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RESEARCH ARTICLE

AWARENESS OF EBOLA VIRUS DISEASE AMONG GENERAL POPULATION, ADIGRAT TOWN, TIGRAY REGION, ETHIOPIA

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Abstract

Background: Ebola virus disease (formerly known as Ebola haemorrhagic fever) is a severe, often fatal illness, with a death rate of up to 90%. The illness affects humans and nonhuman primates (monkeys, gorillas, and chimpanzees).The objective of this study is to assess the awareness of Ebola Virus Disease (EVD) among general population in Adigrat town, Tigray region, Ethiopia.

Methods: A descriptive study was conducted among general population at Adigrat town, based upon availability of the sample and convenient of the researcher. A questionnaire included questions designed to assess the demographic variables like age, gender, educational status, occupation and source of Ebola information and another part of questionnaire which includes 21 question regarding awareness of Ebola causes, mode of transmission and prevention.

Results: Majority of the people 38 (76%) have medium level of awareness on Ebola, followed by 3(6%) have good awareness, and 9(18%) have poor awareness on Ebola and there is a significant relationship between the demographic variables and awareness of Ebola among general population.

Conclusion: In this study, the awareness of Ebola among general population of Adigrat town is at medium level, so they need knowledge about Ebola to be aware regarding causes, prevention and care against Ebola. Awareness of Ebola Virus Disease has significant relationship between the demographic variables like age, gender, educational status, occupation and sources of information. The results highlight the need for educational and awareness programmes that reinforce.

Introduction

Ebola virus disease brings the most frightening of infectious disease syndromes to mind. Ebola virus disease is the kind of thing that horror writers dream about. Invariably, Ebola is a severe illness caused by Ebola virus. It is highly infectious, rapidly fatal, with a death rate of up to 90%, but can be prevented. It is spread through direct contact with body fluids like blood, saliva, urine, sperm, etc. of an infected person and by contact with contaminated surfaces or equipment, including linen soiled by body fluids from an infected person. The Ebola virus can be relatively easily eliminated with heat, alcohol-based products, and sodium hypochlorite (bleach) or calcium hypochlorite (bleaching powder) at appropriate concentrations (1).

The filoviruses, Ebola and Marburg, are among the most virulent human pathogens. Case-fatality rates in large epidemics in central Africa have reached 80 to 90 percent. Ebola and Marburg viruses are also classified as

"hemorrhagic fever viruses" based on their clinical manifestations, which include coagulation defects, a capillary leak syndrome, and shock. With the exception of the first outbreak in Marburg, Germany, and a few subsequent accidental laboratory infections, all cases of filoviral disease have occurred in sub-Saharan Africa (9). Ebola virus causes severe viral hemorrhagic fever with a high fatality rate. Five Ebola virus species within the genus Ebolavirus are known; including four that cause Ebola virus disease (EVD) in humans (a fifth species has only caused disease in nonhuman primates). The 2014 outbreak of EVD in West Africa, caused by Ebola virus (Zaire Ebola virus species), is the largest outbreak of EVD in history. Ebola virus can be transmitted by direct contact with blood, body fluids, or skin of EVD patients or persons who have died of EVD(10)**(Figure 1)**.

The largest outbreak of Ebola virus disease is the West African outbreak caused by the Zaire species of the virus. This outbreak started in the West African nation of Guinea in late 2013 and was confirmed by the World Health Organization in March 2014. The countries with widespread transmission include Guinea, Liberia, and Sierra Leone. Cases of Ebola virus disease related to this outbreak have also been reported outside of West Africa (eg, Spain and United States). These cases have occurred in healthcare workers caring for patients with Ebola virus disease, as well as a returning traveller. Person-to-person transmission requires direct contact with blood or other virus-containing body fluids. The reservoir host of the filoviruses is not known. Evidence is accumulating that various bat species serve as a source of infection for both humans and wild primates. In addition to causing extensive tissue damage, filoviruses also induce a systemic inflammatory syndrome by causing the release of cytokines, chemokines, and other proinflammatory mediators from infected macrophages. The incubation period is typically 6 to 12 days, but can range from 2 to 21 days. Patients with Ebola and Marburg virus disease usually have an abrupt onset of non-specific symptoms, such as fever, malaise, headache, and myalgias. As the illness progresses, patients develop worsening prostration, stupor, and hypotension. Signs of impaired coagulation generally remain limited to conjunctivalhemorrhages, easy bruising, blood in the stool, and failure of venipuncture sites to clot. Ebola virus can persist for some time in certain bodily fluids, such as semen and breast milk. In one known instance, viral persistence in semen led to virus transmission through sexual contact (2).

BACKGROUND

The Ebola virus causes an acute, serious illness which is often fatal if untreated. Ebola virus disease (EVD) first appeared in 1976 in 2 simultaneous outbreaks, one in Nzara, Sudan, and the other in Yambuku, Democratic Republic of Congo. The latter occurred in a village near the **Ebola River,** from which the disease takes its name.

The current outbreak in West Africa, (first cases notified in March 2014), is the largest and most complex Ebola outbreak since the Ebola virus was first discovered in 1976. There have been more cases and deaths in this outbreak than all others combined. It has also spread between countries starting in Guinea then spreading across land borders to Sierra Leone and Liberia, by air (1 traveller) to Nigeria and USA (1 traveller), and by land to Senegal (1 traveller) and Mali (2 travellers).

The most severely affected countries, Guinea, Liberia and Sierra Leone, have very weak health systems, lack human and infrastructural resources, and have only recently emerged from long periods of conflict and instability. On August 8, the WHO Director-General declared the West Africa outbreak a Public Health Emergency of International Concern under the International Health Regulations (2005).

The virus family Filoviridae includes three genera: Cuevavirus, Marburgvirus, and Ebolavirus. There are five species that have been identified: Zaire, Bundibugyo, Sudan, Reston and Taï Forest. The first three, BundibugyoEbola virus, Zaire Ebola virus, and Sudan Ebola virus have been associated with large outbreaks in Africa. The virus causing the 2014 West African outbreak belongs to the Zaire species (8).

Transmission

It is thought that fruit bats of the Pteropodidae family are natural Ebola virus hosts. Ebola is introduced into the human population through close contact with the blood, secretions, organs or other bodily fluids of infected animals such as chimpanzees, gorillas, fruit bats, monkeys, forest antelope and porcupines found ill or dead or in the rainforest.

Ebola then spreads through human-to-human transmission via direct contact (through broken skin or mucous membranes) with the blood, secretions, organs or other bodily fluids of infected people, and with surfaces and materials (e.g. bedding, clothing) contaminated with these fluids.

Health-care workers have frequently been infected while treating patients with suspected or confirmed EVD. This has occurred through close contact with patients when infection control precautions are not strictly practiced.Burial ceremonies in which mourners have direct contact with the body of the deceased person can also play a role in the transmission of Ebola.People remain infectious as long as their blood contains the virus (7).

No formal evidence exists of sexual transmission, but sexual transmission from convalescent patients cannot be ruled out. There is evidence that live Ebola virus can be isolated in seminal fluids of convalescent men

for 82 days after onset of symptoms. Evidence is not available yet beyond 82 days. There is no evidence of live Ebola virus in vaginal secretions.

Symptoms of Ebola virus disease

The incubation period, that is, the time interval from infection with the virus to onset of symptoms is 2 to 21 days. Humans are not infectious until they develop symptoms. First symptoms are the sudden onset of fever fatigue, muscle pain, headache and sore throat. This is followed by vomiting, diarrhea, rash, symptoms of impaired kidney and liver function, and in some cases, both internal and external bleeding (e.g. oozing from the gums, blood in the stools). Laboratory findings include low white blood cell and platelet counts and elevated liver enzymes(6).

Diagnosis

It can be difficult to distinguish EVD from other infectious diseases such as malaria, typhoid fever and meningitis. Confirmation that symptoms are caused by Ebola virus infection are made using the following investigations:

- antibody-capture enzyme-linked immune sorbent assay (ELISA)
- antigen-capture detection tests
- serum neutralization test
- reverse transcriptase polymerase chain reaction (RT-PCR) assay
- electron microscopy
- Virus isolation by cell culture.

Samples from patients are an extreme biohazard risk; laboratory testing on non-inactivated samples should be conducted under maximum biological containment conditions.

Treatment and vaccines

Supportive care-rehydration with oral or intravenous fluids- and treatment of specific symptoms, improves survival. There is as yet no proven treatment available for EVD. However, a range of potential treatments including blood products, immune therapies and drug therapies are currently being evaluated. No licensed vaccines are available yet, but 2 potential vaccines are undergoing human safety testing.

Prevention and control

Good outbreak control relies on applying a package of interventions, namely case management, surveillance and contact tracing, a good laboratory service, safe burials and social mobilization. Community engagement is key to successfully controlling outbreaks. Raising awareness of risk factors for Ebola infection and protective measures that individuals can take is an effective way to reduce human transmission. Risk reduction messaging should focus on several factors:

- **Reducing the risk of wildlife-to-human transmission** from contact with infected fruit bats or monkeys/apes and the consumption of their raw meat. Animals should be handled with gloves and other appropriate protective clothing. Animal products (blood and meat) should be thoroughly cooked before consumption.
- **Reducing the risk of human-to-human transmission** from direct or close contact with people with Ebola symptoms, particularly with their bodily fluids. Gloves and appropriate personal protective equipment should be worn when taking care of ill patients at home. Regular hand washing is required after visiting patients in hospital, as well as after taking care of patients at home.
- **Reducing the risk of possible sexual transmission,** because the risk of sexual transmission cannot be ruled out, men and women who have recovered from Ebola should abstain from all types of sex (including anal- and oral sex) for at least three months after onset of symptoms. If sexual abstinence is not possible, male or female condom use is recommended. Contact with body fluids should be avoided and washing with soap and water is recommended. **Outbreak containment measures,** including prompt and safe burial of the dead, identifying people who may have been in contact with someone infected with Ebola and monitoring their health for 21 days, the importance of separating the healthy from the sick to prevent further spread, and the importance of good hygiene and maintaining a clean environment(5).

Controlling infection in health-care settings:

Health-care workers should always take standard precautions when caring for patients, regardless of their presumed diagnosis. These include basic hand hygiene, respiratory hygiene, use of personal protective equipment (to block splashes or other contact with infected materials), safe injection practices and safe burial practices.

Health-care workers caring for patients with suspected or confirmed Ebola virus should apply extra infection control measures to prevent contact with the patient's blood and body fluids and contaminated surfaces or materials such as clothing and bedding. When in close contact (within 1 meter) of patients with EBV, health-care workers should wear face protection (a face shield or a medical mask and goggles), a clean, non-sterile long-sleeved gown, and gloves (sterile gloves for some procedures).Laboratory workers

are also at risk. Samples taken from humans and animals for investigation of Ebola infection should be handled by trained staff and processed in suitably equipped laboratories.

B. Fazekas et al., (December 2014). Ebola virus disease: awareness among junior doctors published in England the journal of hospital infections, the current Ebola virus epidemic continues to pose a threat to the UK. Junior clinicians are often at the frontline of medical care in hospitals and their awareness of the clinical features and management of the Ebola virus disease (EVD) may significantly influence the timely implementation of infection control measures. In view of this, we carried out a cross-sectional survey of 119 junior doctors across four different hospitals in England in order to assess their level of knowledge of EVD. We demonstrate that there is currently a deficiency of knowledge about critical aspects of EVD in this population(3).

Everyone in the country and society must be aware of the dreadful infectious diseases like Ebola Virus Disease to prevent transmission of the disease and take precautions and preventive measures. The researchers feel that general public of Adigrat town is not aware of Ebola Virus Disease, its causes, transmission, care and prevention. So, researchers felt need to assess the awareness, recommend research in this field.

Objectives:

- To assess the level of awareness of Ebola among general population.
- To find out the association between the awareness of Ebola with demographic variables.

Hypothesis:

- H_0 – there will be significant association between the awareness of Ebola and the demographic variables among general population.
- H_1 - There will be no significant association between the awareness and their age, gender, education, occupation and sources of information.

MATERIALS AND METHODS

Research approach: A descriptive research approach.

Research design: Non experimental descriptive survey method.

Setting of the study: -The setting for the present study is Adigrat town, Tigray region, Ethiopia. This setting was selected because the investigator observed that the educated people are high in this area.

Population: -The population for the present study are the general public, who meet the inclusive criteria.

Sample and sampling technique: -Subjects for the present study are selected by using convenient/purposive sampling technique. Data was collected by using structured questionnaire on awareness of Ebola from general public.

Tool: The structured questionnaire used in the study consists of 2 sections:

Section – A consists of 5 items on demographic profile of the subjects.

Section – B comprises of 21 questions related to awareness on Ebola, each question has 3 options one right answer and 2 wrong answers, and each right answer assigned a score of '1' and wrong answer '0'.

Scoring system:

Poor awareness (0-7),

Medium awareness (8-14),

Good awareness (15-21).

Data collection procedure: - Informed consent is taken from all the participants in the study. The data was collected for one week from general public who met the inclusive criteria. The structured questionnaire was used to collect data from the subjects.

RESULTS

Out of 50 samples, 42 (84%) belongs to the age group of 19-28years, 31(62%) are males, 42(84%) completed their graduation, 25 (50%) are employees and business people, 36(72%) got information on Ebola through mass communication media (Table I).

The figure-2 shows that majority of the people 38 (76%) have medium level of awareness on Ebola, followed by 3(6%) have good awareness, and 9(18%) have poor awareness on Ebola.

Table II shows the chi square values of awareness of Ebola and age ($\chi 2$ =86.8724), gender ($\chi 2$ =27.5598), education ($\chi 2$ = 44.3596), occupation ($\chi 2$ = 71), sources of information ($\chi 2$ =29.8398), are formed to be more than the table value at 5% level of significance which implies that there is significant association existing between the awareness of Ebola among general population and their age, gender, education, occupation, source of information. Hence, the researcher rejects the research hypothesis H_0 and H_1 is accepted.

DISCUSSION

Five socio-demographic variables were used in the study namely: age, sex, educational status, occupation and source of information. The study also explored variable like awareness of ebola risk factors, symptoms, care, and prevention.

The results from the study showed that the general population for Adigrat Town had medium level of awareness regarding Ebola.Michele Njiki and Alice EsambeTatah (January 2005), the objective of this study was to gauge prevailing Ebola Knowledge in some risk groups in Yaounde, in order to provide baseline information that could help to assess the outcome of CMSC's Ebola awareness program. The general response rate achieved by the study was 100%. The results showed that 78.32% of respondents knew that Ebola is a highly infectious disease that originates from bats and animals. 80.29 % knew that the virus is transmitted by an infected person, 63.64% indicated high temperature as the first symptom of the Ebola Virus disease, while 49.34% knew that bleeding, body weakness and vomiting are all other symptoms of EVD. 78.26% knew that a suspected case should not be helped except by health authorities and 65.67% knew that to prevent Ebola disease; one should not come in contact with an infected person.

CONCLUSION

The overall objective of this study is to assess the awareness of Ebola in Adigrat Town. The study sought to determine prevailing Ebola knowledge among selected group of the general population. The study concludes that majority of the general population have medium awareness regarding Ebola Virus Disease and there is significant association between the socio-demographic variables and awareness of Ebola. Based upon these results, the following recommendations are made:

1. The government of Ethiopia must provide information to the general public regarding Ebola Viral Disease and ways of preventing the infection.
2. Schools, universities, Government organisation should be used as a medium for Ebola Education through mass media like pamphlets, charts, television channels, radio and other sources of information.

MowafaHouseh and et al., (2014) conducted study on Communicating Ebola through social media and electronic news media outlets: A cross-sectional study published in medical informatics journal. The study reveals the finding that Social media and electronic news media activity are an important source of information for the general public. Yet, there is a dearth of research exploring the use of Twitter and electronic news outlets during significant worldly events such as the recent Ebola Virus scare. The purpose of this article is to investigate the use of Twitter and electronic news media outlets in communicating Ebola Virus information. A cross-sectional survey of Twitter data and Google News Trend data from 30 September till 29 October, 2014 was conducted. Between 30 September and 29 October, there were approximately 26 million tweets (25,925,152) that contained the word Ebola. The highest number of correlated activity for Twitter and electronic news outlets occurred on 16 October 2014. Other important peaks in Twitter data occurred on 1 October, 6 October, 8 October, and 12 October, 2014. The main influencers of the Twitter feeds were news media outlets. The study reveals a relationship between electronic news media publishing and Twitter activity around significant events such as Ebola. Healthcare organizations should take advantage of the relationship between electronic news media and trending events on social media sites such as Twitter and should work on developing social media campaigns in co-operation with leading electronic news media outlets (e.g. CNN, Yahoo, Reuters) that can have an influence on social media activity (4).

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Table I: Description of demographic characteristics of general population of Adigrat Town

Demographic characteristics	Frequency	Percentage %
Age in years		
19 - 28 years	42	84
29 – 38 years	7	14
39 – 48 years	1	2
Gender		
Male	31	62
Female	19	38
Educational status		
11-12 grade	3	6
Degree	42	84
Master and above	5	10
Occupation		
Student	5	10
Employee / business	25	50
Teacher	20	40
Source of information		
Mass media	36	72
Internet	14	28

Table II: Association between the awareness of Ebola with selected demographic variables.

Variables	$\chi 2$ value	$\chi 2$ value at 5 % level (d.f.)	Level of significance
Age	86.8724 *****	9.488 (d.f.4)	Significant
Gender	27.5598 *****	5.991 (d.f.2)	Significant
Education	44.3596 *****	9.488 (d.f.4)	Significant
Occupation	71 *****	9.488(d.f.4)	Significant
Sources of information	29.8398 *****	5.991(d.f. 2)	Significant

*** = Significant at 0.05 level**

Figure 1: Genome Framework (Electron micrograph of an Ebola virus virion)

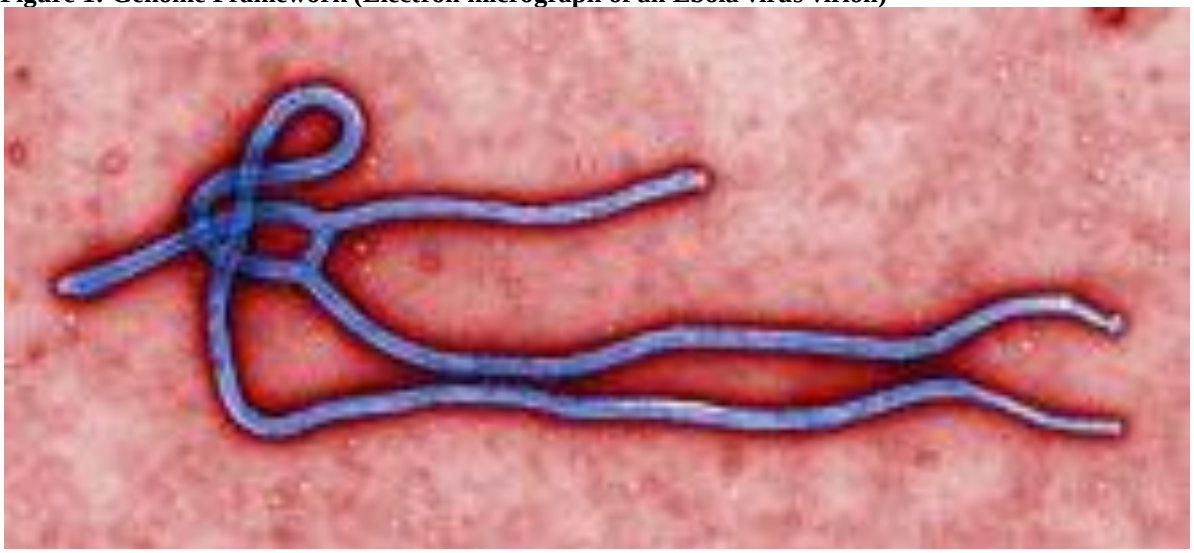

Figure –2: Levels of awareness of Ebola among general population