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ORIGINAL ARTICLE

Awareness of Ebola Virus Disease among the Medical and Non-medical Personnel in Lahore

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ABSTRACT

Background: Ebola hemorrhagic fever, also called Ebola Virus Disease (EVD), is caused by a member of Filoviridae family known as Ebola Virus (EBOV). The incubation period of this virus is 2 to 21 days and initial symptoms may include fever, chills, headaches, muscle aches, and loss of appetite.

Objectives: The study was aimed to assess the effectiveness of awareness sessions about EVD among university population.

Methodology: A cross sectional study was carried out post awareness sessions at different universities of Lahore and data was compared with data of medical personnel.

Results: Our study indicated that 75% of university population have gained the knowledge about Ebola virus disease after the awareness session.

Conclusion: The present study concludes that awareness sessions about EVD are highly effective in spreading basic knowledge about the disease, therefore, it is recommended to use multidimensional approaches such as seminars, awareness campaigns, presentations and social media etc. to increase awareness of diseases so that the possible outbreak of this disease in Pakistan could be prevented.

Keywords	*Address of Correspondence	Article info.
Awareness, Cross-sectional study, Ebola virus, Filoviridae, Medical personnel, Prevention.	*babar.khawar@uon.edu.pk* *mussaratrafiq369@gmail.com*	*Received: May 28, 2021* *Accepted: June 01, 2022*

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INTRODUCTION

Ebola virus is a fellow of the Filoviridae viral family of RNA viruses, which are recognized by their thin and long filaments. It is named after the Ebola River from where the virus was originated. EBOV is the causative agent of Ebola hemorrhagic fever. It damages the endothelial cells lining of the blood vessels and lead to difficulty in coagulation of the blood cells. Due to failure of platelets coagulation and damaged blood vessels, patients suffer from hypovolemic shock or decrease in blood pressure. Ebola can have up to a 90% mortality rate[1].

Many different types of Ebola virus infect humans. Currently these are Zaire, Sudan, and Ivory Coast Ebola virus, named for the respective areas in Africa where the strains were first found. Reston Ebola virus is a type of Ebola that only infects animals. It was first discovered Ebola outbreak in Reston, Virginia[2].

Zaire and Sudan strains were discovered in 1976 when outbreak of Ebola hemorrhagic fever occurred in Zaire and Sudan. The Zaire Ebola virus belongs to the group of human affecting viruses that have reportedly highest fatality rate. In the 1976 outbreak, the 88% of patients died, 81% in 1995, 73% in 1996, 80% in 2001-2002, and 90% in 2003. Sudan Ebola virus has a lower fatality rate, yet very dangerous, with the reported fatality as 53% in 1976, 65% in 1979, 53% in 400 patients infected in 2000, and 41% in 2004[2].

Fruit bats of the Pteropodidae family are natural Ebola virus hosts. Ebola enters in the humans through close contact with blood, secretions, organs or other body fluids of infected animals such as chimpanzees, gorillas, fruit bats, monkeys. Ebola can also spreads through human-to-human contact or direct contact (through broken skin or mucous membranes) with the blood, secretions, organs or other body fluids of infected people, and with surfaces and materials (e.g. bedding, clothing) contaminated with these fluids[3].

The recovery period from Ebola virus infection is up to 7 weeks. While during incubation period virus do not transmits. A person shows symptoms within 21 days after having contact with Ebola. EBOV transmission occur through following ways; (I) having slept in the same household with a case, (II) has had direct physical contact with the case (dead or alive) during the illness, (III) has had direct physical contact with the (dead) case at the funeral, (IV) has touched his/her blood or body fluids during the illness, (V) has touched his/her clothes or linens and (IV) has been breastfed (baby) by the patient[4].

The incubation period of the Ebola virus is 2 to 21 days. Human are not infectious until they show symptoms. Initial symptoms that appear are sore throat, fever, muscle pain, fatigue, and headache, while other symptoms are diarrhea, vomiting, rash, symptoms of decreased liver and kidney functioning, and in some circumstances, both internal and external bleeding (e.g. oozing from the gums and blood in the stools). In the analytical way there is a reduction in white blood cell and platelets and elevation in liver enzymes has been reported. It is very problematic to isolate EVD from other infectious diseases such as malaria, meningitis, and typhoid fever[5]. According to timeline of infection the different diagnostic tests are described in Table **1**[6].

Table 1. Diagnostic Test on the Basis of Infection Timeline.

Timeline of Infection	Diagnostic Tests Available
Within a few days after symptoms begin	• Antigen-capture enzyme-linked immunosorbent assay (ELISA) testing • IgM ELISA • Polymerase chain reaction (PCR) • Virus isolation
Later in disease course or after recovery	• IgM and IgG antibodies
Retrospectively in deceased patients	• Immunohistochemistry testing • PCR • Virus isolation

Moreover, careful-rehydration with oral or IV fluids treatments are given according to specific symptoms. No proper treatment and vaccine for this virus is available. Disease can be prevented by taking the standard precautions such as Safe discard of sharp instruments, hygiene of hand, use of Personal Protective Equipment (PPE) according to the risk evaluation, clean environment and sterilized clinical tools[4]. By assuring some safety measures inside EBV units of hospitals the spread of EBOV can be reduced, following are the safety measures, (I) Limit number of staff allocated to patient care, (II) Bound the number of visits (III) Retain log books to record staff caring for the patient as well as for visitors (IV) Use of PPE by both health care personnel's and visitors (V) Correct use of surgical masks and goggles and (VI) Eliminate PPE before leaving the isolation area. Special precautions should be taken when eliminating PPE to prevent contact with eyes and mucous membranes[7]. Similarly, health-care personnel should always follow the standard protective measures when handling the patients. These include basic safety measures such as respiratory hygiene, hand hygiene, use of personnel protective equipment. Moreover, Health-care personnel treating the Ebola positive patients should avoid contact with the patient's blood, body fluids and contaminated places or things such as clothing and bedding. When in close contact (within 1 meter) of EV patients, health-care personnel should wear medical mask and goggles[8].

World Health Organization (WHO) has warned Pakistan about the possibility of Ebola outbreak in Pakistan. Recent deadliest spread of EVD in West Africa has become alarming for Pakistan as large number of people travel to Pakistan from Africa[9, 10]. A cross sectional study by Salman *et al.,* (2017) involving participants from various universities of Lahore have reported that a large number of university population (91.8%) had inadequate knowledge of EVD. This study had suggested that there is an immense need to increase awareness about EVD among university population because universities hosts large number of national students and even international students[11]. Therefore, we have designed the two step study, where we first aimed to increase the knowledge of university population, and then we have carried out a questionnaire base study to check the effectiveness of EVD awareness sessions by comparing the results of post awareness session among university participants with medical personnel.

MATERIALS AND METHODS

A cross sectional study was carried out to evaluate awareness about EVD among two study groups, medical and non-medical professionals from different universities and hospitals of Lahore. A predesigned and self-administered questionnaire was used to collect data from study participants. Non-medical study participants were selected from Hajvery University Lahore, University of Lahore, Lahore Leeds University, on the other medical participants were included from various hospitals like Shalamar Hospital, Services Hospital, Mayo Hospital.

Questionnaire was distributed after taking consent from each participant and both study groups have equal number of sample size, 500 participants in each study group. Seminars, presentations and broachers' distribution was conducted for providing information to the people regarding the disease. We went to various groups and after giving awareness provided them with the questionnaires regarding the causes, incidences, risk factors, transmission, adverse effects, epidemiology, laboratory findings, and all other related knowledge about Ebola Virus Disease. This observational research was independent of any variable manipulation. The purpose of our study was to assess the level of knowledge, find the percentage of the people who are well-aware about the disease and need to analysis the epidemiological features of Ebola Virus Disease (EVD), as well as our current thoughtful of the transmission dynamics and the effect of control interferences against Ebola transmission.

Statistical Analysis

Data was analyzed using IBM SPSS software version 22.0. Data mining was performed after initial data coding. Variables were recorded into binary variables by assigning code (0) to the correct option and all the wrong options were coded (1). Recoded relevant items were aggregated into the variables i.e. knowledge of EVD, precautionary knowledge of EVD, overall awareness of EVD of two (yes/no, aware/unaware) and three categories (low, medium, high). After categorizing variables, cross tabulations was performed between independent variable (medical vs. non-medical personnel) and dependent

variables. In addition, the Pearson Chi-Square test was used to check the association between study variables

RESULTS

Questionnaire was distributed among different individuals, 1000 questionnaires were solved, compared and evaluated.

The questionnaires were distributed among medical and nonmedical personnel (as shown in Table **2**) and evaluated afterwards. Equal number of males and females participated in the study, involving students and working people (Table **3**).

Table **4** presents cross tabulation results between medical and non-medical personnel with the knowledge of EVD. In addition, it also includes Chi-Square results at significant value 0.05. Cross tabulation results indicated that 45% of medical and 35% of non-medical personnel know about Ebola virus. The value of Pearson chi-square test indicates that the difference between the knowledge of two groups about EBOV was non-significant. Similarly, awareness among participants of both groups about EBOV diagnostic test, severity of disease and non-hygienic conditions that leads to EVD was equal. While the knowledge about the vaccination of disease, air as its route of transmission and EVB effects on liver enzymes was higher among medical personnel compared to non-medical personnel. Moreover, both groups were well aware about treatment of disease, precautionary measures and transmission from mother to babies and from person to person through needles and body fluids. Overall, the baseline results of our survey indicated that 75% of university population have knowledge about Ebola virus disease.

Table 2. Number of Questionnaires of Medical and Nonmedical Personnel.

Medical personnel	500
Non-Medical personnel	500

Table 3. Total Number of Participants of the Study.

Total No. of Participants	1000
Male	500
Female	500
Students	700
Working people	300

Table 4. Cross Tabulation and Pearson Chi-Square Results of the Knowledge of EVD.

	Knowledge of EVD		Pearson Chi-Square
	Aware	**Unaware**	
Do you know what Ebola virus is?			
Medical	45%	5%	6.250
Non-Medical	35%	15%	
Does it have any vaccination?			
Medical	45%	5%	12.000*
Non-Medical	30%	20%	
Which test is preferred to diagnose EVD?			
Medical	33%	17%	2.627
Non-Medical	25%	25%	

Contd….

Is it treatable?			
Medical	40%	10%	4.672
Non-Medical	30%	20%	
Any non-hygienic condition can lead to the disease?			
Medical	40%	10%	0.233
Non-Medical	38%	12%	
Ebola virus disease is also called?			
Medical	38%	12%	7.250*
Non-Medical	25%	25%	
Does Ebola virus disease has severity?			
Medical	25%	25%	1.010
Non-Medical	20%	30%	
The incubation period of Ebola virus is			
Medical	38%	12%	1.214
Non-Medical	33%	17%	
Does Ebola virus transmit through air?			
Medical	43%	7%	8.574*
Non-Medical	30%	20%	
Does Ebola virus affect the liver enzymes?			
Medical	45%	5%	12.000*
Non-Medical	30%	20%	
The level of liver enzymes are?			
Medical	38%	12%	1.214
Non-Medical	33%	17%	
The Ebola virus disease patients are placed in?			
Medical	35%	15%	0.184
Non-Medical	33%	17%	
Ebola virus is transmitted through?			
Medical	45%	5%	3.473
Non-Medical	38%	12%	
Can Ebola virus transmit to babies from affected mother?			
Medical	44%	6%	4.882
Non-Medical	35%	15%	
Is Ebola virus transmitted from?			
Medical	30%	20%	1.010
Non-Medical	25%	25%	
Is Ebola virus is transferred from one country to another?			
Medical	45%	5%	3.473
Non-Medical	38%	12%	

*= Significant value at 0.05

DISCUSSION

Findings of our study reveals that awareness sessions were very effective and significantly contributed in spreading awareness among university students. Previously, a study by Salman *et al*, reported that 91.8% of university population had inadequate knowledge about Ebola virus disease. This study suggested that there is an immediate need to increase the knowledge and spread awareness among university population[11]. Our study determined that use of multidimensional approaches such as seminars and awareness campaigns are highly effective in increasing knowledge of general public about EVD. The results of our study are in accordance with the results reported by Rehman and colleagues (2019), according to which the basic training session regarding EVD are highly effective in increasing basic knowledge about Ebola virus disease. The results of our study have suggested that about 75% of participants gave the correct responses which suggested that the awareness session significantly improved the knowledge of university participants[12].

CONCLUSION

The findings of our study concludes that EVD awareness sessions are highly effective in improving understanding and knowledge of Ebola virus disease. To halt the possible outbreak of EVD in Pakistan, it is mandatory that all organizations at different levels of the health care system and all health care personnel such as clinical, public health professionals, laboratory, etc. must be informed about the characteristics and modes of transmission of the disease**.** Similarly, it is recommended to communicate with the public about the EVD via social media, awareness campaigns, and seminar etc. as our study had proved their effectiveness. National health authorities are encouraged to control EVD by the community cooperation. National authorities should advice travellers who travel to those countries where transmission of EVD is documented, to get tested. Media should spread information about the modes of transmission and prevention of EVD.

ETHICAL APROVAL

The cross section study was conducted following Ethical approval guidelines.

CONFLICT OF INTEREST

The author declares no conflict of interest.

FUNDING SOURCE

The study has no internal or external funding source to declare.

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LIST OF ABBREVIATIONS

ELISA	Enzyme-linked Immunosorbent assay
EBOV	Filoviridae family known as Ebolavirus
PPE	Personal protective equipment
PCR	Polymerase chain reaction
RNA	Ribonucleic acid
WHO	World health organization
ELISA	Antigen-capture Enzyme-linked Immunosorbent assay

REFERENCES

1. Leroy EM, Kumulungui B, Pourrut X, Rouquet P, Hassanin A, Yaba P, *et al*. Fruit bats as reservoirs of Ebola virus. Nature. 2005; 438(7068):575-6.
2. Pourrut X, Kumulungui B, Wittmann T, Moussavou G, Délicat A, Yaba P, *et al*.. The natural history of Ebola virus in Africa. Microb Infec. 2005; 7(7-8):1005-14.
3. Weingartl HM, Embury-Hyatt C, Nfon C, Leung A, Smith G, Kobinger G. Transmission of Ebola virus from pigs to non-human primates. Sci Rep. 2012; 2(1):1-4.
4. Siegel JD, Rhinehart E, Jackson M, Chiarello L. 2007 guideline for isolation precautions: preventing transmission of infectious agents in health care settings. Am J Inf Cont. 2007; 35:65-9.
5. Sodhi A. Ebola virus disease: Recognizing the face of a rare killer. Postgrad Med. 1996; 99(5):75-8.
6. Towner JS, Rollin PE, Bausch DG, Sanchez A, Crary SM, Vincent M, *et al*.. Rapid diagnosis of Ebola hemorrhagic fever by reverse transcription-PCR in an outbreak setting and assessment of patient viral load as a predictor of outcome. J Virol. 2004; 78(8):4330-41.
7. Poel WH, Lina PH, Kramps JA. Public health awareness of emerging zoonotic viruses of bats: A

European perspective. Vector-Borne Zoo Dis. 2006; 6(4):315-24.

8. Garner JS, Hospital Infection Control Practices Advisory Committee. Guideline for isolation precautions in hospitals. Inf Cont Hosp Epidemiol. 1996; 17(1):54-80.
9. CDC A. Outbreaks chronology: Ebola Virus Dis. 2014; 1-9.
10. The Nation Newspaper. Pakistan at risk of deadly Ebola virus: WHO spokesperson. 2014; 23-9.
11. Salman M, Shehzadi N, Hussain K, Saleem F, Khan MT, Asif N, *et al*. Knowledge of Ebola virus disease among a university population: a cross-sectional study. American J Inf Cont. 2017; 45(2):e23-5.
12. Rehman H, Ghani M, Rehman M. Effectiveness of basic training session regarding the awareness of Ebola virus disease among nurses of public tertiary care hospitals of Lahore. JPMA. 2020; 10-8.