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RESEARCH PAPER

MEDICAL COST OF LASSA FEVER TREATMENT IN IRRUA SPECIALIST TEACHING HOSPITAL, NIGERIA

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ABSTRACT

This cross-sectional study sought to estimate the direct medical cost of Lassa fever treatment on patients in South-South Nigeria. All the 73 confirmed Lassa fever cases admitted in the isolation ward of the Institute Of Lassa Fever Research and Control, Irrua Specialist Teaching Hospital (ISTH) Irrua, in Edo State, Nigeria, between May 2015 and May 2016 were studied. A checklist was used to collect data on the socio-demographic characteristics and medical cost incurred by the patients. Data entry and analysis was done using SPSS version 20. The average total direct cost for Lassa fever treatment was N86,802.63 per patient for the subsidized treatment and N205,558.99 per patient for the unsubsidized treatment. Medications accounted for the highest unsubsidized payments (N86,929.55; 42.10%) while hospital care accounted for the highest cost component of he subsidized payments (N19,756.51; 22.76%). Up to 84.28% of medication and 70.8% of investigations was subsidized making a total of 57.77% subsidy in the average total payments per patient. For an average Nigerian, direct cost of treatment of Lassa fever is still expensive despite subsidy in medications and investigations. Therefore efforts geared towards reducing the economic burden of Lassa fever on patients and their families are advocated.

Key words: Lassa fever, medical cost, poverty-reduction, South-South Nigeria

INTRODUCTION

Healthcare expenditures often present a considerable challenge to the economic well-being of patients and households especially in low economic resource countries like Nigeria.(Leive and Xu, 2008). This can increase a household's susceptibility to impoverishment (Chuma *et al*., 2007; Whitehead *et al*., 2001). The World Health Organization (WHO) estimated that households that spend 40% or more of their non-food expenditure on treatment are most likely to be impoverished (WHO, 2000). To this effect, the poor are likely to be the most affected, because they spend larger proportions of their income than the wealthier groups when they seek care (Leighton and Foster, 1993).

Lassa fever is a severe and often fatal hemorrhagic illness caused by Lassa virus (Frame et al., 1970). There have been countless outbreaks of various magnitude and severity across West Africa. Estimates of annual incidences of Lassa fever across this region reach as high as 300,000 infections and 5,000 deaths annually (Ogbu *et al*., 2007). Primarily, humans become infected from contact with urine and droppings of infected rodents of the genus mastomys. Transmission from person to person has also been established, presenting a challenge for health care workers. Other possible routes include inhalation of infective aerosols and transmission via sex, transplacental, and breast milk (Fisher-Hoch, *et al.* 1995; Adewuyi *et al*., 2009; Cummins *et al*., 1990; Joel and Segel, 1990)

Lassa virus is easily isolated from the blood or serum during the febrile phase of the disease up to 14 or more days after onset, using ELISA (Enzyme-Linked Immunosorbent Assay) which detects IgM and IgG antibodies as well as Lassa

antigen. Reverse transcriptase polymerase chain reaction test (RT-PCR) is also a sensitive test for Lassa virus (Asogun *et al*., 2012).All persons suspected of Lassa fever infection should be admitted to isolation facilities and their body fluids and excreta properly disposed (Adewuyi *et al*., 2009). Treatment is both specific with use of ribavirin and supportive which consist of maintenance of appropriate fluid and electrolyte balance, oxygenation and blood pressure, as well as treatment of any other complicating infection (Frame *et al*., 1970).

Lassa fever like any other hemorrhagic fever can be adequately prevented and controlled by general public awareness, health education on Lassa fever, rodents control, food hygiene etc. No vaccine against Lassa fever is currently available though development is underway. (Correia *et al*., 2014). However due to scarce resources to diagnose the illness as well as inadequate surveillance, many cases remain unaccounted for. The disease has had considerable impact in endemic regions of West Africa (Peters *et al*., 2002).

Burden-of-illness studies (which are sometimes known as Cost-of-illness [COI] studies) analyze the total costs incurred due to a specific disease or health condition (WHO, 2015). This requires recognizing, identifying, listing, measuring and valuing the costs generated by an illness (Asian Development Bank, 2012). Direct economic costs of disease are those generated by the resources used in treating or coping with a disease, including expenditures for medical care and the treatment of the illness (hospital care, physician services, nursing home care, drugs and other medical needs), borne by the healthcare system, community and family in directly addressing the problem. There are other indirect costs such as man hour loss and grief. However, some of these cannot be quantified directly in monetary terms (Federal Ministry of Health, 2003; WHO, 2005).

Direct cost of Lassa fever entails cost incurred in obtaining a hospital card, investigations (Lassa polymerase chain reaction PCR, full blood count FBC, erythrocyte sedimentation rate ESR, electrolyte urea and creatinine E/U/Cr, malaria parasite test MP, liver function test LFT, serum protein, urinalysis etc), hospitalization, treatment which include drugs such as ribavirin, antibiotics, omeprazole, vitamins etc, blood transfusion, dialysis, medical supplies which include intravenous fluids, cannullae, syringes, sterile gloves, catheters, plaster etc and follow up visits. Lassa fever carries a high degree of mortality and morbidity like other infectious diseases and these can be prevented by effective methods thus reducing the burden of the disease. Although part of Lassa fever treatment is being subsidized, bulk of the treatment is paid by patients out of pocket, thus still a burden to them.

Out-of-pocket (OOP) expenditure on healthcare including treatment of Lassa fever imposes a significant burden on households (Essue *et al*., 2015; Atella *et al*., 2015; Wang, 2015) and is a major concern (Barros and Bertoldi, 2008; O'Donnell *et al*., 2008). This can lead to poor health seeking behaviours and inequity (WHO, 2012; Goudge *et al*., 2009; Wagstaff and van Doorsaler, 2000). Despite the paucity of data on the direct economic cost of Lassa fever, studies on other common endemic diseases have been carried out. A cross-sectional survey was conducted on the resource utilization pattern and cost of tuberculosis treatment from the provider and patient perspectives in the state of Penang, Malaysia in 2010/2011 (Muhammad *et al*., 2014). The average provider sector cost was MYR 992.34 (median = MYR 891.55) (USD 325.35 per patient). In a cross-sectional study conducted in urban and rural areas of Magway, Myanmar, the mean of health expenditures per year was US$419 in the urban areas and US$79 in the rural areas (Inn *et al*., 2015). A cross-sectional descriptive study on the Health care seeking patterns and determinants of out-of-pocket expenditure for Malaria for the children under-five in Uganda in 2009, a total cost of $7.26 in urban areas and $3.39 in rural areas was incurred in the treatment of malaria (Juliet *et al*., 2013). In a cross-sectional study conducted in Asa Local Government Area of Kwara State, Nigeria 2013, it costs an average of about ₦224 to treat malaria using self-medication compared to ₦326 for herbalist/spiritualist and ₦1,833 for clinic/hospital when admission is involved, while clinic/hospital treatment without admission costs about ₦1,361 (Olalekan *et al*., 2013).

In another cross-sectional study conducted in Achi and Oji-river rural communities in Enugu State, Southeast Nigeria in 2015. The average expenditure to treat malaria was $22.9, which was all incurred through out-of- pocket payments (Enyi *et al*., 2015). This was comparable to a study in Anambra and Enugu in southeast Nigeria, 2013 where the total treatment cost for each person for Typhoid, Malaria, Diarrhea and others ranged from US$7.6 per month in the rural community of Amansea to US$25.6 per month in the urban community of Uwani (Oforbuike *et al*., 2013). It is also somewhat similar to the study on the Costs of Illness, Payment and Coping Strategies to Different Population Groups conducted among the Igbo-speaking tribe of Anambra and Enugu states in Southeast Nigeria in 2012 where the total cost of treatment for malaria was 2,819.9 Naira ($20 US) per person (Ogochukwu. *et al*., 2012). Other studies on cost of healthcare include a cross sectional study carried out in Bangladesh, on Coping strategies for financial burdens in families with childhood pneumonia in 2010, the median total out of pocket expenditure for patients interviewed was US$110 (Nadia *et al*., 2010).

The study conducted in Orissa one of the poorest states of India, in 2012 on Hardship financing of healthcare among rural poor in Orissa, India revealed that 38.6% of health expenditure was spent on hospitalization, 24.5% was spent on maternity, 23.1% was spent on outpatient care and 24.9% was spent on other health events (Erika *et al*., 2012). In 2003/2004, Villagers in rural Cambodia reported spending on average US$34.50 and up to US$150 for a single episode of dengue, with those not granted a fee exemption spending a mean of US$49.29 (range US$25–150) at a public facility and a mean expenditure of US$34.60 (range US$8.75–50.00) at a private practice (Sokrin and Lenore, 2008)..

As with the disease conditions studied above, Lassa fever also had an economic impact on the pocket of the victims but the cost is yet to be quantified in a scientific study. This study therefore sought to estimate the direct cost of Lassa fever illness on patients in south-south Nigeria where the disease is now endemic. In this regard, the study will provide a monetary estimate for the economic burden of Lassa fever and estimates the amount that could potentially be saved or gained if the disease were to be prevented or eradicated. Information obtained from this study will also help make informed choices in resource allocation by estimating resource consequences of health problems and a need for an increase in health sector investment to expand access to preventive and curative health services. This study can therefore help to focus society's attention on health and Lassa fever treatment leading to intervention from concerned authorities to ameliorate the medical cost to patients, economic hardship and improved well-being.

METHODOLOGY

Study area: This study was be carried out in the Institute Of Lassa Fever Research And Control, Irrua Specialist Teaching Hospital (ISTH) Irrua, in Edo State, Nigeria. The institute was founded in January 2007 by the Board of Management of ISTH, following a proposal for its establishment made by the Chief Medical Director through the Hospital Management Committee to the board. The Institutes' strategic location along the Benin-Abuja expressway in Irrua, the headquarters of Esan Central Senatorial District, enables it to serve the Central and Northern Senatorial Districts of Edo State, as well as parts of the Southern-Senatorial District. In addition, it also receives patients from the neighboring states of Delta, Kogi, Ondo and the country at large.[52] The Institute Of Lassa Fever Research And Control is dedicated to the attainment of excellence in the control of Lassa fever, is the first of its kind in Nigeria and indeed the West Africa sub region[36].

Study design/Study population: This was a cross-sectional study. The study subjects were confirmed cases of Lassa fever admitted between May 2015 and May 2016 into the Institute Of Lassa Fever Research And Control.

Inclusion and Exclusion criteria: Confirmed Lassa fever cases were included in this study, while Lassa fever patients who had other co-morbidities unrelated to Lassa fever were excluded.

Ethical consideration: An approval was obtained from the ISTH ethical committee. A Collaborative Institutional Training Initiative (CITI) program on good clinical practice and National ethics code was completed and certificates awarded.

Duration of study: A total population survey was done for Lassa fever patients seen from May 2015 to May 2016.

Study Instrument: A checklist comprised of 2 sections. Section A: Socio demographic data and Section B: Direct medical cost which include hospital care cost, cost of investigations, cost of medications, cost of intravenous fluids amongst others.

Collection of data: A checklist was developed and used to obtain information on the cost of treatment of Lassa fever from: Case notes of confirmed Lassa fever patients admitted to the Institute Of Lassa Fever Research And Control, ISTH. Institute Of Lassa Fever Research And Control, General laboratory, Accounting, Pharmacy, Hospital catering and Radiology departments, ISTH.

Measurement of variables: The variables of interest include; total direct cost, average costs and pattern of cost. The total direct cost includes the sum of all the cost incurred in the treatment of Lassa fever. This included cost of hospital care, investigations, medications, fluids and other treatments.

The average cost was measured as:

$$\frac{\text{Total medical cost}}{\text{Total number of patients}}$$

The pattern of cost was expressed as the average amount spent on each aspect of care: drugs, investigations, admissions etc and expressed in proportions and percentages.

Table 1: Socio-demographic characteristics of the patients

	Number (n=73)	Percent (%)
Age Group (Years)		
11-20	9	12.3
21-30	27	37.0
31-40	23	31.5
41-50	6	8.2
5-60	5	6.8
>60	3	4.1
Total	73	100
	Mean = 32.8±3.5	
Gender		
Male	37	50.7
Female	36	49.3
Total	73	100
Ethnic group		
Etsako	15	20.5
Esan	12	16.4
Bini	4	5.5
Others (Owan, Ibo, etc)	42	57.5
Total	73	100
Marital status		
Married	45	61.6
Single	28	38.4
Divorced	0	0
Total	73	100
Religion		
Christian	61	83.6
Muslim	12	16.4
Others	0	0
Total	73	100
Occupation		
Artisan	4	5.5
Farmer	4	5.5
Business	19	26.0
Student	20	27.4
Professional	7	9.6
Others	19	26.0
Total	73	100
Level of education		
Tertiary	29	39.7
Secondary	25	34.2
Primary	15	20.5
No formal education	4	5.5
Total	73	100

Data analysis: Continuous variables are described using mean and standard deviations, median and quartiles. Categorical variables were expressed in proportions and frequencies and data summarized using bar charts, pie charts and tables. Costs for each component were multiplied with the appropriate number. For drugs and saline, the unit cost was multiplied by the dosage number. Hospital stay, utilities, feeding and nursing costs in each day was multiplied by the total hospital days. Oxygen, dialysis and investigations unit costs were multiplies by the number of times they were administered or required. Different medical supplies such as saline sets face masks, glove packs, nasogastric tubes, catheters costs etc. were usually a one-time cost. Out of pocket payments were defined as all payments made by the patient in the treatment of Lassa fever. The IBM statistical package for social sciences (SPSS) software version 20 was used for data entry and analysis. Data cleaning was conducted so as to take hold of data inconsistencies and other errors. Validity of data was certified by double checking entries for errors. Relevant frequency distribution tables and summary indices were generated such as mean for continuous variables.

RESULTS

Social demographic characteristic:

Majority of the patients were less than 50years of age (89%) with a mean age of 32.8±3.5; married (61.6%) and Christians (83.6%). The gender distribution was in equal proportions. On education, 39.7% had attained tertiary education, 34.2% secondary and 26% was a combination of those who had only primary education and those that had no formal education. Students and individuals engaged in business ventures/traders constituted 27.4% and 26% of the patients respectively. Other occupations were professionals (9.6%), farmers (5.5%), artisans (5.5%) and drivers, motorcyclists, hair stylists etc. accounted for 26% of the patients (Table 1).

Total and average direct medical cost of the treatment of Lassa fever:

The median total direct medical cost for the treatment of Lassa fever was N80, 704.00. The highest total direct medical cost paid by a patient was N229, 087.00, while the least total amount spent on treatment was N27, 590.00 with a range of N201, 497 and interquartile range of N58, 186.00(Table 2). On the average, the direct medical cost paid from pocket by the patients for the treatment of Lassa fever was N86, 802.63 (Table 3).

Table 2: Total direct medical cost of treatment of Lassa fever

	Median	Q1	Q3	(Range)
Cost (N)	80,704	54,895	113,081	(27,590.00 - 229,087.00)

Q1- first quartile, Q3- third quartile, N- Naira

Table 3: Average direct medical cost of treatment of Lassa fever

	Mean	(Range)
Average cost (N)	86,802.63	(27,590.00 - 229,087.00)

Pattern of cost of treatment of Lassa fever

In the treatment of Lassa fever at ISTH, the cost of investigation (confirmatory diagnostic test) and the cost of procuring the drug of choice effective against the virus, Ribavirin are subsidized for the patients. Overall, 61.80% of the total payments was subsidized, while what was paid by the patients (Out of pocket payment) was 38.20% of the total cost of treatment. Dialysis and oxygen accounted for the highest out-of-pocket payment, amounting to an average cost of N30, 000 per patient with a maximum cost of N87, 600.00 and minimum cost of N1, 700.00. An average of N18, 300.00 and N18, 250.00 was paid for investigations and hospital care respectively. Medications had an average cost of N12, 462.00 with the maximum paid by a patient being N40, 986.00 and the minimum N4, 016.00. The least (N5, 000) average out of pocket payment was spent on intravenous fluids (Table 4).

Table 4: Pattern of cost for subsidized and unsubsidized treatment

	Median	Q1	Q3	Range	Minimum	Maximum
Hospital care (N)	18,250.00	8,950.00	24,725.00	51,450.00	3,800.00	55,250.00
Investigation						
Unsubsidized (N)	54,250.00	47,950.00	85,500.00	107,150.00	24,000.00	131,150.00
Subsidized (N)	18,300.00	13,400.00	20,550.00	67,100.00	6,200.00	73,300.00
Medication						
Unsubsidized (N)	92,334.00	63,905.00	109,228.00	117,332.00	29,480.00	146,812.00
Subsidized (N)	12,462.00	8,560.00	17,388.00	36,970.00	4,016.00	40,986.00
Intravenous Fluids (N)	5,000.00	3,600.00	6,300.00	7,120.00	1,580.00	8,700.00
Dialysis and Oxygen (N)	30,000.00	14,400.00	44,550.00	85,900.00	1,700.00	87,600.00
Others (N)	8,300.00	3905.00	11,435.00	29,650.00	1,250.00	30,900.00

Q1- first quartile, Q3- third quartile, N- Naira

Unsubsidized treatment cost

Medications accounted for the highest unsubsidized payment, (N92,334; 44.36%) as shown in Figure 2 above, with a maximum payment of N146,812.00 and a minimum of N29,480.00 (Table 4), together with payments for investigations (26.06%) made up the bulk of the payments. Dialysis and oxygen came next in the unsubsidized cost pattern accounting for 14.41%. Hospital care followed suit (8.77%) then payments for other items (3.99%) with the least payment been intravenous fluids (N5, 000; 2.4%) (Figure 1)

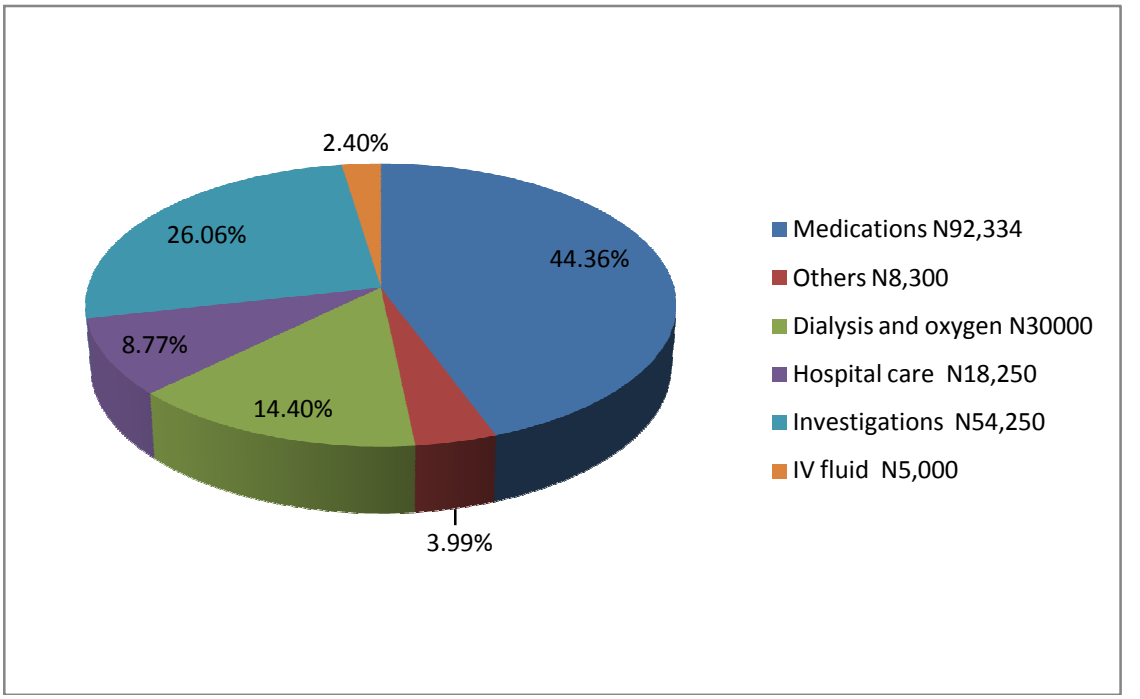

Figure 1: Pattern of cost of treatment (Unsubsidized)

Comparison of cost Subsidized and Unsubsidized treatment

Only two sets of payments were subsidized, medications and investigations. For the medications, 86.5% of the payment was subsidized making an average of N79, 872.00, while patients had to pay 13.5% of the cost, which amounted to N12, 462.00. A greater (66.27%) proportion of the cost of investigations was subsidized which amounted to an average of N35,

950 of the payments for investigations. The out of pocket payment for investigation amounted to an average of N18, 300 which is 33.73% of the total cost of investigation.

When subsidized and unsubsidized payments are compared (figure 2). Medications accounting for the highest payments (44.36%) with an average of N92,334.00; then investigations (26.06%); dialysis and oxygen (14.41%), then hospital care (8.77%) and then others (3.99%) as illustrated in above. The pattern was however different for the subsidized payment with dialysis and oxygen accounting for the highest (32.5%) followed by investigations (19.82%) then closely followed by hospital care (19.77%). Payments made on medical supplies were next with 8.99%. Intravenous fluids accounts for the least (5.42%) payments both in the subsidized and unsubsidized payments.

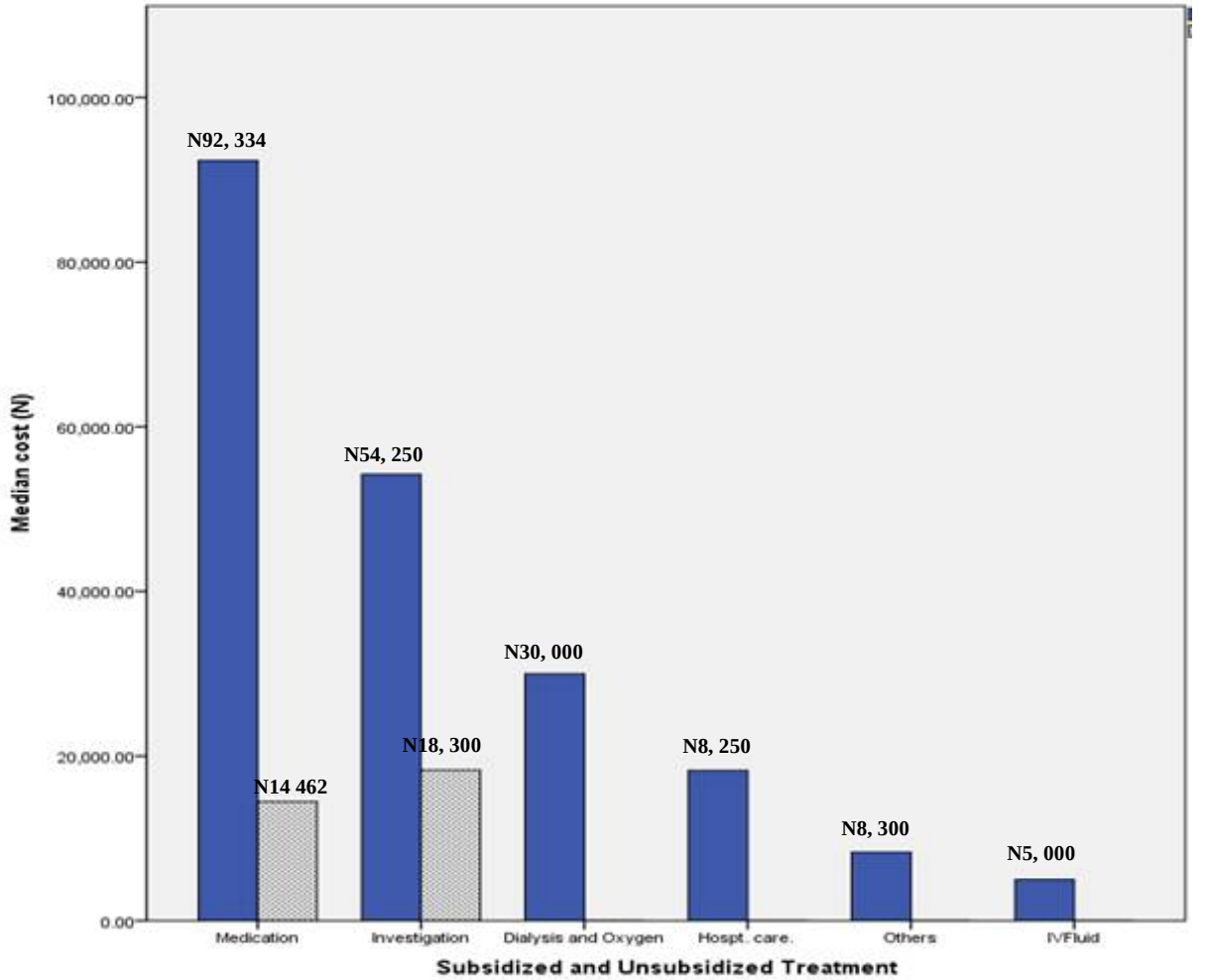

Figure 2: Pattern of subsidized and unsubsidized treatment payment .

DISCUSSION

In this study, socio-demography revealed that 27(37%) of the 73 patients studied were aged 21-30 years with a mean age of 32.8 years which was in keeping with a similar study done in Northwest Nigeria (Sambo, *et al*., 2013). There was no significant sex predilection as male (50.07%) and female (49.3%) distributions were in almost same proportions unlike what was obtained in other similar studies done in Myanmar (Katzin, 2010) and other parts of Nigeria (Olalekan, 2013; Sambo, *et al*., 2013). Expectedly, majority (83.6%) of the patients were Christians which is the predominant religion in Southern Nigeria. Lassa fever, like other viral haemorrhagic fevers is a disease which affects people across educational strata as 29 (39.7%) of the 73 patients attained tertiary education, 34.2% attained secondary education whilst 26% of had

primary level or had no formal education. This was akin to the finding of a study in Northwest Nigeria where Tertiary, Secondary and Primary levels represented 50%, 30%, 9.5% respectively (Sambo, *et al*., 2013)and another in India (Erika *et al*., 2012). Occupation is one of the risk factors in the epidemiology of Lassa fever. Some categories of workers are more likely to have occupational exposures by the nature of their job like the health workers when they treat infected patients. In this study however, 27.4% of the patients were students followed by business individuals making 26% of the cases with most of them being traders. Other occupations which included drivers, motorcyclists, hair stylists etc. accounted for 26% of the patients. The health workers in ISTH Irrua have over time learnt the art of effective personal protection and hence are less frequently affected. This may not be so with students especially those not from Edo State, who are yet to be sensitized on preventive measures and some lack good and proper food hygiene, stay in environment susceptible to rodent infestations. Traders are exposed when they handle contaminated food items like grains unprotected from rodents.

With regards to treatment cost, the finding from this study is indicative that the treatment of Lassa fever can be an expensive experience particularly in present day economic recession for patients of lower socioeconomic status. The average patient's expenditure on treatment was N86, 802.63 which is about 482.24% of the minimum wage (N18, 000.00) in Nigeria (Inalegwu, 2011). The median patient's expenditure was N80, 704 with a maximum payment of N229, 087.00 and a minimum of N27, 590.00. This high health care expenditure was similar to studies done on other infectious diseases in Malaysia (Muhammad *et al*., 2014) Myanmar (Inn *et al*., 2015), Uganda (Juliet *et al*., 2013)and in Nigeria (Olalekan *et al*., 2013; Enyi *et al*., 2015; Oforbuike *et al*., 2103 and Ogochukwu *et al*., 2012). Although a greater part of the expenditure is subsidized, patients still paid for some medications and investigations, IV fluids, oxygen, dialysis and hospital care including hospital registration which accounted for the high expenditure despite subsidy. Findings from this study though on the high may not be far from what is obtainable in other parts of the country. This is similar to ratios obtained in multi-country analysis in Africa (Mclntyre *et al*., 2001; Xu *et al*., 2003; Cashin *et al*., 2010). The wide range between the maximum and minimum total cost of treatment is due to factors which include; length of hospital stay, this is a strong determining factor as the cost of hospital care, utilities and medical supplies, repeat investigations and continuous medication all affected the cost of treatment due to prolong hospital stay. Severity of the disease significantly affected the duration of hospital stay. Death within a few days of diagnosis greatly reduced the cost of treatment compared to patients that spent an appreciable time on treatment. Another factor is weight of the patient; this was proportional to the dosage of ribavirin given and translated to an increased cost. Another determining factor is the use of oxygen and the need for dialysis which are both expensive utilities; these contributed a huge chunk to the cost of treatment and were not covered by the subsidy. This was in keeping with a similar study done in the United states with a range of US$ (4-430).

The finding that dialysis and oxygen, drug cost and investigations took about 65.82% of the treatment expenditure despite subsidy, means that even if user fees are waived for services like registration and consultation, most of the poor people would still have to bear a huge burden of the direct cost by buying drugs and paying for investigations themselves which could be catastrophic to the low income earners.

The results are comparable to similar studies done on the pattern of cost of treatment of common ailments, with medications being the highest (Oforbuike *et al*., 2013; Ogochukwu *et al*., 2012; Katzin *et al*., 2010) as seen in the unsubsidized pattern of treatment taking 44.36% with investigations (26.06%) next to it, as seen in another study done on health expenditures, payment and coping mechanisms in Nigeria (Oforbuike *et al*., 2013). Investigations still came second in the treatment expenditure despite a 66.27% subsidy, while bulk of the expenditure paid on the subsidized treatment was on dialysis and oxygen. 21 patients received oxygen alone in the course of their treatment, 10 utilized dialysis alone and 11 utilized dialysis and oxygen together in the course of their treatment. This ancillary treatment contributed significantly (32.5%) particularly to the subsidized payment as this area was not covered by the subsidy. The burden on medications was greatly reduced by the subsidy with an 86.5% reduction. In comparing the subsidized and unsubsidized payments, the cost of treatment without subsidy (average total cost N211, 284.00) was enormous as compared to the cost of treatment with subsidy (average total cost N80, 704.00) that is patients had to pay N130, 580 less of the cost of treatment, which is just 38.2% as OOP of the total cost with a 61.80% subsidy in the median total payments. There was an 86.5% subsidy in the expenditure for medication and a 66.27% subsidy in expenditure for investigations. Despite the subsidy, most patients still had to pay a lot to access treatment. This was similar to studies done relating to subsidy in Bangladesh (Nadia *et al*., 2010) and Cambodia (Sokrin *et al*., 2008). The implication of a very high level of OOP money is that a significant proportion of the poor may be driven into destitution after paying for health care. A severe ill health that afflicts the breadwinner of the family may completely impoverish the family especially those who sell their labour on daily basis to provide food for their families. Even the non-poor may be impoverished by large random out-of-pocket payments arising from unanticipated ill health.

The economic development of any country is closely related to the health status of its population. As such, an efficient and equitable health care system that responds to the need of its people is an important instrument that can break the vicious circle of poverty and ill-health. In order for Nigeria to move towards sustainable health spending that will lead to a sustainable health outcome, there is the need for investments in the improvement of healthcare with urgent need for a substantial increase in health sector investment to expand access to preventive and curative health services. If this is achieved, more and more people will escape from poverty and their health burden reduced.

LIMITATION

This study did not monetize the indirect cost caused by the illness, which reflect mainly productivity losses caused by the problem or diseases, borne by the individual, family, society, or by the employer of the patients in other words lost income because of not being able to work. Man-hour loss was not therefore computed. Also intangible costs which reflect the costs of pain, grief, suffering and loss of quality of life which could not be quantified directly in monetary terms were beyond the scope of this study. Duration of Hospital stay was a variable that could not be altered to standardize the treatment cost, death of patients influenced the individual cost, as well as need for special treatments also affected the individual cost. Finally, nonverbal mode of data collection was another limiting factor as National Health Insurance Scheme (NHIS) payments, grants and financial assistance could not be ascertained, hence all payments were generalized as out of pocket.

CONCLUSION

In conclusion, the findings from this study showed that the median total patients expenditure was N80,704.00 with a maximum payment of N229,087.00 and a minimum of N27,590.00. Two patterns of cost was observed, medications being the highest with 44.36% with investigations (26.06%) next to it in the unsubsidized pattern of treatment, while in the subsidized treatment pattern, dialysis and oxygen accounted for most (32.5%) of the payments as these items were not covered by the subsidy. Only two aspects of the treatment were subsidized and they include medication with an 86.5% subsidy and investigations with a 66.27% subsidy.

RECOMMENDATIONS

In the long term, it is important to recognize that health and poverty are closely linked. Reducing the burden of Lassa fever in Nigeria will help to contribute to the economic well-being of communities and poverty-reduction will be an essential input into improving health. National Lassa fever control programmes should be instituted in Nigeria with the need to recognize these links, and identify mechanisms for ensuring that the poorest have access to essential health interventions. Efforts to improve access to Lassa fever treatment should explicitly incorporate efforts to protect patients from high OOP expenditure. This call for provision of subsidies to enable the sectors reduce prices for medications, investigations, medical supplies etc. and put in place regulatory mechanisms to check excesses.

Detection and tackling of the menace of Lassa fever, thus eliminate the burden of treatment and care. Government should therefore focus on research that will be aimed at tackling the disease and prevention and also creating public awareness about the disease spread.

Roles of the government in the health sector must be redefined and sharpened. Financial provisions should be made for the poor and vulnerable groups in the form of direct payments, subsidies, paying for insurance contributions or any other methods. Similarly, there is the need for expansion of social health insurance through the National Health Insurance Scheme (NHIS) to cover the informal sector as a means of increasing resources for health thereby ensuring universal access to care and providing financial protection to the poor and vulnerable.

Creating an enabling environment for public/private partnership and encouraging the NGO's and philanthropists. Hence, any government policy that will offer free drugs, more drug subsidies other that ribavirin, vouchers and duty waivers (for those that want to import drugs) will tackle the financial burden of health cost. The policy may encourage drug production by local manufacturers by offering loans and tax cuts thereby driving down the cost of these drugs. In the interest of ensuring access for all, creative ways of making medicines available at affordable prices among the private providers has the potential to reduce the burden that results from OOP expenditure, especially on medicine. The high expenditure incurred on drugs alone highlights the need for expediting pro-poor interventions like exemptions and waivers aimed at improving access to health care for the vulnerable poor and other victims. The hospital should be encouraged to prioritize the management of Lassa fever, training of staff in the department of preventive medicine to create awareness to the public

on the need to prevent the spread of the disease. Also social works department of the hospital should prioritize welfare for Lassa fever prevention.

Individuals should be encouraged to adhere strictly to the prevention guidelines on Lassa fever, practice good personal and environmental hygiene. They should have the need for early consultation to the health facilities for prompt diagnosis whenever the individual falls ill. There is need for the community to be educated on the causative agents, mode of transmission of Lassa fever and control of rats. There should be education on healthy cultural practices to avoid eating the rodents as delicacies and also prevention of contacts with rats and rat droppings. In addition health education to the community on good environmental hygiene and early recognition of the signs and prompt transfer of individuals with symptoms and signs of Lassa fever to the health faculty is recommended.

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AUTHORS CONTRIBUTIONS

All the authors involved in this study participated in the study design, data collection and analysis as well as the subsequent drafting and review of the manuscript.

\Disclosure

There is no conflict of interest declared in this study.