

Knowledge And Preparedness Of Medical Officers And Nursing Officers In Managing Ebola Patients At The National Institute Of Infectious Diseases, Sri Lanka

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Abstract

Introduction: Outbreaks suggested that healthcare-associated transmission of Ebola disease is high due to close contact with an infected person. Therefore, preparedness in managing Ebola patients at designated healthcare institutions is crucial. Medical and nursing officers are the front-line staff in managing an outbreak and risk their lives when handling the patients at the hospital.

Methods: A descriptive cross-sectional study was carried out at the National Institute of Infectious Diseases which is the main specialized hospital for infectious diseases in Sri Lanka. The study consisted of a review of health facility infrastructure, availability of equipment, outbreak surveillance, and assessing the knowledge in managing Ebola patients among medical and nursing officers. A self-administered questionnaire was used to assess the knowledge, attitudes, and preparedness of medical and nursing officers. A checklist was administered to assess the hospital's preparedness.

Results: Availability of personal protective equipment for Ebola outbreak management such as PPE for standard and droplet precautions, impermeable gowns, N95 masks, and eye protection ware was adequate. However, there were no Airborne Infection Isolation Rooms available. Nearly half (n=60, 45.1%) of the study participants did not know the type of PPE that has to be worn when managing Ebola patients. Overall a majority (n=30, 93.8%) of medical officers and 65 (64.4%) of nursing officers reported more than 50% in the total knowledge score in managing Ebola disease.

Conclusions: Most of the study participants had overall satisfactory knowledge in managing an outbreak of Ebola but there were gaps.

Keywords – Ebola, outbreak, knowledge, preparedness.

I. INTRODUCTION

In the recent past, many deadly life-threatening infections have emerged. They are responsible for causing a substantial number of human deaths around the globe. Due to the urban lifestyle and growing travel and trade, an epidemic somewhere in the world could be a threat anywhere. Ebola Viral Disease is an important emerging disease that has caused increasing international concerns in the recent past.

Ebola is a virus that causes an acute serious infection. It is often fatal if left untreated. In 1976 Ebola Virus Disease (EVD) first appeared in two simultaneous epidemics, one in, South Sudan, and the other in the Democratic Republic of Congo (DRC). The latter occurred in a village near the Ebola village, from which the disease takes its name.¹ The human-to-human transmission of the Ebola virus occurs through direct contact of broken skin or mucous membranes containing blood or body fluids of an infected person or who has died from Ebola or from objects that have been soiled with body fluids like blood, vomitus or faeces.¹

The treatment is mainly supportive, involving rehydration therapy with oral and intravenous fluids. There is yet no effective treatment available to increase the chances of survival. The case fatality rate is around 50-90%. Vaccination is currently under development in Guinea, which is still under trial. Prevention mainly involves adhering to universal safety precautions during an

epidemic. The most important measure is hand hygiene while handling blood or body fluids, gloves should be worn. The use of face masks and goggles while cleaning and handling contaminated surfaces is very important. While in the hospital a well-equipped triage area and isolation rooms consisting of well-trained doctors and nurses on PPE and Ebola handling.

In 2015, WHO formulated a list of causative factors for the rapid spread of the disease, which included Poor preparedness, Poor health care facilities, Rise of travel and trade, Reduced number of health care workers, and Cultural and religious practices. On 17th July 2019, WHO Director-General in an emergency meeting at Geneva under the International Health Regulations (IHR) (2005) declared the Ebola virus disease in DRC as a Public Health Emergency of International Concern (PHEIC).²

A cross-sectional study conducted in India in the year of 2014, in a tertiary care hospital in central Karnataka on knowledge attitudes and practices of health care professionals on Ebola viral disease found that overall 73.6% of doctors (N=52) and 83.1% of nurses (N=102), showed satisfactory score (>50% score) on knowledge and attitudes in managing Ebola outbreak. Gaps in knowledge and attitudes were seen among both doctors and nurses. It was found that the gaps were mostly because of poor knowledge, poor motivation, busy work schedules, and poor materials.

A study conducted in the Ashanti region of Ghana in two different government hospitals among healthcare workers indicates ill-preparedness for Ebola viral disease. The study revealed that out of 101 participants 81 knew the cause of the disease correctly. Of the healthcare workers, 44.55% (n=45) were ready to attend to a suspected EVD patient (and 92 (91.09%) indicated that they were not adequately trained to handle an Ebola suspected case. It was found that more than half (54.46%) of health care workers were of the opinion that their hospitals were not prepared to handle an Ebola case.³

A cross-sectional study conducted by Oladimeji et al⁴ in Lagos, Nigeria to assess the gaps in knowledge and practice about Ebola virus disease among healthcare workers revealed that 72.5% of healthcare workers had good knowledge of EBV and doctors accounted for most of it (CI-87.8-96.8%). The study concluded that repeated exercises and simulations raised the knowledge and attitudes of an EBV case thus, in turn, helping for better management of an Ebola case.

In Sudan, a cross-sectional study was carried out in 2014, among 258 health care workers in several districts and federal hospitals to assess the knowledge, attitudes, and practices towards managing Ebola patients. It was found that there were significant differences (P <0.05) in the knowledge of doctors and other health care workers regarding modes of transmission and clinical manifestations of EBV, where 50% stated that airborne transmission is possible and 30.4% stated they spread can occur through mosquito bites. The study found that a majority of the participants (81.3%) were willing to treat an Ebola suspected case with safety precautions. However, it revealed that 91.1% of health care workers had not attended any training sessions on EVD. The study recommended more hospital training for health care personnel on managing Ebola cases.⁵

A study was conducted in Northwest Ethiopia in the year of 2016 on health care professionals' knowledge, attitudes, perceptions and beliefs about Ebola at Gondar University Hospital with a 245 randomly selected sample found that a majority of participants have heard about EVD and correctly identified Ebola symptoms i.e. fever (97.2%), bleeding (95.7%), severe headache (94.8%), body pain (86.3%). However, a majority (54%) could not correctly identify the mode of transmission where they thought that the disease can be transmitted through food, water and mosquitoes. The study also showed the participants were scared of getting the disease (56.4%, P=0.001), and some (46.40%) felt angry and afraid of Ebola infected patients (P=0.006). In conclusion the study found some serious gaps in knowledge and recommended intensive training on health care personals.⁶

A KAP study was done in Conakry, Guinea in 2016 among healthcare workers on Ebola viral disease with a sample size of 990 healthcare workers. Among the participants 43% were doctors and 36% were nurses. The study found that the participants had good knowledge of some aspects of knowledge part as in incubation period and clinical signs of EVD, but the knowledge was poor on diagnostic methods and transmission of the disease. 84% of the participants had reported that their EVD knowledge is insufficient and 97% reported that they are in need of specific training to improve their knowledge of EBV. The study concluded by highlighting the low levels of knowledge on EBV and emphasized the importance of targeted training programs and infection control among health care workers.⁷

A descriptive cross-sectional study was done in a tertiary care hospital in Saudi Arabia in the year of 2016 on Ebola outbreak preparedness and preventive measures among healthcare providers with a total participants of 722. The study showed almost all the participants (100%) knew the causative organism was a virus but only 32.8% (doctors-11.3%, nurses 21.3%) knew that EBV

cannot be transmitted via airborne ($P < 0.001$). 75% (doctors-21.6%, nurses 57.3%, $P = 0.015$) had a knowledge that the disease can be transmitted by shaking hands and touching the infected person. Most of the participants 73.9% (doctors 16.7%, nurses 56.1%, $P < 0.001$) knew that EBV can spread to humans from bats and monkeys.⁸

A study conducted in the United States on Ebola knowledge and attitudes among pediatric providers, with a sample size of 245, consisting mainly of doctors and nurses found that the overall score for knowledge was especially on mortality rates, incubation period, and incapable airborne transmission. The average knowledge score was 56% and doctors had a significantly higher score than the nurses (61% vs 50%, $P = 0.001$). Participants who had received training and simulations had scored better in knowledge than the ones who did not participate in any training programs (69% vs 53%, $P = 0.001$). The study recommends the need for training programs and educational campaigns for health care workers.⁹

A descriptive cross-sectional study was done in South India on healthcare workers' readiness for Ebola. The study found that the participants generally had poor knowledge of Ebola (60.32%). In general, 63.2% of the responders had a positive attitude towards Ebola in doctors had an overall higher attitude level compared to other parts of the health care workers ($P < 0.05$). The positive relationship between knowledge and attitudes was checked using Spearman's correlation test. It showed a statistically significant relationship ($r = 0.13$, $P < 0.03$). The study concluded that health care workers had poor knowledge about EVD but the attitude towards the disease was positive.¹⁰

II. METHODS

The study was conducted as a descriptive cross-sectional study at the National Institute of Infectious Diseases, Angoda. The National Institute of Infectious Diseases, previously known as Infectious Disease Hospital, is the only specialized hospital for infectious diseases in Sri Lanka. The study population consisted of all grade medical officers and all Grade Nursing officers. Medical and nursing officers who were on long leave and Specialist Medical officers were excluded from the study.

There were 40 medical officers and 144 nursing officers in positions attached to the hospital. The sample consisted of all eligible officers. A pre-tested, self-administrated questionnaire was used to assess the knowledge and attitudes and a Checklist was used to assess the hospital preparedness.

The assessment of the hospital preparedness was carried out by direct observation. Clarifications were made by the Director, Consultant Physician, Consultant Microbiologist, Chief Matron, and other relevant staff. When necessary, the relevant documents, reports, and records were scrutinized.

III. RESULTS

A total of 133 out of 180 medical officers and nursing officers completed the questionnaire giving a response rate of 73.8%

Table 1: Distribution of the study sample

| Category | Number | Percentage |
|------------------|--------|------------|
| Medical officers | 32 | 24.1 |
| Nursing officers | 101 | 75.9 |
| Total | 133 | 100.0 |

Knowledge on Ebola

Knowledge of Ebola among study participants is described in table 2. A majority of medical officers ($n = 31$, 96.9%) and nursing officers ($n = 72$, 71.3%) reported satisfactory knowledge of the causative organism of Ebola. A majority of medical officers ($n = 31$, 96.9%) had satisfactory knowledge of transmission of the Ebola virus while the knowledge of 44 (43.6%) of nursing officers was

unsatisfactory. Out of 32 medical officers, only 2 (6.2%) had unsatisfactory knowledge of symptoms of Ebola, while among nursing officers it was 15 (14.9%). Most of the medical officers ($n = 24$, 75%) had satisfactory knowledge of laboratory diagnoses

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of Ebola. However, most nursing officers (n=53, 52.5%) had unsatisfactory knowledge. Out of 32 MOs, most (n=30, 93.0%) had satisfactory knowledge of the treatment and outcome of Ebola. However, only 53.5% (n=54) of nursing had satisfactory knowledge.

Table 2: Distribution by knowledge

| Knowledge area | Medical officers (32) | Nursing officers (101) | Total (133) |
|------------------------------|-----------------------|------------------------|-------------|
| | N (%) | N (%) | N (%) |
| Causative organism | | | |
| Satisfactory | 31 (96.9) | 72 (71.3) | 102 (76.7) |
| Unsatisfactory | 01 (3.1) | 29 (28.7) | 31 (23.3) |
| Modes of transmission | | | |
| Satisfactory | 28 (87.5) | 57 (56.4) | 86 (64.7) |
| Unsatisfactory | 4 (12.5) | 44 (43.6) | 47 (35.3) |
| Signs and symptoms | | | |
| Satisfactory | 30 (93.8) | 86 (84.1) | 116 (87.2) |
| Unsatisfactory | 02 (6.2) | 15 (14.9) | 17 (12.8) |
| Laboratory diagnosis | | | |
| Satisfactory | 24 (75.0) | 48 (47.5) | 71 (53.4) |
| Unsatisfactory | 08 (25.0) | 53 (52.5) | 62 (46.6) |
| treatment and outcome | | | |
| Satisfactory | 30 (93.8) | 54 (53.5) | 84 (63.2) |
| Unsatisfactory | 2 (6.2) | 47 (46.5) | 49 (36.8) |

Out of 133 study participants, 5 (3.8%) had total knowledge of 0-24. However, most (n=62, 46.6%) of the study participants scored between 50-74.

Table 3: Medical officers and nursing officers combined knowledge score

| Knowledge score | Total N (%) |
|-----------------|-------------|
| 0 – 24 | 05 (3.8) |
| 25 – 49 | 33 (24.8) |
| 50 – 74 | 62 (46.6) |
| 75 - 100 | 33 (24.8) |

Hospital preparedness for Ebola

Adequate supplies of PPE for standard contact and droplet precautions, impermeable gowns, N95 respirators, and eye protection ware and facemasks for Ebola are available at the National Institute of Infectious Diseases except for shoe covers. Airborne Infection Isolation Rooms are not available at the National Institute of Infectious Diseases.

Both nursing staff and laboratory staff are being regularly made aware of the current guidelines on specimen collection and transport of specimens of a suspected Ebola patient. Regular evaluation and updates on, hospital infection control protocols and procedures are being carried out and updated hospital protocols and procedures for isolation of suspected or confirmed Ebola infectious disease is available at the hospital. However, there are no hospital protocols and procedures for screening and minimizing healthcare personnel exposure appropriate for Ebola, and the hospital's infection control procedures are inadequate to ensure adequate implementation for preventing the spread of the Ebola disease. NIID also does not have any protocols and procedures for special handling of linens, equipment, and supplies from suspected or confirmed Ebola-affected patients.

The relevant staff has been trained on using PPE, infection control methods, and management and precautions on exposure for suspected or confirmed Ebola cases at the hospital. Procedures and protocols to notify the designated points of contact to inform a suspected case is in place for Ebola patients at NIID. Healthcare personnel has readily available access to medical consultation through telephone at NIID.

Table 4: Hospital preparedness

| Item | Response |
|---|----------------------|
| Supplies | |
| PPE for standard contact and droplet precautions | Adequately available |
| Impermeable gowns | Adequately available |
| Gloves | Adequately available |
| Shoe cover and Boots | Only boots available |
| Eye protection ware and facemasks | Adequately available |
| N95 respirators | Adequately available |
| Supplies for hand hygiene | Adequately available |
| PPE supplies at OPD, and designated areas | Adequately available |
| Infrastructure | |
| Airborne Infection Isolation Rooms | Not available |
| Availability of all Airborne Infection Isolation Rooms (AIIR) in working condition with properly monitored for airflow and exhaust handling | Not available |
| Following updated guidelines, protocols and procedures | |
| The nursing staff are been regularly made aware of the current guidelines on specimen collection and transport of specimen of a suspected Ebola patient | Yes |
| The laboratory staff are regularly made aware of current guidelines on specimen collection, transport and testing of specimens of a suspected Ebola patient | Yes |
| Standard, contact and droplet infection control and isolation guidelines are available | Yes |
| Regular evaluation and updates on, hospital infection control protocols and procedures are being carried out. | Yes |
| Hospital protocols and procedures for screening and minimizing healthcare personnel exposure, appropriate for Ebola is available | No |
| Updated hospital protocols and procedures for isolation of suspected or confirmed Ebola | Yes |

| | |
|--|-----|
| infectious disease is available | |
| Hospital's infection control procedures are adequate to ensure adequate implementation for preventing the spread of the Ebola disease. | No |
| Protocols and procedures for special handling of linens, equipment and supplies from suspected or confirmed Ebola affected patients is available | No |
| Training and updates | |
| Relevant staff have been trained in use of PPE | Yes |
| Relevant staff have been trained on infection control methods | Yes |
| Relevant staff have been trained on management and precautions on exposure for suspected or confirmed Ebola cases. | Yes |
| Regular evaluation and updates on, hospital infection control protocols and procedures are being carried out | Yes |
| Surveillance and access of staff for consultation | |
| Procedures and protocols to notify the designated points of contacts to inform a suspected case is in place | Yes |
| Readily available access to medical consultation through telephone | Yes |

IV. DISCUSSION

Due to extensive travel to the affected areas for economic and personal reasons and insecurity, there is a potential risk for Ebola disease transmission nationally, regionally, and globally. Thus, preparedness in healthcare settings is needed. This study aims to provide evidence on preparedness and knowledge in managing Ebola patients among medical and nursing officers at the National Institute of Infectious Diseases. NIID is the only specialized hospital for infectious diseases in Sri Lanka where the most patients with infectious diseases are managed.¹¹

The findings of this study reported that airborne infection isolation rooms are not available in the health facility, which should be preferable in managing Ebola patients.¹² The evidence of the current study shows that PPE such as impermeable gowns, N95 masks, and eye protection ware, and face shields for Ebola management are available at NIID. Further, relevant staff has been trained on using PPE, infection control methods and management, and precautions on exposure for suspected or confirmed Ebola cases at the hospital. The presence of equipment in adequate quantities is the strength of the hospital. However, the quantity of available equipment for managing an outbreak is insufficient.

Although PPE is available at the hospital, the current study reported that nearly half (n=60, 45.1%) of the study participants did not know the type of PPE that has to be worn when managing Ebola patients and a similar number (n=66, 50.4%) of the study participants did not know the correct sequence of wearing PPE. Therefore, it is important to conduct training programs and simulation exercises to improve the hospital and staff preparedness for outbreak situations, especially in Ebola patients. Further, the availability of an updated outbreak response plan is essential in the hospital.

Out of 32 medical officers, 93.8% (n=30) and out of 101 nursing officers 64.4% (n=65) scored more than 50% of the total score on knowledge of the Ebola virus. Similarly, a higher percentage (73.6%) showed satisfactory knowledge scores on managing Ebola patients in a study conducted in India in 2014, in a tertiary care hospital in central Karnataka. The high level of knowledge may be due to the result of the management of the diseases being discussed frequently at the NIID which is the hospital where Ebola and MERS Cov patients will be managed.

Knowledge of disease transmission showed that 12.4% of medical officers and 43.5% of nursing offices reported unsatisfactory knowledge. Medical officers and nursing officers reported satisfactory knowledge of modes of transmission in

some studies.^{5,13,14} However, the majority (54.0%) of respondents believed that Ebola can be transmitted through food, water, mosquitoes, or other insects (24.6%) in a study conducted among 245 healthcare workers including 99 doctors, 62 nurses, 33 pharmacists, and 17 other staff in Ethiopia in 2016.⁶ One study conducted in Ghana in two different government hospitals reported similar findings representing that most (n=81, 80.2%) of the health staff knew the cause of Ebola correctly nevertheless one doctor and 16 nurses could not identify the cause of the disease.³ These facts highlighted that though most of the study participants scored a higher proportion for most of the knowledge-related questions, there is a gap in some facts related to the disease which should be improved through conducting awareness programs.

Out of 32 medical officers, 93.8% (n=30) and out of 101 nursing officers 64.4% (n=65) scored more than 50% of the total score on knowledge on the Ebola virus. Similarly, a higher percentage (73.6%) showed satisfactory knowledge scores on managing Ebola patients in a study conducted in India in 2014, in a tertiary care hospital in central Karnataka. The high level of knowledge may be due to the result of the management of the diseases being discussed frequently at the NIID which is the hospital where Ebola and MERS Cov patients will be managed.

V. CONCLUSIONS

A majority of the participants had a satisfactory overall knowledge score related to Ebola. Most of the study participants had satisfactory knowledge on causative organism (n=102, 76.7%), modes of transmission (n=86, 64.7%), signs and symptoms (n=116, 87.2%), laboratory diagnosis (n=71, 53.4%) and treatment and outcome (n=84, 63.2%) on Ebola disease. PPE for standard contact and droplet precautions, impermeable gowns, N95 masks, and eye protection ware are available at the National Institute of Infectious Diseases but airborne Infection Isolation Rooms are not available.

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