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# LASSA FEVER AND INFECTION CONTROL: KNOWLEDGE, ATTITUDES AND PRACTICE IN A UNIVERSITY TEACHING HOSPITAL IN UYO, NIGERIA

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## ABSTRACT

**Context:** Lassa fever is a deadly viral hemorrhagic disease that is endemic in Nigeria with recurrent outbreaks that often affect healthcare workers. Hospital infection control can potentially limit the impact of outbreaks of this disease in healthcare settings

**Objective:** To determine the knowledge attitudes and practices toward Lassa fever and infection control among medical doctors and students in Uyo, Nigeria.

**Methods:** This was a cross sectional survey of knowledge attitude and practice among medical students, house officers and resident doctors undergoing training in the University of Uyo Teaching Hospital using a 23-point structured self-administered questionnaire.

**Results:** 89.5% of participants correctly identified the causative agent for Lassa fever to be a virus. 141 participants correctly identified rats as the reservoir for Lassa fever. The state chosen by most participants to have the highest prevalence of Lassa fever was Edo State (44.8%), followed by Adamawa State (20.4%). 79.7% of participants correctly identified the drug treatment of Lassa fever. Most participants agreed that there is a possibility of contracting Lassa fever in the course of their duties and that facilities in the hospital are not sufficient to protect them from contracting the infection.

**Conclusion and recommendations:** There is good knowledge of Lassa fever among medical trainees but with significant gaps. There is need to place more emphasis on Lassa fever and infection control in training curricula.

**Key words:** Lassa fever, viral hemorrhagic

diseases, infection control, KAP, Uyo

## INTRODUCTION

Lassa fever is a viral hemorrhagic disease caused by Lassa virus, an arena virus. Its definitive host is *Mastomys* spp like *Mastomys natalensis*, the multimammate rat which is ubiquitous in most parts of Nigeria. Lassa fever is endemic in Nigeria and some other West African countries and occurs in sporadic outbreaks mainly in the dry season. Up to 80% of infections are asymptomatic and Overall mortality is around 1% with mortality among hospitalized cases around 35%<sup>1,2</sup>. Between December 2015 and January 2016, Nigeria experienced a major outbreak of Lassa fever hemorrhagic disease spread across 10 of 36 states of the federation including the federal capital which resulted in over 53 deaths. Case fatality was reported to be as high as 37%<sup>3</sup>. With more states in different geopolitical zones in Nigeria experiencing outbreaks, epidemiological link between cases has been difficult to establish making it near impossible to predict where possible outbreaks could occur.

Hospital infection control has been recommended as an important element in controlling potential outbreaks of Lassa fever. Hospital infection control refers to the systematic measures taken to reduce the incidence, and improve the adverse effects of hospital-acquired infections on patients and health workers<sup>4,5</sup>. While index cases have usually come from the community, most outbreaks have been significantly associated with hospital transmission<sup>6,7</sup>. In many occasions, transmission had occurred before Lassa fever was suspected. Challenges in establishment of comprehensive infection control systems in resource limited settings has been reviewed. It was found that in hospitals with improved infection control

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practices, transmission of Lassa virus was minimal. Education of healthcare workers on proper infection control practices is critical to institution of adequate infection control system<sup>8,9</sup>.

University of Uyo teaching Hospital is a tertiary healthcare institution serving Akwa Ibom State in South-South Nigeria and other neighboring states. It is involved in clinical training of Medical Students, Resident doctors and other medical manpower. There was a documented outbreak of Lassa fever in this state in 1987<sup>10</sup> and more recently in neighboring Abia<sup>7</sup> and Rivers States. In this hospital, there was a suspected case of Lassa fever in January 2016 at the peak of the nationwide Lassa fever outbreak which brought to the fore the level of preparedness of this institution for a potential case of Lassa fever. With a view to exploring the preparedness of this institution for a potential viral hemorrhagic fever outbreak, this study was conducted to assess the level of knowledge of lassa fever among medical doctors and students and determine their attitudes towards infection control.

## METHODS

This study was conducted in the University of Uyo Teaching Hospital (UUTH), Uyo Akwa Ibom State. UUTH is a 500-bed tertiary hospital serving Akwa Ibom and neighboring states in South-South Nigeria. It is the training center for students of the Faculty of Clinical Sciences of University of Uyo, and also provides internship training for graduate doctors as well as postgraduate training of medical doctors undergoing specialty training.

This was a cross sectional survey of knowledge attitude and practice among medical students, interns (house officers) and resident doctors undergoing training in this Hospital. The study instrument was a 23-point structured self-administered questionnaire whose knowledge questions were derived from WHO and CDC fact sheets on Lassa fever. The attitude and practice section was derived from previous studies, current issues on Lassa fever and infection control as well as

issues surrounding the suspected case of Lassa fever in this institution. This instrument was pretested before administration to study subjects.

Two hundred questionnaires were administered to participants selected from resident doctors, house officers and medical students undergoing training in this institution. All students and doctors available at the time of survey were included. Informed consent was obtained from all participants and confidentiality was maintained by making data anonymous.

Data collected was processed using the Statistical Package for Social Sciences Software and presented in tables, graphs and charts. Chi square test was used to evaluate significant differences and level of significance was set at 0.05.

## RESULTS

Out of 200 questionnaires distributed, 152 were returned (76% response rate); 79 medical students (52%), 36 interns (23.7%), and 37 resident doctors (24.3%). Most participants (67.8%) fell within the 21-30 age group. There were 50 female participants (32.9%). 112 (73.7%) participants reported having received instruction on infection control. The common sources of information on Lassa fever reported by participants is shown in figure 1.

### Knowledge

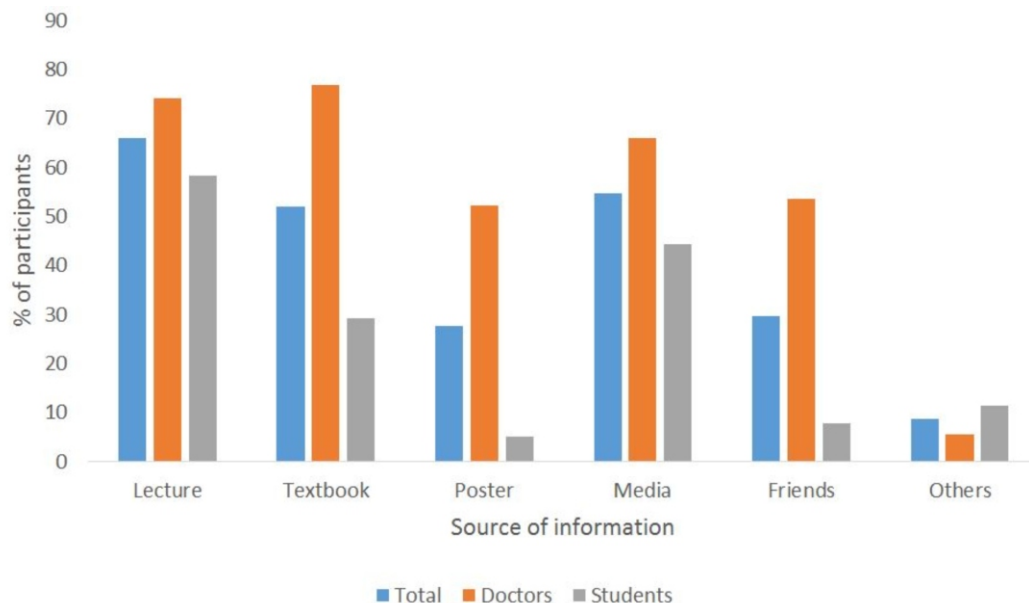
Participants' knowledge of Lassa fever is shown on table 2. 89.5% of participants correctly identified the causative agent for Lassa fever to be a virus. 141 participants correctly identified rats as the reservoir for Lassa fever. The state chosen by most participants to have the highest prevalence of Lassa fever was Edo State (44.8%), followed by Adamawa State (20.4%). 79.7% of participants correctly identified the drug treatment of Lassa fever. Only 34.9% of participants knew that the overall mortality rate of Lassa fever was not up to 20% while only 22.4% knew that most cases of Lassa fever infections were not severe. 92.1% of participants correctly identified healthcare workers as being at high risk for Lassa fever

**TABLE 1: CHARACTERISTICS OF STUDY PARTICIPANTS**

Variable	Frequency (n=152)	Percentage (%)
<b>Age</b>		
<20	2	1.3
21-30	103	67.8
31-40	44	28.9
41-50	3	2.0
>50	0	0
<b>Gender</b>		
Female	50	32.9
Male	102	67.1
<b>Job Title</b>		
Students	79	52
Interns	36	23.7
Residents	37	24.3
Received IC instruction	112	73.7
<b>Hours of IC lectures received</b>		
<1	43	28.2
1-3	76	50.0
>3	33	21.7

IC= Infection Control

**FIGURE 1: PARTICIPANTS SOURCE OF INFORMATION ON LASSA FEVER**

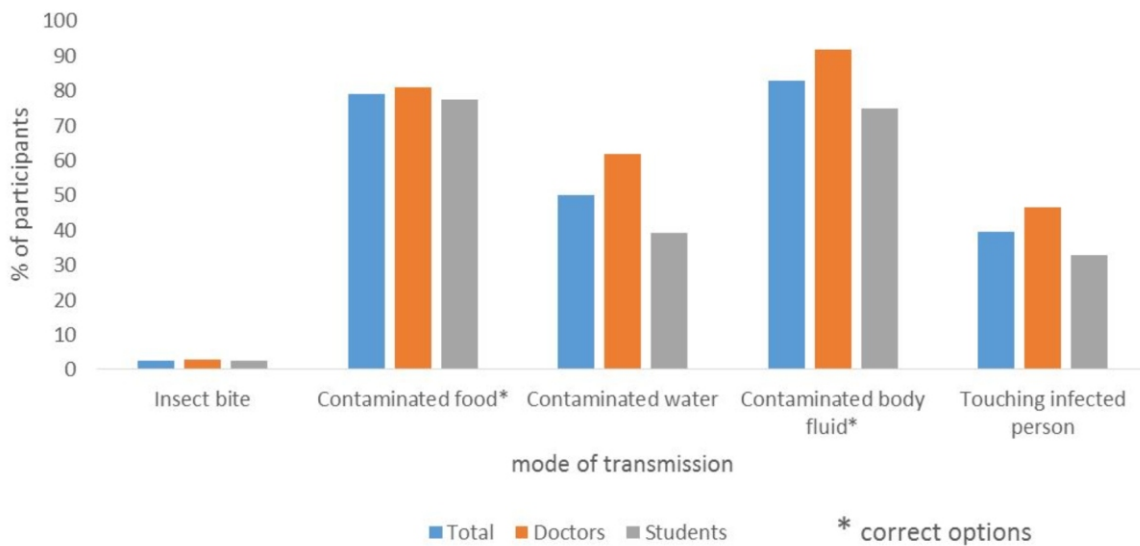


**TABLE 2: PARTICIPANTS' KNOWLEDGE OF LASSA FEVER**

Question	Answer	No (%) correct			p*
		Total	Doctors	Students	
What class of organism causes Lassa fever	Virus	139 (89.5)	72 (98.6)	63 (79.7)	<0.001
What is the reservoir of Lassa fever	Rats	141 (92.8)	70 (95.9)	71 (89.9)	0.153
In which of these states in Nigeria is Lassa fever most prevalent	Edo	68 (44.8)	48 (65.8)	19 (24.1)	<0.001
Drug treatment for Lassa fever	Ribavirin	121 (79.6)	68 (93.2)	53 (67.1)	<0.001
Overall mortality for Lassa infection is up to 20%	False	53 (34.9)	41 (56.2)	12 (15.2)	<0.001
Most cases of Lassa fever infection are severe	False	34 (22.4)	20 (27.4)	14 (17.7)	0.153
Healthcare workers are at high risk of contracting Lassa fever	True	140 (92.1)	70 (95.9)	70 (88.6)	0.096
Blindness is the most common complication of Lassa fever	False	89 (58.6)	38 (52.1)	51 (64.6)	0.118

p – Chi square

**FIGURE 2: PARTICIPANTS' CHOICE OF ROUTE OF TRANSMISSION OF LASSA FEVER**



infection while 58.6% knew that blindness was not the commonest complication of Lassa fever. Participants' choice of route of transmission of Lassa fever is shown in figure 2, while the choices of common symptoms is in figure 3.

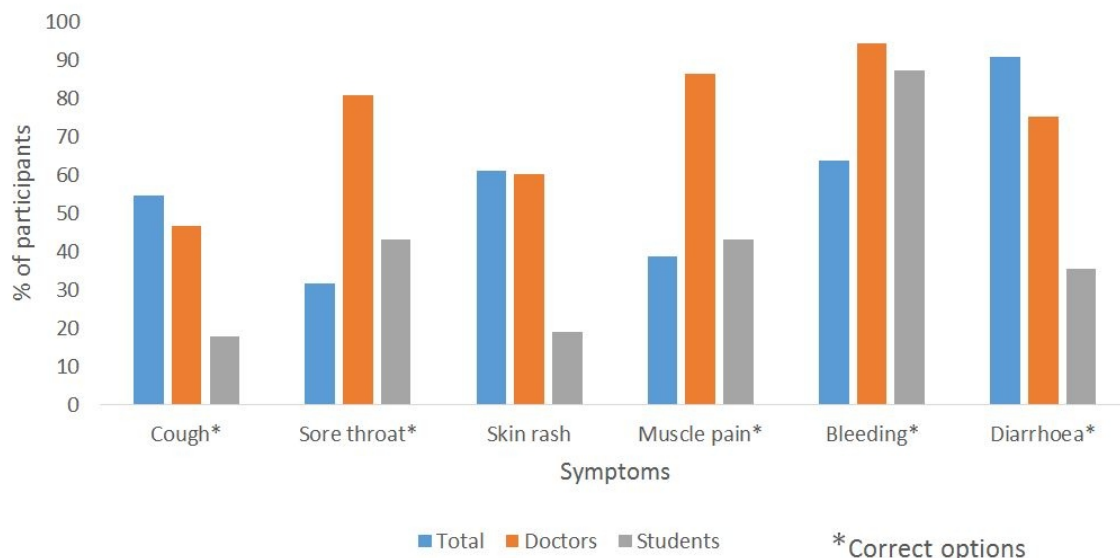
**Attitudes**

The attitude section revealed that most participants believe that there is a possibility of contracting Lassa fever in the course of their duties and that facilities in the hospital are not sufficient to protect them from contracting the infection. While majority of

**TABLE 3: ATTITUDE OF PARTICIPANTS TOWARDS LASSA FEVER & INFECTION CONTROL**

Statement		Total no (%)	Doctors no (%)	Med students no (%)
It is possible to get infected with Lassa fever in the course of work in the hospital	Agree	146 (96.1)	70 (95.9)	76 (96.2)
	neutral	3 (2.0)	3 (4.1)	1 (2.6)
	Disagree	1 (0.7)	0 (0)	1 (1.3)
I will refuse to treat a suspected Lassa fever patient in order to protect myself	Agree	10 (6.6)	6 (8.2)	4 (5.1)
	Neutral	67 (44.1)	31 (42.5)	39 (49.4)
	Disagree	72 (47.4)	36 (49.3)	36 (45.6)
I will like to get more information about Lassa fever	Agree	145 (95.1)	70 (95.9)	75 (94.9)
	Neutral	4 (2.6)	3 (4.1)	3 (3.8)
	Disagree	1 (0.7)	0 (0)	1 (1.3)
The facilities in this hospital are sufficient to protect staff from getting infected with Lassa fever	Agree	7 (4.6)	2 (2.7)	5 (6.3)
	Neutral	24 (15.8)	7 (9.6)	19 (24.1)
	Disagree	119 (78.3)	64 (87.7)	55 (69.6)

**FIGURE 3: PARTICIPANTS CHOICE OF COMMON SYMPTOMS OF LASSA FEVER**



participants (47.1%) disagreed with the statement “I will refuse to treat a suspected Lassa fever patient in order to protect myself,” 44.1% were neutral. Most participants (95.1%) expressed desire to learn more about Lassa fever.

**Practice**

54.6% of participants said they always washed their hands after attending to patients in the hospital. On disposal of examination gloves, almost all participants said they do not leave them on examination table, on the floor,

**TABLE 4: INFECTION CONTROL PRACTICE OF PARTICIPANTS**

Statement	Response	Total no (%)	Doctors no (%)	Med students no (%)
How often do you wash hands after touching any patient	Always	83 (54.6)	42 (57.5)	41 (51.9)
	Sometimes	63 (41.4)	30 (41.1)	33 (41.8)
	Never	2 (1.3)	1 (1.4)	5 (6.3)
How do you usually dispose of used personal protective equipment e.g. gloves	Leave them on examination table	0 (0)	0 (0)	0 (0)
	Leave them on the floor	3 (2.0)	1 (1.4)	2 (2.5)
	Leave them at the nurses' station	2 (1.3)	0 (0)	2 (2.5)
	Leave them at the hand wash sink	3 (2.0)	0 (0)	3 (3.8)

at nurses' station or at the hand wash sink.

## DISCUSSION

Since the first reported case in Nigeria in the 1950s, Lassa fever has remained an endemic disease in Nigeria causing periodic outbreaks and claiming hundreds of lives over the years. Poor knowledge and late suspicion among healthcare workers has contributed to this burden as healthcare workers have made up a significant proportion of reported case mortality in Nigeria. There may not be adequate coverage of this disease in the curricula of some medical schools in Nigeria. This study was conducted to examine the knowledge, attitudes and practice of Lassa fever and infection control among medical students and doctors undergoing training in Uyo, Nigeria.

The most common source of information selected by participants was lectures, and this was followed by the media and then textbooks. Because almost all cases of Lassa fever occur in West Africa, most standard texts which are often imported from The US, Europe and recently India, do not adequately cover this disease. Other studies have shown a greater role for the media among healthcare workers.<sup>11,12</sup> Although more participants reported having received instruction on infection control, a sizeable number had not. Formal training on infection control should be given to doctors and all healthcare workers repeatedly to minimize the possibility of accidental infections, spread of pathogen among patients and ensure proper practice. Many reported cases of Lassa fever have occurred in healthcare settings with poor

barrier nursing and infection control practices.<sup>7</sup>

Knowledge of participants was varied. There was high level of knowledge among participants on the aetiology, reservoir, treatment and healthcare workers risk, but poor knowledge on ratio of infections to disease and overall mortality. There appears to be poor understanding of the epidemiology of Lassa fever among doctors and medical students and this can impact negatively on approach to these cases when they occur. Knowledge of doctors was mostly significantly higher among doctors than students and this is explainable by longer duration of study.

Knowledge of route of transmission was fairly good with most persons selecting correct routes of transmission. Over 50% of participants selected "drinking contaminated water" as a possible route of transmission. While this assertion is plausible, there has not been any documented case of transmission of Lassa fever by drinking contaminated water although many cases and outbreaks have not been subjected to thorough epidemiological investigation.<sup>6</sup> Casual touch is not known to be a significant route of transmission, but in severe hospitalized cases unprotected touching may lead to contact with body fluids and contribute to transmission.

There was also relatively low knowledge of symptoms of Lassa fever. While bleeding was identified as a symptom of Lassa fever by majority of participants, it has been noted that it is not a common cause of bleeding despite its designation as a "hemorrhagic fever."<sup>1</sup> Bleeding only occurs in about one third of

patients<sup>13</sup> and as such may not be a sensitive diagnostic criteria. Lassa fever generally presents with signs and symptoms indistinguishable from those of febrile illnesses such as malaria and should be suspected in patients with fever not responding to antimalarial and antibiotic drugs.<sup>14</sup> The knowledge of participants is similar to that of doctors and other healthcare workers in Federal Teaching Hospitals in Edo and Ebonyi States,<sup>2</sup> and that of primary care workers in Edo State.<sup>11,15</sup>

The attitude section revealed that participants were generally aware of the risk of contracting Lassa fever in the course of duty. They were also desirous of getting more information about the disease. However, a significant percentage of participants were neutral on refusing to attend to suspected cases in order to protect themselves while majority felt that facilities to protect staff in the hospital were inadequate. Fear of contracting highly infectious diseases like Lassa fever may impact negatively on willingness to treat suspected cases<sup>6,16</sup> leading to poor outcomes during outbreaks. In this center, there were reports of healthcare workers refusing to attend to a suspected case on the grounds that they were not sufficiently protected. However, it has been established that basic infection control practices with isolation are sufficient to prevent spread of Lassa fever in the healthcare setting.

There was fairly good practice reported by participants with more than half reporting that they always wash hands after touching patients. There was also good practice on use of personal protective equipment and proper disposal of waste. However, survey reported practice is usually higher than actual behavior<sup>17</sup>. Also it has been shown that there is generally improved compliance with infection control practice during and shortly after outbreaks (or scare) of highly infectious diseases which wanes as time goes by without incidence<sup>18</sup>.

This study is limited by the use of convenience sample; the sample and distribution of resident doctors was limited by an industrial action which took place during

the period of data collection. Also, self-reported practice data has many sources of potential bias not allowing for independent verification. However, findings from this study may be useful in advocating for curriculum development on Lassa fever.

#### Conclusion and recommendations

There is good knowledge of Lassa fever among medical trainees but with significant gaps. Attitudes and practice are generally positive. There is need to place more emphasis on Lassa fever in training curricula and encourage the use of local texts with adequate coverage of the disease. More structured training on infection control should be given to clinical students and doctors. Instituting sufficient infection control structures will give staff confidence when attending to potentially highly infectious patients.

#### References:

1. Abdulraheem IS. Public Health Importance of Lassa Fever Epidemiology, Clinical Features and Current Management: Review of Literature. *African J Clin Exp Microbiol.* 2002;3(1):33–7.
2. Adebayo D, Nwobi EA, Vincent T, Gonzalez J. Response Preparedness to Viral Hemorrhagic Fever in Nigeria: Risk Perception, Attitude towards Lassa fever. *Epidemiol.* 2015;5(3):199.
3. World Health Organization. Lassa Fever Nigeria - Disease Outbreak news. 2016.
4. Brisibe SF-A, Ordinioha B, Gbeneolol PK. The effect of hospital infection control policy on the prevalence of surgical site infection in a tertiary hospital in South-South Nigeria. *Niger Med J.* 2015;56(3):194–8.
5. David OM, Famurewa O. Towards effective management of nosocomial infections in Nigerian hospitals - A review. *Acad Arena.* 2010;2(5):1–7.
6. Ajayi NA, Nwigwe CG, Azuogu BN, Onyire BN, Nwonwu EU, Ogbonnaya LU, et al. Containing a Lassa fever

- epidemic in a resource-limited setting: outbreak description and lessons learned from Abakaliki, Nigeria (January-March 2012). *Int J Infect Dis.* 2013;17:e1011–6.
7. Fisher-Hoch SP, Tomori O, Nasidi A, Perez-Oronz GI, Fakile Y, Hutwagner L, et al. Review of cases of nosocomial Lassa fever in Nigeria: the high price of poor medical practice. *Br Med J.* 1995;311:857–9.
  8. Zimmerman P. Help or hindrance? Is current infection control advice applicable in low- and middle-income countries? A review of the literature. *Am J Infect Control.* 2007;35(8):494–500.
  9. Dougherty L, Lister S. Infection prevention and control. In: *The Royal Marsden Manual of Clinical Nursing Procedures.* 2011. p. 93–154.
  10. Ogoina D. Lassa fever: A Clinical and Epidemiological Review. *Niger Delta J Med Med Res.* 2013;1(1):1–10.
  11. Aigbiremolen AO, Duru CB, Awunor NS, Abejegah C, Abah SO, Asogun AD, et al. Knowledge and Application of Infectious Disease Control Measures among Primary Care Workers in Nigeria: The Lassa Fever Example. *Int J Basic, Appl Innov Res.* 2012;1(4):122–9.
  12. Idris BJ, Inem V, Balogun M. Comparing the knowledge, attitude and practices of health care workers in public and private primary care facilities in Lagos State on Ebola virus disease. *Pan Afr Med J.* 2015;22(Supp 1):19.
  13. Adewuyi GM, Fowotade A, Adewuyi BT. Lassa Fever: Another Infectious Menace. *African J Clin Exp Microbiol.* 2009;10(3):144–55.
  14. Richmond JK, Baglolle DJ. Lassa fever: epidemiology, clinical features, and social consequences. *Br Med J.* 2003;327:1271–5.
  15. Tobin EA, Asogun DA, Isah EC, Ugege OG, Ebhodaghe P. Assessment of knowledge and attitude towards Lassa fever among Primary care providers in an endemic suburban community of Edo state: implications for control. *J Med Med Sci.* 2013;4(8):311–8.
  16. Ezeja B, Omili M, Ehigiator L. Nigerian Dental Students' Willingness to Treat HIV-Positive Patients. *J Dent Educ.* 2010;74(4):446–52.
  17. Adams AS, Soumerai SB, Lomas J, Ross-Degnan D. Evidence of self-report bias in assessing adherence to guidelines. *Int J Qual Heal Care.* 1999;11(3):187–92.
  18. Hansen M. As Ebola scare dies down in U.S., infectious disease preparations wane. *Los Angeles Times* [Internet]. Available from: [www.latimes.com/business/healthcare/la-na-future-of-diseases-20141115-story,amp.html](http://www.latimes.com/business/healthcare/la-na-future-of-diseases-20141115-story,amp.html)