IOSR Journal of Nursing and Health Science (IOSR-JNHS)
e-ISSN: 2320–1959.p- ISSN: 2320–1940 Volume 7, Issue 1 Ver. IV. (Jan.- Feb .2018), PP 06-12
www.iosrjournals.org

Lassa fever: A Threat to Nigeria Economy A Paper Presented At

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Date of Submission: 12-01-2018 Date of acceptance: 29-01-2018

I. Introduction

Lassa fever is a zoonotic virus infection. The disease causes an annual wide spread of morbidity and mortality in Africa. It can be imported by travelers, possible importation of Lassa fever, and the potential use of Lassa fever virus as an agent of biological weapon or bioterrorism. Clinicians in Nigeria and other West African countries are to be vigilant and familiar with the basic characteristic of this disease. The virus resides in either animal or anthropoid vectors. The disease is restricted to areas where the host species live. It's estimated that annually about 15 million contacts the disease with the annual number of illness estimated at three million and annual death rate put at 58,330 (WHO).Lassa fever kills in a trail; it's not uncommon for it to completely wipe out whole families. As at January 14th, 2016, 13 states are affected or have reported cases of Lassa fever in Nigeria and they are; Bauchi, Nasarawa, Niger, Taraba, Kano, River, Edo, Plateau, Gombe, Abuja, Lagos, Oyo and Imo. This has been increasing with every outbreak. This paper will be discussed under the following headings;

II. Background History

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2. Virology
3. Vector
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15. Threat of Lassa fever to the Nigerian Economy
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III. Background History

The modern-day Lassa virus strain probably originated at least 1,060 years ago in Nigeria and then spread to Sierra Leone as recently as 150 years ago. The lineage is most likely much older but how long can not be calculated for lack of data. Though it was first described in 1950's, the virus causing Lassa fever or Lassa hemorrhagic fever was not identified until 1969 when two missionary nurses (Laura wine and Lily Pinneo) died in Nigeria in a town called Lassa in Bornu State, and that was where it got its' name After Lily Pinneo died her sample was sent to Yale University in New Haven where the virus was detected. Yale University is a private University found in 1701.It's endemic in West Africa, including Sierra Leon, Liberia, Guinea, and Nigeria. However other neighboring countries are also at risk.

The First Case Recorded In African

Year	Countries
1969	Nigeria
2000	Mali
2011	Ghana

Cote D'Ivoire
Burkina Faso
Togo
Benin

3.1 **Causes**

It's caused by Lassa virus which belongs to the group of Arenaviridae.
All hemorrhagic fever is caused by four major group of viruses.

1. Arenaviridae, Causes:
2. Lassa Fever In Africa
3. Bunyaviridae, Causes
4. Rift Valley In Africa Or
5. Hantavirus Hemorrhagic Fever With Renal Syndrome In Asia
6. Filoviridae, Causes
7. Ebola And Marburg Infection In Africa
8. Flaviviridae, Causes
9. Yellow Fever In Africa And South America
10. Dengue fever in Asia, Africa, and America

Virology

Lassa fever is caused by a single-stranded RNA virus and its disseminated systemic primary virus infection. The virus gains entry into the host cell using the cell-surface receptor, the ALPHA-DYSTROGLYCAN (ALPHIA – DG). In the cell, it's able to replicate and cause immune suppression.

Vector

The natural host for the virus is the multimammate rats (mastomysnatalensis) which breed frequently and are distributed widely throughout West, Central, and East Africa. They are the common rodents in tropical Africa, and they are found predominately in rural areas and dwellings more often than surrounding country side. It's found in urban settings where the level of hygiene is low.
Member of this genus are infected persistently and shed the virus in their excreta and other bodily fluid throughout life.

Fig 1: Multimammate Rat.

Mode Of Transmission

1. Humans become infected with Lassa virus from exposure to the droppings of infected mastomy rats.
2. Through contacts with contaminated food, drinks, and items within or around human, e.g. eating plates.
3. Through humans by direct contact with blood, urine, feces or other bodily fluid of infected human.
4. In the health care setting where the virus may be spread by contaminated medical equipment such as needles.
5. It can be transmitted sexually through semen.
6. It could be transmitted through breast milk from an infected mother to her child.
7. It can be inhaled from dry surfaces or infected dust.
8. By eating the multimammate rat (Mastomys natalensis) as it's a delicacy in some parts of Africa.

Fig 2: Rat Eating Grains

Diagnosis

Diagnosing Lassa fever is by testing the blood of the infected or suspected individual for Lassa virus. Laboratory diagnosis is by using enzyme like immune sorbent serologic assays (ELISA)

Incubation Period

The incubation period is from 1 – 21 days (3 weeks)

Incidence

It affects both male and female, and it's common in the dry season than wet season.

Clinical Manifestation

Lassa fever is difficult to diagnose clinically but should be suspected in a patient with a fever **greater than 38c, and suc**

h patient failed to respond to anti-malaria and antibiotics drugs.

Clinical Predictor

1. Fever > 38^0c - 41^0C.
2. Cough.
3. A Sore throat.
4. Pharyngitis.
5. Retrospinal pain.
6. Vomiting.
7. Stomach pain.
8. Diarrhea.
9. Pink eye[conjunctivitis].
10. Swelling of the face.
11. Protein in urine.
    - Tremor.

Fig3: Signs And Symptoms Of Lassa Fever

Treatment

1. Any suspected or diagnosed patient should be admitted promptly to hospital and barrier nurse or isolated
2. Strict isolation technique should be maintained in all cases. Procedures' for handling body fluid and excreta must be maintained.

3. Fluid, blood, oxygenation should be replaced if need be with close monitoring.
4. Antibiotics to be given to prevent any bacterial infection.
5. RIBAVIRIN - (Trade names are; Copegus, Rebetol, Ribazol, Virazol) is an antiviral, pro drug, called nucleoside analog. The drug was pioneered by Joe MC Cormick in 1979.
6. It interferes with virus replication by inhibiting RNA dependent nucleic synthesis.
7. It's the drug of choice in the treatment of Lassa fever. It's very effective if started early in the illness and that is within six days of contracting the virus.

Adult Dose;
Less than 75kg 5oomg b.d
Greater than 75kg 400mg tds or 600mg b.d
Pediatric Dose
25-36KG – 200mg b.d
37-49KG - 200mg -400mg
51- 61kg- 400mg b.d
61kg above Adult Record show that it reduces the death rate by 90%. It's expensive.

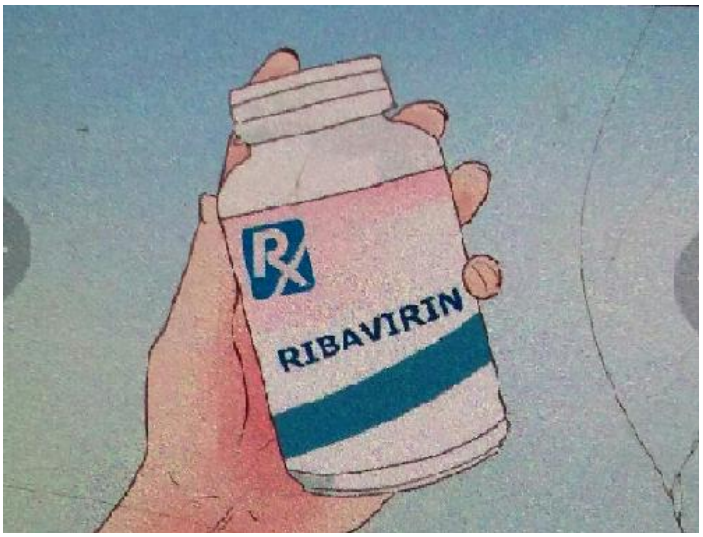

Fig 4: Ribavirin; Drug Of Choice For The Treatment Of Lassa Fever

Complication

1. Mucosal bleeding [nose, mouth, lungs, digestive tract and the vagina]
2. Sensory neural hearing loss deficit
3. Pleural effusion
4. Pericardial effusion
5. Spontaneous abortion
6. Shock
7. zoonosis
8. Myalgia
9. Coagulopathy
10. Thrombocytopenia
11. Encephalitis
12. Hepatocellular jaundice.
13. Seizure.
14. Death.

Prognosis

About 15%- 21% of hospitalized Lassa fever patient will die from the illness. The overall mortality rate is estimated to be 1%, but during endemics, mortality can climb as high as 50%. The death rate can be greater than 80% when it occurs in pregnant women during their third trimester. Abortion decreased the risk of death to mothers. Some survivors experience the lasting effect of the disease.

Morbidity & mortality rate of Lassa fever.

The death rate is particularly high for women who are in their third trimester of pregnancy and for fetuses about 95% of which die in the uterus of infected pregnant mothers.

WHO, estimated about 1000,000 – 3000,000 with approximately 5000 deaths. From August 2015 to February 2016 about 63 people in 212 reported death (Punch newspaper 2016).

Approximately about 15% - 20% of patients hospitalized for Lassa fever died from the illness. However, only 1percent infected with Lassa virus result in death.

data of lassa fever in nigeria(2015 -2016)

Description	Bauchi	Niger	Taraba	Kano	Rivers	Oyo	Edo	Plateau	Nasarawa	FCT	Ondo	Delta	Ekiti	Ebonyi	Lagos	Kogi	Osun	Gombe	Ogun	TOTAL
Cases																				
New Laboratory confirmed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	3
New Suspected Cases	0	1	0	1	1	3	0	4	1	0	2	0	0	1	0	0	0	4	1	19
Rumour Under investigation	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	1	5
Total Laboratory confirmed	**6**	**1**	**5**	**2**	**3**	**2**	**9**	**4**	**2**	**2**	**2**	**1**	**1**	**0**	**3**	**0**	**1**	**0**	**1**	**45**
Total Suspected Cases	**38**	**56**	**23**	**18**	**11**	**6**	**9**	**19**	**16**	**5**	**10**	**2**	**5**	**7**	**4**	**4**	**1**	**5**	**1**	**240**
Total number currently in treatment facility	4	0	4	2	0	0	2	7	2	1	5	0	4	1	2	1	0	4	1	40
Deaths																				
Newly Reported	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	0	0	3
Total deaths in confirmed cases	4	0	2	2	3	0	7	0	1	2	2	1	0	0	1	0	1	0	1	27
Total deaths in suspected cases	5	1	9	7	0	1	0	3	1	2	2	0	1	3	0	1	0	0	0	56
Total Deaths	**9**	**21**	**11**	**9**	**3**	**1**	**7**	**3**	**2**	**4**	**4**	**1**	**1**	**3**	**1**	**1**	**1**	**0**	**1**	**83**

Satistical report of lassa fever 2016 NCDC

Lassa Statistics From Dec 2016---June 2017

As at 9th June 2017, a total of 501 suspected cases including 104 deaths were reported.

People At Risk

1. Individuals who live or visit rodent infested areas.
2. Persons who eat the rodent (MastomysNatalensis) as a delicacy.
3. Researchers.
4. Physicians.
5. Nurses.
6. Health care assistance.
7. Laboratory scientist.

Prevention

1. People should be educated on proper way of food processing (stop drying food beside roads, e.g., Cassava produce, grainsetc.)
2. Ensure foods are adequately covered, cooked or uncooked.
3. Ensure regular hand washing with liquid soap and antiseptics
4. Ensure furniture surfaces are cleaned with disinfectants, e.g., tables & floors.
5. Doors and windows should be closed especially at night, if not possible, a net should be used.
6. All medical professionals should wear protective gadgets when treating people who are infected or suspected to be having Lassa fever.
7. Wear mask one meter before reaching the patient.
8. Anybody who show symptoms of Lassa should report to the hospital immediately.
9. General cleanliness of all home environments should be maintained.
10. All waste bin should be tightly closed.
11. Avoid unnecessary handshakes and contacts with anybody fluids of other people.

Threat Of Lassa Fever To The Nigeria Economy

1. The multimillion-naira cassava flakes(Garri) processing company was short down temporarily for fear of individuals contracting Lassa fever through the consumption of cassava flakes; Gari consumption drops. Garri could not be exported, as this affects both internal and external revenue generation.
2. Millions of naira were spent by Nigeria government to get the protective gadget for clinicians who care for people with Lassa fever. This money if channeled to other parts of the health sector would have improved our health care facilities tremendously.
3. Same applied to training and retaining of staffs to enable them to prevent and manage the diseases effectively .e.g. was the Epidemiology &laboratory training program to support and manage Lassa fever by the ministry of health.(Tim new man 2016)
4. Drug of choice in the treatment of Lassa fever ribavirin is expensive, and families are affected financially as there are report that in some Lassa treatment centers treatment are not free
5. Lassa fever outbreak in Nigeria is putting out investors who would have come to invest in Nigeria economy.
6. Families spend more money on rodenticide compare to two years before the outbreak
7. The disease reduces employment opportunity of people living in affected areas.
8. Tourists are not able to come into Nigeria and making the sector to be losing revenue.
9. Not enough primary health care centers in the remote rural areas where these out breaks occur, and this is the reason for the fast spread of the virus.
10. Brain drain to Lassa fever; As many health professionals lose their life to the scourge in the bid to save other peoples lives.
11. If this continues, Nigeria may be barn from participating in international competition.

IV. Recommendation

Intensive public enlightenment campaign through print electronic and social media on food processing, handling, storage, handwashing and disposing of waste. This will increase the awareness of the diseaseWar against rats by using rodenticide within and around the houseSTOP eating of rats as one can be infected during the process of preparation and consumptionEnsure proper disposal of dead rats (bury them)Government to improve our surveillance system, epidemiology studies by funding them appropriately Open up more diagnostic centerEnsure all Lassa centers are working, the country has up to 12 centers, but only two centers are functioning, i.e. Irrua specialist teaching hospital in Edo State (ISTH) and (LUTH) Lagos university teaching hospital. This is too small for one eighty million Nigerians to access. Provision of protective gadgets and other equipment by relevant authorities to the appropriate quarters.Health care professionals should always apply standard infection prevention and control precautions when caring for patients, regardless of their presumed diagnosis.Life insurance cover for all health professionals saddled with the responsibilities of managing infectious cases. Subsidizing the drug of choice for Lassa fever will make it more accessible.The government needs to wake up to their responsibilities on time to avert further spread of the virus. Also, the government is to open more primary health care centers that are well-equipped with competent professionals in rural areas, as this will aid early diagnosis, treatment, and curb the spread of Lassa virus.

V. Conclusion

To free Nigeria from Lassa fever and to protect our economy, all hands must be on deck.
Also, the government should focus on other things, the health of its citizen and the nation at large.
Finally, the people should carry out daily sanitation of their environment as this will make it inconvenient for rats to breed.

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Adagunodo Rachael Mubo."Lassa Fever: A Threat To Nigeria Economy A Paper Presented At"." IOSR Journal of Nursing and Health Science (IOSR-JNHS) , vol. 7, no.1, 2018, pp. 06-12.