply factors however the policy component could favorably be added to address excess morbidity and mortality due to LASV. Some components are duplicated (caregiver support and social support) while some were not useful (assets). Further research into LASV and other infectious diseases using such

framework could benefit from reducing redundancy by removing some of these identified duplicated errors.

## Study limitations

Limited data was retrieved from other Lassa endemic countries from literature search. Specifically, data on health literacy, beliefs, trust and expectations, social support, opportunity cost were unavailable. Therefore, these made contextualizing difficult resulting in inability to generalize. Possible explanations for the limited data include prolonged conflicts (Sierra Leone), poor reporting due to limited surveillance activities, less virulent strain of LASV.

A second limitation is information bias resulting from stigma and discrimination of respondents in qualitative studies reviewed. Thirdly, the use of grey literatures in the absence of peer-reviewed literatures may produce results that are not generalizable. Also, articles from Lassa endemic countries may produce results that are not be generalizable to other contexts.

# CHAPTER 4: CONCLUSION AND RECOMMENDATION

The conclusion and recommendations of the study is presented in this chapter. Essentially, recommendations are suggested to strengthen policies by the MoHs on the prevention and control of Lassa fever.

## 4.1. Conclusion

Every year, cases of Lassa fever are detected in many states in Nigeria. However, unlike Nigeria this trend has not been reported in other Lassa endemic countries. For instance, in Ghana outbreaks of Lassa fever were reported twice in five years. Generally, literacy rates are low on all countries on the Lassa belt except for Ghana. Although, health literacy derives from literacy and personal motivation, it is low among most Nigerians apart from those with a tertiary education. Poor knowledge about preventive care to Lassa fever occurs among residents of rural and urban communities, exception being inhabitants with tertiary education in both communities. Among health providers, knowledge of preventive care shows conflicting patterns, high and low. Within the health workforce, nurses have a higher knowledge in comparison to other cadres.

Sociocultural determinants influence access to health care. Personal and communal beliefs, gender discrimination, myths and misconceptions act as barriers to access. Although there are no sexual preferences for Lassa fever disease, gender roles are responsible for the sex-specific incidences reported in different contexts. Further barriers to demand for preventive and curative care include psychosocial consequences of stigma and discrimination associated with Lassa fever. Moreover, inequities and inequalities in health facility and human resource distribution relative to rural-urban population demands are also recognized barriers. Also, payment for curative care for households not covered by national health insurance are barriers that predispose most low socioeconomic households into impoverishment. However, social, print and broadcast media as well as health providers, friends and associates are enablers of demand for preventive and curative care.

Supply factors are important determinants of access to prevention and treatment of Lassa fever. For instance, screening services are conducted in specialized laboratories located in treatment centers. Screening services are inadequate in all Lassa endemic countries to high population demands. Also, professional ethics and attitudes of health providers influence access to services. Further supply factors include geographical location of treatment centers, cost of care, technical expertise, and availability of protocols.

## 4.2. Recommendations

Due to the recurrent outbreaks of Lassa fever with its associated morbidities and mortalities, the following are recommendations to the MoH based on their practicability and relevance to the Nigerian context.

### 1.Health Literacy

Since the discovery of Lassa fever over forty years ago, responses to outbreaks of the disease in the country have been reactive. Proactiveness in response using surveillance (epidemiological) data of populations and communities at risk is highly recommended. Simultaneously, empowerment of the entire population about Lassa fever prevention and treatment should occur. This is because all persons irrespective of socioeconomic status are at risk of disease. Health literacy in the population should be promoted through all media channels (radio, television, print media and social media). This is because all the media outlets are cost effective, accessible and have wide coverage of the population. Also, key messages and risk communication should be provided in local dialects to further empower populations with knowledge. Specifically, this should commence following the completion of the situation analysis of communities and populations at risk. This is very crucial prior to the commencement of the harmattan season- the period of outbreaks in Nigeria.

Furthermore, all health providers must undergo quarterly in-service training to empower them with knowledge on Lassa fever and IPC. Stigmatization and discrimination against Lassa fever cases and survivors should be strongly discouraged during empowerment sessions. Emergency help lines should be made available always for questions, clarifications, and reporting of suspected cases. Also, hygiene specialists and environmental health officers should be deployed routinely for inspection of food handlers and communities.

### 2.Advocacy

- Poor political commitment towards public health measures to control Lassa fever since its discovery over forty years ago has contributed to the failure in achieving control leading to the transmission of the disease to almost all states of the country. The MoH should pay regular advocacy visits to all tiers of government to lobby for political support on public health intervention towards Lassa fever control.
- Legislature: Advocacy visits to the legislature to enact laws against spreading grains on roadside, bush burning, traditional autopsies, consumption of rats and “bathing of corpses” and sanctions for erring individuals or groups.
- Ministry of Education: Advocacy to the ministry of education to include modules on Lassa fever and other VHFs in the education curriculum for secondary schools and colleges.

- Ministry of Agriculture: collaboration with the ministry of agriculture on vector elimination to break the transmission cycle of LASV. This will involve use of rodenticides in rural households and grain stores.
- Community: Advocacy visits to community and religious leaders to promote health literacy among the communities, dispel myths and misconceptions about Lassa fever disease.

### 3.Treatment Centers

The MoH should urgently rehabilitate and equip all eleven treatment centers, recruit, and train health providers to promote effectiveness in service delivery. Also, referral services should be strengthened through provision of free transportation to all suspected and confirmed cases.

### 4.Lassa Fever Fund

Due to the low budgetary allocation to health sector, funds can be raised effectively from mild increases in ticket prices. This source of funding is sustainable because demand for air transportation is inelastic among the high socioeconomic class in Nigeria. Pooled funds can be used to provide free curative care for Lassa fever patients.

### 5. Research

More research needs to be conducted on trust and expectations, opportunity costs, transparency, outreach components of the Levesque conceptual framework.

## Annex 1: Definitions

Cases of Lassa fever are classified into the following to enable uniformity in diagnosis by all health providers.

1. Alert: any individual presenting with fever of unexplained origin associated with or without hemorrhage OR anyone with a history of sudden death following an unknown illness associated with fever or hemorrhage (NCDC, 2020).
2. Suspect: anyone with an onset of high-grade fever (temperature> 38$^{o}$C) associated with at least one of the following symptoms: diarrhea, vomiting, myalgia, sore-throat, uncontrolled bleeding from orifices, abdominal pain, and fatigue OR in neonates, maternal history of Lassa fever with or without symptoms (NCDC, 2020).
3. Probable: any dead person or a suspect (where sample collection for laboratory confirmation has remained impossible) that is linked to a confirmed case of Lassa fever in time, place or person (NCDC, 2020).
4. Confirmed: any suspected case with a laboratory confirmation (positive IgM, positive PCR, or viral isolation) OR having an epidemiological link to confirmed case (NCDC, 2020).
5. Contact: any individual that co-habits with a case for at least thirty days, had a direct or indirect communication with a case (dead or alive) or his/ her body secretions (Ajayi et al., 2013).

## Annex 2: keywords combinations and search engines

| Specific Objective | keywords | Search combination | Databases/websites |
|---|---|---|---|
| 1.To determine enabling factors and barriers influencing demand for prevention and treatment of Lassa fever. | "Health belief", "health literacy", "trust and expectation" "individual factors", "cultural norms", "cultural practices", "sociocultural practices", "gender", "living environments", "housing", "social support", "family support", "payment options", "health insurance". "Empowerment", "information", adherence, "caregiver support", "healthcare seeking", Perception, | Lassa fever in Nigeria<br>Lassa fever in West Africa<br>Lassa fever in Ghana<br>Lassa fever in Benin<br>Lassa fever in Guinea<br>Lassa fever in Sierra Leone | PubMed, Goggle search, Goggle Scholar, NCDC and WHO websites |
| 2. To explore supply factors associated with access to Lassa fever prevention and treatment | "Approachability", "transparency" information, screening "Acceptability", "professional ethics", values", norms, "culture", "gender", "geographical location"," accommodation", "opening hours", "appointment mechanisms"," direct'" costs", indirect cost", "technical" "expertise", "guidelines', "coordination and continuity" Availability and Accommodation Affordability', "Appropriateness" "Provider information", "Screening", "geographical location", "accommodation", "health worker availability", "costs of healthcare", " | Lassa fever in Nigeria<br>Lassa fever in West Africa<br>Lassa fever in Ghana<br>Lassa fever in Benin<br>Lassa fever in Guinea<br>Lassa fever in Sierra Leone | PubMed, Goggle search, Goggle Scholar, NCDC and WHO websites |
| 3. To make recommendations to Ministry of Health (MoH) to strengthen policies on prevention and treatment of Lassa fever in Nigeria | | | |

## Annex 3: References


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