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ORIGINAL RESEARCH

Knowledge, Attitude, and Practice of Use of Safety Precautions Among Health Care Workers in a Nigerian Tertiary Hospital, 1 Year After the Ebola Virus Disease Epidemic

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Abstract

BACKGROUND Several studies have found that compliance with universal precautions (UP) reduces the risk of exposure to diseases transmitted through blood and body fluids. Several efforts were made during the 2014 Ebola virus disease (EVD) outbreak in Nigeria to ensure a better behavioral change toward the practice of UP.

OBJECTIVES This study assessed knowledge, attitude, and practice of the use of universal safety precautions among health care workers in a tertiary hospital in Osun State in southwestern Nigeria, 1 year after the containment of the EVD epidemic in Nigeria.

METHODS Descriptive cross-sectional study among 274 health care workers of LAUTECH Teaching Hospital Osogbo, selected using systematic sampling method. Data collected using semistructured, pretested questionnaires were analyzed using SPSS software version 17.0 (Chicago, IL, SPSS Inc.).

FINDINGS Two hundred twenty (80.3%) washed their hands regularly after procedures, 256 (93.4%) used gloves regularly when caring for all patients, 100 (36.5%) said they occasionally recap needles carefully, and 250 (91.2%) said they properly handled and disposed sharp instruments and wastes. About 224 (81.8%) had good mean knowledge score, 154 (56.2%) had a positive attitude score, and 192 (70.1%) had a good mean practice score for UP among respondents. The practice of UP was statistically significantly associated with gender, years of work experience ($P = .002$), and knowledge of ($P = .039$) and attitude about UP ($P = .007$).

CONCLUSIONS The good knowledge and practice scores of UP were associated with better attitude toward handwashing and the use of gloves during the post-EVD period compared with the pre-EVD period. A significant proportion still recap used needles just like during the pre-EVD period.

KEY WORDS Ebola virus disease, health care workers, knowledge and practice, Nigeria, universal precaution (UP)

INTRODUCTION

The year 2014 witnessed the largest outbreak of the Ebola virus disease (EVD) outbreak in some West African countries, including Nigeria. On August 8, 2014, the World Health Organization (WHO) identified the EVD outbreak in West Africa as an extraordinary event and a Public Health

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Annals of Global Health, VOL. 82, NO. 5, 2016
September–October 2016: 897–902

Emergency of International Importance.[1] Apprehension, morbidity, and mortality accompanied this disease outbreak, which was eventually contained through several public health measures instituted by stakeholders and coordinated by the health sector. Like HIV and hepatitis B virus infection, the EVD virus could be transmitted through health care workers (HCWs) contacting blood and other body fluids from infected patients.[2,3]

Worldwide, almost 3 million HCWs experiences percutaneous exposure to bloodborne pathogens each year.[4] Also, about 2.5% of the total HIV global cases are due to occupational exposure among HCWs.[4] Thus health care providers remain at risk of acquiring bloodborne infections.[5] Many exposures can be prevented by careful adherence to existing infection control precautionary measures.[6,7]

Standard precautions are the minimum infection prevention practices that apply to all patient care, irrespective of suspected or confirmed infection status of the patient, in any health care setting. These practices aim to both protect HCWs and prevent them from transmitting the infections to their patients. These include but are not limited to hand hygiene, use of personal protective equipment (PPE; eg, gloves, gowns, and masks), needle safety, and safe handling of potentially contaminated equipment or surfaces and proper disposal of sharps, body fluids, and other clinical wastes.[8]

Despite the availability of detailed guidelines, the knowledge of and compliance with standard precautions vary among HCWs and have been found to be inadequate in both developed and developing countries.[9-11]

A little more than 1 year after the containment of the EVD epidemic, the culture of handwashing and observance of universal precautions was successfully encouraged among HCWs and the general population, and it is expected that this culture, including regular use of PPE, would be sustained through positive behavioral change among HCWs over time. This would limit human-to-human spread through HCWs in case of future outbreak. This study assessed knowledge, attitude, and practice of the use of safety precautions among HCWs in a tertiary hospital in Osun State in southwestern Nigeria 1 year after the containment of the EVD epidemic in Nigeria.

METHODS

The study area was Osogbo, the capital of Osun State, with a population of about 4.2 million.[12] There are 3 levels of health care, the primary being managed by the local government, the secondary by the state government, and the tertiary by both the state and federal governments. LAUTECH Teaching Hospital is a tertiary level health facility in Osogbo, and it takes referrals from the general hospitals and primary health facilities within the state. During the 2014 EVD outbreak, the hospital took numerous steps toward improving EVD awareness among populations and HCWs; some of this included seminars and workshops on EVD, sponsoring media awareness sessions on radio and television, and printing and dissemination of EVD preventive measures through posters and flyers, and with special emphasis on the health workforce.

The study population consisted of all HCWs in the service of LAUTECH Teaching Hospital, Osogbo. HCWs whose work puts them at high risk of EVD were purposely included in this study; these include doctors, nurses, and laboratory scientists. HCWs with less than 1 year of experience were excluded from the study. This was a descriptive cross-sectional study.

Expecting the prevalence of correct knowledge of universal precaution among HCWs to be 50%, the Leslie Fischer formula for calculation of sample size in population less than 10,000 was employed.[13] A sample size of 254 was calculated, and this number was increased to 280 to account for attrition and nonresponses.

Sampling was done using a systematic sampling method. A list of eligible HCWs irrespective of education level was obtained from the establishment unit of the hospital. Using a ratio of 1:3:6 to represent the registered numbers of laboratory scientists, doctors, and nurses/community health extension workers, respectively, a sampling frame of the HCWs was prepared. A systematic sampling of 1 in 3 names on the list was drawn and these were used to represent the study population. Sampled HCWs were followed up including those on annual leave and those on nights or off duties. The process of selection was repeated in situation where the allocated slots of HCWs were exhausted.

Research Instruments. The WHO/Centers for Disease Control and Prevention (CDC) guidelines and recommendations[14] were modified to produce the carefully designed tool used in data collection. The instrument includes semistructured, self-administered, and pretested questionnaires administered by 3 research assistants. The instrument was validated by 2 experts in the field of epidemiology and applied research. The reliability

of the instrument was determined through a test-retest method. Pretesting was done using 10 nurses at the General Hospital Ilesha, and the response was used to further modify the questionnaires. Questionnaires consist of sections on awareness, knowledge, and attitude to universal safety precautions in health care practice, with reference to the EVD outbreak of 2014.

Ethical Approval. Ethical approval to conduct the study was obtained from LAUTECH Teaching Hospital research ethics committee. Further permission was taken from the management of the hospital, and written informed consent was obtained from each of the HCWs who responded to the study instrument.

Data Management. Data management was done using the SPSS software version 17.0 (Chicago, IL, SPSS Inc.) after data cleaning. Validity of data entered was ensured by double entry and random manual checks. Calculation of mean knowledge and attitude scores was done by pooling together relevant knowledge (or attitude) questions and scoring correct answers as +1 and incorrect answers as −1. Scores above the average mark was considered as good, and scores below the average were considered as poor. The χ^2 test was used to explore association between selected categorical variables, and the independent t test was used to compare means; P values $\leq .05$ were considered significant for all inferential statistics.

Definition of Terms. The CDC definition of universal precaution (as modified) can be defined as set of rules and recommendations designed for preventing the transmission of bloodborne diseases such as human immunodeficiency virus (HIV), hepatitis B virus (HBV), and other bloodborne pathogens when first aid or health care is provided.[15] Knowledge is the capacity to acquire, retain, and use information or skills gained through education or experience, and attitudes refer to inclinations to react in a certain way to certain situations, to see and interpret events.[16] With regard to universal precautions, it is a piece of information, formal understanding, or notion about infection control and recommendations about biosafety. On the other hand, attitude was defined as one's response or reaction to the infection control principles or recommendations about biosafety.[17] Practices are the application of rules and knowledge that leads to action. Each of these 3 indices can be categorized into good or poor as appropriate, as described in Data Management.

FINDINGS

Table 1 lists the mean age of respondents as 36.7 ± 6.9 years, with 31-35 years constituting the highest (26.3%) proportion of respondents; 178 (65.0%) were women, 220 (80.3%) were nurses, and 175 (63.9%) had more than 10 years of clinically related working experience.

Table 2 shows that a majority of respondents (258 [94.2%]) believed that HCWs are at high risk of EVD, HIV, and HBV infection and that UP can prevent occupational exposures to HIV or HBV (266 [97.1%]); 264 (96.4%) believed that UP should be used regularly. About 220 (80.3%) said they wash their hands regularly after procedures, 256 (93.4%) said they use gloves regularly when caring for all patients, 100 (36.5%) said they use gloves regularly when caring for high-risk patients, another 100 (36.5%) said they occasionally recap needles carefully, and 250 (91.2%) said they properly handle and dispose sharp instruments and wastes. Going by knowledge scoring, 224 (81.8%) had good mean knowledge score of UP, 154 (56.2%) had positive attitude score, and 192 (70.1%) had good mean practice score of UP.

Table 3 shows a positive association between mean knowledge scores of UP and age of respondents ($P = .008$) and between the practice of UP and gender ($P = .010$) and years of experience

Table 1. Sociodemographic Characteristics of Respondents

Variable	Frequency (N = 274)	%
Age (y)		
≤30	66	24.1
31-35	72	26.3
36-40	60	26.3
41-45	48	17.5
>45	28	10.2
Mean ± SD	36.7 ± 6.9	
Sex		
Male	96	35.0
Female	178	65.0
Designation		
Nurse/community health extension workers	220	80.3
Medical laboratory scientist	54	19.7
Experience (y)		
<10	99	36.1
≥10	175	63.9
Mean ± SD	11.7 ± 7.0	

SD, standard deviation.

Annals of Global Health, VOL. 82, NO. 5, 2016
September–October 2016: 897–902

Table 2. Knowledge, Attitude, and Practice of Universal Precautions Among Health Workers

Variable	Yes (%)	No (%)
Knowledge		
Health care workers are at high risk of EVD, HIV, and HBV infections	258 (94.2)	16 (5.8)
Rape victims can also contact HIV from their assaulters	266 (97.1)	8 (2.9)
HIV and hepatitis B are deadly diseases	260 (94.9)	14 (5.1)
UP can prevent occupational exposures to HIV or HBV	266 (97.1)	8 (2.9)
UP are important in prevention of infection from and to health workers	270 (98.5)	4 (1.5)
Regular washing is a form of UP	270 (100.0)	0 (0.0)
Wearing protective equipment like gloves and gowns is part of UP	266 (97.1)	8 (2.9)
Attitude		
Only health workers in units at risk of HIV should practice UP	44 (16.1)	230 (83.9)
UP should be used regularly	264 (96.4)	10 (3.6)
UP should be used only when one is attending to high-risk patients	60 (21.9)	214 (78.1)
This hospital closely monitors us to ensure we always comply with UP	176 (64.2)	98 (35.8)
I know my hospital have policy on UP and safety	196 (71.5)	78 (28.5)
Practice		
I wash my hands regularly after procedures	220 (80.3)	54 (19.7)
I don't wash my hands after all procedures because I am not at risk of HIV	4 (1.5)	270 (98.5)
I use gloves regularly when caring for all clients	256 (93.4)	18 (6.6)
I use gloves regularly when caring for high-risk patients	100 (36.5)	174 (63.5)
I occasionally recap needles carefully	100 (36.5)	174 (63.5)
I properly handle and dispose sharp instrument and wastes	250 (91.2)	24 (8.8)
I have been trained on UP before in this hospital	210 (76.6)	64 (23.4)
I have done a HIV test in the last 6 months	186 (67.9)	88 (32.1)

EVD, Ebola virus disease; HBV, hepatitis B virus; HIV, human immunodeficiency virus; UP, universal precautions.

($P = .002$). A statistically significant association was also found between the practice of UP and knowledge of ($P = .039$) and attitude to UP ($P = .007$).

DISCUSSION

The majority of respondents in our study believed that HCWs are at high risk of EVD, HIV, and HBV infections and that UP can prevent occupational exposures to these infections and should be used regularly. This supports findings from other studies.[6,7] Similarly, several studies have reported the benefits of effective infection control measures, from improving morbidity and mortality and preventing disease transmission to enhancing cost-effective health care.[18-20]

Observance and compliance with UP was one of the public health strategies that led to the prompt containment of the EVD outbreak in Nigeria in 2014.

A majority of respondents do wash their hands regularly after procedures now compared with a figure of one-tenth reported by another Nigerian study before the EVD epidemic.[21] This amounts to a 2-fold increase in better practice of handwashing when the pre- and post-EVD periods are compared. This improvement could be due to the high awareness put in place by stakeholders, including the media and the health workforce that led to the reported successful containment of the 2014 EVD epidemic. This showed that the culture of handwashing among HCWs after every procedure was not totally lost after EVD containment, though the practice is very low even now. For the same reason, a great majority of our respondents used gloves regularly when attending to clients. This is also a better behavioral change when compared with pre-EVD epidemic studies in which only about two-thirds of respondents used gloves.[21,22]

The use of PPE is a fundamental way of observing UP among HCWs because it puts a barrier between the infective body fluids and the skin of the HCWs. It is important to note that the practice of handwashing and the use of gloves reported in our study are still low and below expectation when compared with other non-Nigerian studies giving far higher figures even before the Nigerian EVD epidemic.[23,24] This is notable despite the efforts put into creating awareness during the EVD epidemic.

In this post-EVD study, about one-third still occasionally recap needles, whereas a majority said

Table 3. Relationships Between Sociodemographic Characteristics and Knowledge, Attitude, and Practice of Universal Safety Precautions

	Knowledge		Statistic	*P*
	Good n = 224	Poor n = 50		
Age (y)				
≤30	54 (81.8)	12 (18.2)	13.783*	.008
31-45	60 (83.3)	12 (16.7)		
>45	28 (100.0)	0 (0.0)		
Mean ± SD	36.74 ± 7.15	36.72 ± 5.99	0.018†	.985
Sex				
Male	76 (79.2)	20 (20.8)	0.662*	.416
Female	148 (83.1)	30 (16.9)		
	Attitude			
	Good n = 154	Poor n = 120	Statistic	*P*
Age (y)			3.312*	.507
≤30	38 (57.6)	28 (42.4)		
31-45	38 (52.8)	34 (47.2)		
>45	20 (71.4)	8 (28.6)		
Mean ± SD	37.1 ± 7.6	36.3 ± 6.1	0.941†	.348
Sex				
Male	54 (56.2)	2 (43.8)	0.000*	.991
Female	100 (56.2)	78 (43.8)		
	Practice			
	Good n = 192	Poor n = 82	Statistic	*P*
Age (y)				
≤30	40 (60.6)	26 (39.4)	8.326	.080
31-45	50 (69.4)	22 (30.6)		
>45	24 (85.7)	4 (14.3)		
Mean ± SD	37.4 ± 7.0	35.1 ± 6.5	2.543†	.012
Sex				
Male	58 (60.4)	38 (39.6)	6.571	.010
Female	134 (75.3)	44 (24.7)		
Experience (y)				
<10	58 (58.6)	41 (41.4)	9.753	.002
≥10	134 (76.6)	41 (23.4)		
Knowledge				
Good	163 (72.8)	61 (27.2)	4.251	.039
Poor	29 (58.0)	21 (42.0)		
Attitude				
Positive	118 (76.6)	36 (23.4)	7.195	.007
Negative	74 (61.7)	46 (38.3)		

SD, standard deviation.
* Pearson's χ^2.
† Independent *t* test.

they now properly handle and dispose sharp instruments and wastes. Compared with a pre-EVD epidemic Nigerian study, about one-third (31.9%) still recap used needles,[22] suggesting that the situation has not changed despite the EVD awareness. A majority (about four-fifths) of our respondents had good mean knowledge score of UP, and about half had a positive attitude score, but a little less than three-quarters had a good practice score of UP. In another Nigerian study also reporting high awareness and knowledge of UP, weak correlation between good knowledge and good practice was reported, suggesting that knowledge does not always translate into good practice,[25,26] because other confounding predictors of good infection control practice may have a role.

An unusual observation was the finding that a majority of respondents used gloves while caring for all patients; however, only one-third said they used gloves when attending to high-risk patients. Though all patients may also include high-risk patients, the poor practice of use of gloves as PPE with high-risk patients among the remaining two-thirds contradicts findings from many other studies.[21,22] This happened despite the extensive health education efforts put in place during the EVD control era, thus suggesting lack of general disease control through the use of PPE. This calls for sustained health education on proper and adequate use of PPEs among HCWs despite the type of patients being attended to. According to the CDC guidelines,[14] universal precautions should be consistently used for all patients regardless of their bloodborne infection status.

The importance of number of years in practice associated with good mean knowledge and practice scores could be supported by yet another study in which the mean knowledge and practice scores were found almost directly proportionate to year of training of students.[27] The number of years that one had put into practice could be an indication to the amount of training the person has had, whether in-house, on the job, or formal or informal training; all these could have contributed to behavioral change.

A limitation of this study was the use of the self-report method of assessment of practice of UP, instead of direct observation, thus suggesting the need for a study in that direction. In addition, the same study population was not directly studied in the pre-EVD era; rather, findings were generalized on the average Nigerian HCW earlier studied and reported by researchers within the same geographical location or state before the EVD outbreak.

Annals of Global Health, VOL. 82, NO. 5, 2016
September–October 2016: 897–902

CONCLUSIONS

Despite high figures of good mean knowledge score, a positive attitude score was found among half of respondents. However, good practice scores were significant, with a better attitude toward handwashing and the use of gloves during the post-EVD period compared with the pre-EVD period. A significant proportion of respondents still recap used needles just like during the pre-EVD period. There is a need to sustain the high-awareness campaign on EVD and other infectious diseases among health workers to encourage better behavioral change in the practice of UP.

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