

## Review article

**Knowledge and Practices about Ebola Virus Disease: An Update****Pooja Tarmale, Alishba Amolik, Joanna John**

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**Abstract**

Ebola virus disease (EVD) formerly known as Ebola hemorrhagic fever is an acute, communicable and serious illness with high mortality rate. Ebola is a single-strand, negative-sense RNA virus belongs to the Filoviridae family. Health care, good clinical care, and person's immune status are the determinants of recovery from Ebola. Healthcare workers, relatives and friends of Ebola patients are at greatest risk of getting sick through contact while caring for the ill and through funeral practices. Strict and effective infection control measures such as wearing gloves, gown, facemask should be followed while handling the Ebola patients. In this article, we will review knowledge and practices regarding awareness of Ebola viruses.

**Keywords:** Knowledge, practices, Ebola virus, infection, disease

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**1. Introduction**

An Ebola virus is negative-sense RNA viruses, pleomorphic, and belongs to the Filovirus family. Four strains of Ebola virus have been identified and out of them 3 have been shown to cause disease in both humans and nonhuman primates. Out of the three the Zaire, Ivory Coast, and Sudan strains, the Zaire strain is found to exhibit the highest lethality rate [1,2]. Patients infected with Ebola Virus Disease (EVD) initially complain of non-specific influenza-like symptoms and which may later progress to multi-organ failure and septic shock. Common signs and symptoms reported from West Africa during the 2014 outbreak include: fever (87 per cent), fatigue (76 per cent), vomiting (68 per cent), diarrhea (66 per cent), and loss of appetite (65 per cent) [3].

World Health Organization (WHO) report stated a total of 10,141 suspected cases and 4,922 deaths due to EVD in 2014 [4]. A

Liberian-American was the first case in Nigeria, who flew from Liberia to Nigeria's commercial capital Lagos and became critically ill upon arriving at the airport and died five days later. The doctor who treated him also died of EVD. The first person reported to be infected in the spread to Sierra Leone was a tribal healer. Her body was washed for burial and this appears to have led to infections in women from neighboring towns [5]. Sierra Leone's only expert on hemorrhagic fever, died after contracting Ebola at his clinic in Kenema [5]. Senegalese Minister of Health announced the first case in Senegal [6]. In August 2014, an outbreak of EVD was reported in the Democratic Republic of Congo [7,8]. The index case was a pregnant woman who prepared bush meat from an animal that had been killed by her husband. As at October 20, 2014, a total of 66 cases of EVD, including 49 deaths, have been connected to this outbreak [4]. Many of the areas seriously affected by the outbreak were areas of extreme poverty [9]. Other factors responsible for the spread of EVD

include reliance on traditional medicine and cultural practices involving physical contact with the deceased, especially death customs such as washing and kissing [10]. Some hospitals lack basic supplies and are understaffed, increasing the chance of staff contracting the virus themselves. In August 2014, the WHO reported that ten per cent of the dead have been health care workers [11].

The only source of reference in West Africa was the study in Sierra Leone [12]. In a study, 97% had heard of Ebola and believed in the existence (97%), with only 53% knowing the number to call to report suspected EVD cases or ask questions about the disease [11]. In Sierra Leone, comprehensive knowledge of EVD prevention was generally low. In the study, one-third of the respondents believed that EVD was transmitted by air or through mosquito bites [13].

In Sierra Leone, radio was by far the primary channel of receiving information on EVD (88%), followed by religious venues (42%), megaphone announcements (21%) and television (21%). About 40-43% of respondents received EVD information through television [10].

### **Mode of infection**

In Scientists' opinion, the natural host of the Ebola virus in Africa may be fruit bats, which could be responsible for transmitting the virus to other animals such as apes and monkeys. In humans, the virus is transmitted through direct contact with blood and body fluids of the infected individuals via broken skin or mucous membrane. It can also be transmitted through the use of contaminated syringe needles, bed sheets, pillows, stethoscopes with body secretions of the infected patients. However transmission does not occur through air, water, food, or mosquitoes. Though there are no studies on the survival of Ebola outside the body fluids, experts suggest EBV may die within 24 hrs. EBV can cause infection only if it stays in wet body fluids. Symptoms of Ebola disease usually appear 2-21 days of its infection. Initial symptoms of Ebola are sudden onset of fever, intense muscle weakness, and

headache, sore throat followed by vomiting, diarrhea, rash, impaired hepatic and renal functions. In some cases, it leads to internal and external bleeding. Death if occurs, is typically 6-16 days after symptoms start. No blood test is available to detect the EBV before a person has symptoms. Confirmatory specialized laboratory tests such as enzyme linked immunosorbent assay (ELISA), reverse-transcriptase polymerase chain reaction assay, and electron microscopy are available to detect the patients with typical symptoms. Recovery from Ebola depends on access to health care, good clinical care, and person's immune status. In men who recovered from Ebola, the virus can persist in semen for a period of 70-90 days. The Ebola virus has been detected in breast milk and urine also. As of now, no specific medicine or vaccine has been proven to cure Ebola. Only symptomatic treatment is given to increase the chance of survival which includes providing fluids and electrolytes, maintaining oxygen status, blood pressure and treating infections if any.<sup>8</sup> Healthcare workers, relatives and friends of Ebola patients are at greatest risk of getting sick through contact while caring for the ill and through funeral practices. Strict and effective infection control measures such as wearing gloves, gown, facemask should be followed while handling the Ebola patients.

### **Literature regarding knowledge regarding Ebola Virus**

Umamageshwari *et al* conducted a study to assess the knowledge and to create awareness about Ebola among undergraduate medical students. A self-administered, pretested questionnaire with 30 questions focusing on the general information of virus, mode of transmission, clinical features and complications of the infection, diagnosis, treatment, preventive measures, and epidemiological features was given to the study participants. Scoring system was followed, and statistical analysis was done using Chi-square test and comparison between different sections by one-way analysis of variance. Totally, 263 medical students participated in the study. Based on the percentile of scores obtained they were categorized into three groups, better

knowledge (18-30), average knowledge (10-17), poor knowledge (0-9). On the whole 70% students had an average level of knowledge 25% students had better knowledge and 5% students had poor knowledge. Female students had better knowledge when compared to male students ( $p < 0.0001$ ). Students had less knowledge regarding clinical features, epidemiological features and relatively poor knowledge regarding diagnosis and treatment. Comparatively, knowledge about mode of transmission, preventive measures and general information of virus were better. This study demonstrated apparent lack of knowledge regarding various aspects of Ebola and emphasis to conduct awareness programs to manage the dreadful consequences of the disease if rises [14].

Kharjana *et al* assessed the knowledge on Ebola virus among Engineering, Physiotherapy, and Management students at Saveetha University Chennai and to distribute self instructional module on Ebola viral infection and its prevention. Purposive sampling technique was used and 30 students both male and female studying in Saveetha University were selected. Demographic variables and knowledge regarding Ebola virus were collected by using self structured questionnaire. Descriptive and inferential statistics was used for the analysis of data. The findings of the study revealed that there was inadequate knowledge on Ebola Virus in students. Assessing the level of knowledge on Ebola virus among student, it was revealed that there were 66.6% of students had inadequate knowledge, 26.6% having moderate knowledge and 6.6% students are having adequate knowledge. The chi-square test showed that there was no significant association between the level of knowledge with the demographic variables such as age of the participant, religion and source of health information. The demographic variables such as monthly income, number of graduate in the family, type of family, education of students and occupation have a significant relation [15].

Mortality and morbidity weekly provided report regarding Community Knowledge, Attitudes, and Practices Regarding Ebola Virus Disease from 5 counties in Liberia [16].

A team of epidemiologists, in partnership with local trained volunteers, conducted an Ebola KAP survey in five counties in Liberia (Bong, Margibi, Maryland, River Gee, and Sinoe) with varying cumulative incidence of Ebola cases per 100,000 population. Across all five counties, more than 50 areas were selected to survey 60–100 persons per county. Survey respondents were members of the general public from the communities, including Ebola survivors. The field team trained literate volunteers among local students or county health office staff members to be surveyors. The volunteer surveyor group then recruited participants and administered survey questionnaires using a standardized form across all sites. Subject matter experts reviewed the survey's content before it was administered and local surveyors pilot-tested the surveys. Surveyors were instructed to share accurate information about Ebola after the survey. Surveyors approached community members in public areas, including residential and commercial zones, to solicit participation in the survey. From a central point in populated areas in each district, surveyors randomly chose a direction to approach community members, resulting in a non-probability sample of persons encountered in each county. Surveys were identical for all survey areas, and administered orally, in English. Whenever possible, individual surveys were conducted away from other persons.

Interviewers collected demographic data on sex, age, highest level of education, and occupation. Respondents were asked whether they agreed or disagreed with a total of 38 statements. The statements were divided into scored and non-scored sections. The scored section contained statements (N = 33) with responses scored using the contents of local health messages as a reference. The other statements (N = 5) were placed in the non-scored section. The scored section was further divided into three KAP categories: 1) Ebola knowledge (17 questions designed to gauge respondents' understanding of Ebola transmission), 2) Ebola attitudes (nine questions on perceptions about Ebola, Ebola patients, and treatment centers), and 3) Ebola practices (seven questions used to assess

respondents' anticipated practices if they or an acquaintance were to become symptomatic). Statements were scored "correct" if they were consistent with Liberia's Ministry of Health (MOH) health messaging at the time of the survey. The five non-scored statements were designed to assess respondents' subjective fears regarding Ebola, Ebola patients, or treatment centers. All responses were handwritten by surveyors in printed forms, and collected information was entered electronically into Excel by the CDC field team.

Overall, there were 609 respondents from the five counties (Bong [n = 212], Margibi [n = 126], Maryland [n = 106], River Gee [n = 97], and Sinoe [n = 68]).\*Although no official records were kept, the average response rate was estimated at >90%, based on the survey teams' experience with the refusal rate of persons approached. Among all respondents, 291 (48.2%) were women, and the median age was 32 years (range = 12–99). A majority (58.4%) of respondents had completed middle school education or higher. Of the 33 scored statements, overall, respondents answered correctly a median of 16 (range = 2–17) of 17 Ebola knowledge questions. The correct responses for attitudes (median = 7 of 9 questions correct; range = 1–9) and anticipated practices (median = 7 of 7 questions correct; range = 1–7) also were high, and did not differ by county

The knowledge areas where low-incidence counties scored lower were related to the questions on Ebola transmission, such as eating bush meat and attending burials (where persons might come in contact with the body) of Ebola patients. In addition, more respondents from low-incidence counties believed that a curse or spell could result in Ebola transmission, compared with those from high-incidence counties (34.8% versus 7.4%;  $p < 0.01$ ). Among respondents from all five counties, >30% agreed that a person can get Ebola from a healthy (asymptomatic) person. Scores were lower in a few key areas: respondents across all counties were not confident in their ability to identify Ebola symptoms, were fearful of survivors, and were afraid that if they went to an Ebola

treatment unit, they would not be allowed to see their family. One statistically significant difference in attitude between high- and low-incidence counties was a fear of cured patients (34.6% [high-incidence] and 47.8% [low-incidence],  $p < 0.01$ ) and a fear that a person would not be allowed to see their family if they were admitted to an Ebola treatment unit (37.9% [high-incidence] and 61.6% [low-incidence],  $p < 0.01$ ).

Responses to the five non-scored statements on Ebola-related fears showed that a large proportion (>90%) of respondents feared Ebola patients and persons who live with Ebola patients. Respondents in high-incidence counties were more fearful of these groups than those in low-incidence counties. Similarly, fear of Ebola treatment units was reported by more than half of respondents in both low- and high-incidence county groups; however, a significantly larger proportion from the low-incidence group reported fear of seeking care, and thought they would die if they sought care.

The Centre for Public Policy Alternatives (CPPA) conducted knowledge, attitude and practice (KAP) survey on a cross-section of Nigerians in Lagos state, including healthcare professionals (physicians, nurses, pharmacist and laboratory service providers) in health facilities [17]. Authors investigated the knowledge and perceptions of Nigerians concerning the Ebola virus disease, their attitudes towards it, and the prevention practices that have been or being adopted to curb its spread. The knowledge and perceptions of healthcare providers concerning the Ebola virus disease, their attitudes towards it, and the prevention practices that have been or being adopted to curb its spread was also investigated. It was identified from general population that respondents were aware Ebola can spread through direct (92%) and indirect (84%) contacts, and can be transmitted by non-human primates (88%). One-third respondents believed that Ebola was caused by our sins; 26% think, it could be spread through mosquito bite; 23% believe certain churches or religious centers can cure it; 22% believe born again Christians/Muslims do not easily contact the condition. Television

served as the main source of information on Ebola in general population. About a quarter respondents believed that Ebola could be cured by local or traditional remedies such as herbs and concoctions. Only 28 percent respondents were aware that there was a hot line (help line) for the disease. 20% respondents believed that the Ebola virus disease is both a spiritual and medical problem, while 6% believe the disease was mainly a spiritual problem. In case of healthcare workers, majority of them had knowledge of Ebola disease including the symptoms and mode of transmission. Seventeen percent healthcare workers believed antibiotics as a cure of Ebola. Air as mode of transmission of Ebola was opinion of 15% healthcare workers. Mosquito bite was also opinion of spread of the viruses in 1%. The workers have news media as the source of information about Ebola virus disease.

Nwozichi CU conducted a questionnaire-based study was conducted in Lagos state of Nigeria. A state that was first affected with the Ebola virus. The questionnaire contained two sections: Section A elicited participants' knowledge about EVD and section B assessed their attitude toward Ebola survivors. Participants' knowledge was categorized as adequate, moderate, inadequate and no knowledge and their attitude was categorized as positive and negative. 230 Lagos residents who gave a voluntary consent were asked to fill the self-structured questionnaire.

Findings showed that the majority (79%) of the participants had moderate knowledge of EVD while 56% had a positive attitude toward Ebola survivors. This is in contrast with the report of International Federation of Red cross and Red Crescent Societies stating that Liberian citizens have limited knowledge regarding the mode of transmission of the Ebola virus. Participants' attitude towards Ebola survivors was significantly associated with their marital status, educational background and knowledge of EVD at 5% level of significance. Majority of the participants felt that Ebola survivors may still be having the disease even after treatment and being declared free by health experts.

Rolison et al assessed risk perceptions of Ebola among individuals living in the US and measured their knowledge of the virus. Authors hypothesized that better knowledge of Ebola would be linked to lower perceived risk of contracting the virus, and the internet would be one of the major sources of information about Ebola among knowledgeable individuals. Two hundred twelve respondents were recruited to complete an online survey of their knowledge and perceptions of the Ebola virus. Total Ebola knowledge scores (Table 2; Section A) were calculated by summing correct responses across item 1 (correct = [a]), item 2 (correct = [d]), item 3 (correct = [b] and not [a]), item 4 (correct = [c] and [d]), and item 5 (correct = [a]), generating a maximum possible score of five. Seven items (Table 2; Section B) measured sources of new information about Ebola in the past year, trust in information sources, perceptions of preventive measures, and willingness to pay for an Ebola vaccine. Six items (Table 2; Section C) assessed perceived risk, seriousness, and worry about Ebola, and fourteen items (Table 2; Section D) measured perceptions of risk and seriousness for other medical conditions. The present study revealed that knowledge of Ebola was strongly implemented in people's risk perceptions of the virus. Here, it was found that more knowledgeable individuals perceived less risk of contracting Ebola for themselves and for others. Further, they were less worried about contracting the virus, and perceived greater control over preventive actions against contracting Ebola in the event of an outbreak in the US. Yet, they also regarded contracting Ebola as more serious compared to their less knowledgeable counterparts. These findings provide a tentative suggestion that the provision of accurate health information about Ebola could be effective in informing the general public about the risks of Ebola and of preventive measures without curtailing the seriousness of the virus [19].

Improving the knowledge about EVD is very important in order to curtail its further transmission across borders. Researchers have identified a lack of Knowledge among other issues as a serious challenge in the

response to EVD outbreak and its related stigma. People with less knowledge and education about EVD are more concerned about an outbreak and are also more concerned that they or their families will get sick.

**Conflict of Interest:** None

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