

## **Knowledge and practice of preparedness for infectious disease prevention and control among healthcare workers in secondary health care facilities in Osogbo, Nigeria**

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### **Abstract**

**Background:** Health care workers have critical roles to play in breaking the chain of infections in health care settings. The outbreak of Lassa Fever and Ebola Virus Disease in the West African sub-region in recent times is a rationale for a dire need for a strong epidemic preparedness system. The objective of the study is to assess the knowledge and practice of preparedness for infectious disease prevention and control among healthcare workers in secondary health care facilities in Osogbo, Nigeria.

**Methods:** It was a Descriptive cross sectional study and 340 healthcare workers were selected using a multistage sampling technique. Research instrument used were semi structured pre-tested interviewer-administered questionnaire. Data was analyzed using the SPSS software version 17.0.

**Results:** The mean age of the respondents was  $42 \pm 8.9$  years. Out of the 340 healthcare workers studied 88.7% had good knowledge, while 72% and 67% had favorable attitude and good practice towards preparedness for infectious disease prevention and control respectively. Three hundred and eight (90.6%) said they washed their hands regularly before and after procedures. Only 37.4% said they still recap used needles and 31.8% said they have Infectious Disease Prevention and Control committee in their health facility. One hundred and ninety eight (58.2%) said they normally practice quarantine for eligible suspected cases and 77.4% perceived themselves to be at occupational risk of contracting infectious diseases. Having more than ten years of working experience was the major predictor of likelihood to have good knowledge, attitude and practice of preparedness on binary logistic regression analysis.

**Conclusion:** The gap between knowledge and practice of preparedness for Infectious Disease and prevention Control calls for improved awareness and training among health workers, and their consistent monitoring towards behavioural change.

**Key words:** Infectious disease, preparedness, control, health care workers

### **Introduction**

Communicable diseases outbreak had been a threat not only to lives of individuals but also national security. The recent and ongoing outbreak of Lassa Fever and Ebola Virus Disease in some parts of Africa stressed the urgent need to break the chain of infections through universal standard precaution, and this should be the responsibility of all health care workers. Studying epidemic outbreaks could galvanize support towards building capacities to meet the requirements of the international health regulations.<sup>1</sup> It is possible to track outbreaks of diseases and step up medical treatment and preventive measures even before it spreads over a large populace.<sup>2</sup> Appropriate disease surveillance system should adequately identify, define and recognize cases of illness on a timely and complete basis; and culminating into data driven forecast and advice on the trend of infections.<sup>3</sup> Nigeria need to identify gaps in her surveillance systems towards timely and complete reporting of all diseases in order to meet up with international standards in surveillance program.

Health care workers are traditionally known to be in close proximity with patients, and are likely to be at high risk of acquiring from and transmitting infectious disease to others. Worldwide, almost 3 million Health Care Workers (HCWs) experiences percutaneous exposure to blood-borne pathogens each year, though situation is better in developed than in the developing countries.<sup>4</sup> In developing countries including Nigeria, the culture of preparedness for infectious disease control before its eventual outbreak is poor compared to the pattern in developed countries. Tracking of the pattern of infectious diseases could assist preparedness for control and also preventive measures that could be

instituted even before it spreads over a large populace.<sup>4</sup>

Health care workers both at health facility and community, have significant roles to play in preventing disease outbreaks in the health-care and related settings.<sup>5</sup> They can also assume the leadership role in creating awareness and instituting prevention efforts; and this would largely depend on the level of their acquiring good knowledge and positive attitudes.<sup>6</sup>

Poor practice of universal precaution among Nigeria health workers,<sup>7,8</sup> had been reported, though practice of universal precaution had improved over the years.<sup>9</sup> Thus there is a need for every country level institution to coordinate preparedness, detection and timely response to public health emergencies. This would be feasible when the capacity of health care workers is built in the areas of prevention and preparedness, in terms of knowledge and practices. The general objective of this study was to assess the knowledge and practice of preparedness for infectious disease prevention and control among healthcare workers in primary health care facilities in Osun state in Southwestern Nigeria.

### **Methods**

Osogbo where this study was carried out is the capital city of Osun State in the southwestern region of Nigeria with a population of about 300,000.<sup>10</sup> There is a teaching hospital, two general hospitals, and about twenty primary health care facilities in the city, delivering health services. This study was a descriptive cross-sectional design. The subjects were health care workers in secondary health care facilities in Osun state who must have put at least one year into the practice as at the time of this study. There are two secondary health facilities within Osogbo, and these include Jaleyemi missionary

hospital which is privately owned, and Asubiaro general hospital which is owned by Government. Using Leslie Fisher's formula, the calculation of minimum sample size for single proportion, a figure of 303 was estimated based on an infection preparedness prevalence value of 27.0%.<sup>11</sup>

The total sample size was increased to 340 after correction for non-response. Subjects were selected using multistage sampling technique. The State hospital at Asubiaro, Osogbo was selected by balloting while four categories of health care workers namely Doctors, Lab Scientists, Nurses, and Community health workers in the different units were also selected by balloting after proportionate allocation of sampling units. From the sampling frame obtained for each category a systematic sampling was applied until the total sampling unit for that category was obtained. Self administered semi-structured pre-tested questionnaire was used. The research assistants explained the purpose of the study to respondents and obtained their written consent before the questionnaires were administered.

The obtained data were analyzed using Statistical Package for Social Sciences (SPSS) version 17.0. Knowledge score was computed for a pooled knowledge questions on various aspects of infectious diseases preparedness, prevention and control. Each item was assigned "+1" for correct knowledge and "0" for incorrect knowledge. The knowledge score was graded as good or appropriate if respondent scored above; and poor or not appropriate if scored below the mean score as the break-off point. The attitude of the respondents was graded on Likert scale with "agree" scoring 2, "indifferent" scoring 1 and "disagree" scoring 0. Respondent that has a score less than half of the total score were identified as having

a poor attitude while those that score above average were identified as having a good attitude. Questions of preparedness with overall preparedness score of 8 (ranged from 0 to 8) were given (yes, no or sometimes) option against each set of question, were dichotomized to good preparedness (1 point) with score  $\geq 5$  or poor preparedness (0 point) with score  $< 5$ .

Association between categorical variable was measured using Chi-square. Multivariate analysis was performed using logistic regression to evaluate socio-demographic variables and other variables that are independently associated with good knowledge and practice score of infectious diseases prevention and preparedness. P-values were considered significant at values equal to or less than 0.05. Ethical clearance was obtained from LAUTECH Teaching Hospital ethical review board.

### **Results**

Table 1 shows respondents average age of  $42 \pm 8.9$  years, 86.2% were female, 70.0% were married, 47.4% were nurses while 68.2% had 1-10 years working experience. Figure 1 shows 88.7%, 86.5%, 94.1% and 55.1% had good knowledge on preparedness for prevention and control of infectious disease, signs and general symptoms of common infectious disease, treatment and prevention of infectious disease, and infectious disease reporting respectively. Table 2 shows 90.6% of the respondents said they washed their hands regularly before and after procedures/wearing gloves, while 37.4% said they still recap used needles and 31.8% said they had infectious disease control committee in their health facility/LGA, 58.2% said they normally practice quarantine for eligible suspected cases, 67.9% said they were willing to be part of epidemic investigation team, 66.2%

said their health care facility was well equipped to handle infectious diseases outbreaks while 56.8 of respondents said they were adequately trained on infectious disease prevention, control and preparedness. Two hundred and sixty three (77.4%) of respondents perceived themselves to be at risk of contracting infectious disease due to the nature of their work.

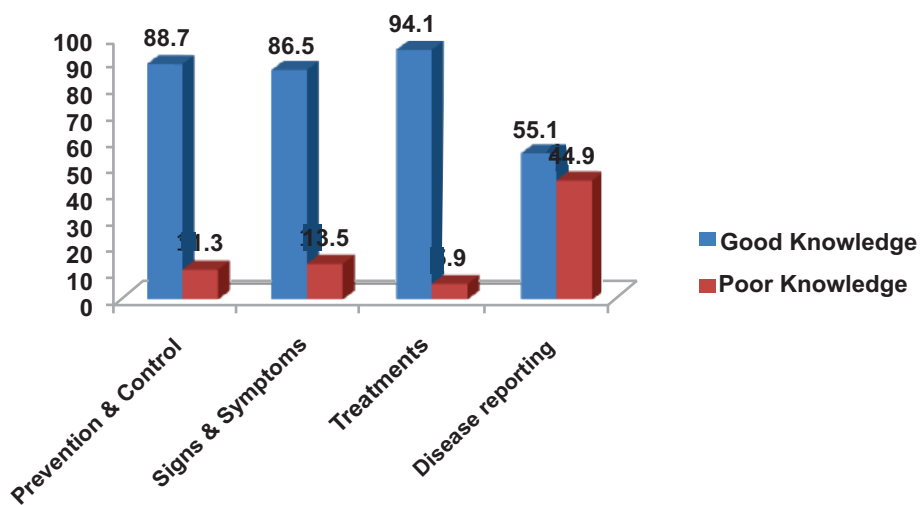
Figure 2 shows 72.0% of respondents had favorable attitude towards prevention and preparedness for infectious disease control. In addition, only 67.0% of respondents had good practice while 33.0% had poor practice. Table 3 displayed no statistical significant association between working experience and knowledge ( $P>0.05$ ), but such association exists between working experience and attitude and practice of epidemic preparedness ( $p<0.05$ ). Likewise a statistically significant association was found between gender and attitude to epidemic preparedness ( $p<0.05$ ). On binary logistic regression analysis, respondents with 1-10 years working experience were about four times (1/0.24) times less likely to have good knowledge of epidemic preparedness compared to those with more than ten years experience,

and this observation was found to be statistically significant (OR 0.24, 95%CI 0.066-1.093,  $p=0.200$ ). Respondents with 1-10 years working experience are two and a half times (1/0.32) times less likely to have good attitude of epidemic preparedness compared to those with more than ten years experience, and this observation was found to be statistically significant (OR 0.39, 95% CI 0.192-0.802,  $p=0.004$ ).

Male respondents were two and a half (1/0.37) times less likely to have good attitude to epidemic preparedness compared to those with more than ten years experience, and this observation was found to be statistically significant (OR 0.39, 95%CI 0.192-0.802,  $p=0.004$ ). Respondents with 1-10 years working experience are three (1/0.32) times less likely to have good practice of epidemic preparedness compared to those with more than ten years experience, and this observation was found not to be statistically significant (OR 0.37, 95%CI 0.125-1.069,  $p=0.066$ ). Thus predictor of good knowledge, attitude and practice of epidemic preparedness was having a working experience of more than ten years. Female gender was a predictor of good attitude to epidemic preparedness.

**Table 1: Socio demographic information of respondents (n = 340).**

Information	Freq.(%)
<b>Age</b> (Mean 42 ± 8.9) years	
20 - 29 years	98(28.8)
30 - 39 years	52(15.3)
40 - 49 years	162(47.7)
50 - 59 years	28(8.2)
<b>Sex</b>	
Male	47(13.8)
Female	293(86.2)
<b>Marital status</b>	
Single	97(28.5)
Married	238(70.0)
Separated/divorced	5(1.5)
Widow	0
<b>Highest Educational qualification</b>	
NCE	12(3.5)
B.Sc.	239(70.3)
PGD	70(20.6)
M.Sc.	19(5.6)
<b>Disciplines</b>	
Medicine/doctors	26(7.6)
Nursing	161(47.4)
Medical Lab science	57(16.8)
Community Health workers	96(28.2)
<b>Working experience</b>	
1 - 10 years	232(68.2)
11 - 20 years	66(19.4)
21- 30 years	42(12.4)

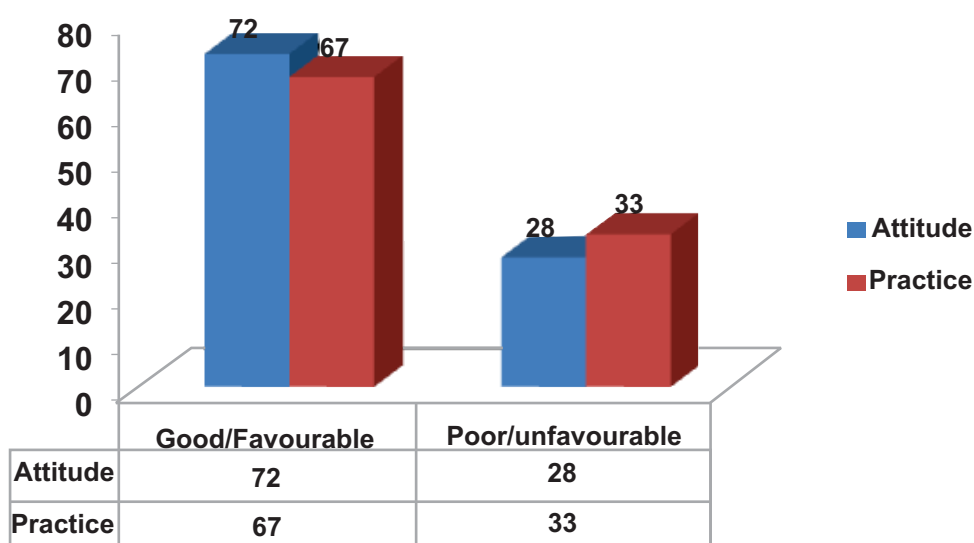


**Figure 1: Mean scores of knowledge of prevention and control of infectious diseases.**

**Table 2: Preparedness of practice by health care workers towards infectious disease.**

Questions	Yes	No
	Freq. (%)	Freq. (%)
Do you wash your hand regularly before and after wearing the gloves	308 (90.6)	13 (3.8)
Do you recap needle after use	190 (55.9)	127 (37.4)
Is your health care facility well equipped to handle infectious disease cases	225 (66.2)	83 (24.4)
Do you have an infectious disease control committee in your hospital or does it exist at LGA level	108 (31.8)	185 (54.4)
Do you normally do outreaches sessions to enlighten public about infectious disease prevention and control	261 (76.8)	33 (9.7)
Do you normally practice quarantine for eligible suspected cases	198 (58.2)	67 (19.7)
Has there ever been epidemic of any disease within your locality before	90 (26.5)	166 (48.8)
Was the epidemic investigated	71 (20.9)	68 (20.0)
Are you willing to be part of epidemic investigation team	231 (67.9)	49 (14.4)
Would you say your health facility is ready to contain epidemic outbreaks	161 (47.4)	123 (36.2)
Are you adequately trained on infectious disease prevention and control	193 (56.8)	106 (31.2)

“Not sure” column not shown



**Figure 2: Mean attitude and practice score of respondents on preparedness for prevention and control of infectious disease.**

**Table 3: Association between Respondent's gender, work experience and knowledge, attitude and practice of preparedness**

		Mean Knowledge score			
Variables	Good Freq. (%)	Poor Freq. (%)	Chi Square	p-value	
Sex			3.189	0.074	
Male	47 (100.0)	0 (0.0)			
Female	248 (93.6)	17 (6.4)			
Working experience			8.027	0.018	
1 - 10 years	215 (92.7)	17 (7.3)			
11 - 20 years	66 (100.0)	0 (0.0)			
21 - 30 years	38 (100.0)	0 (0.0)			
		Mean Attitude score		Chi-square	p-value
Sex			12.143	0.002	
Male	47 (100.0)	0 (0.0)			
Female	216 (78.8)	58 (21.2)			
Working experience			11.901	0.018	
1 - 10 years	170 (78.0)	48 (22.0)			
11 - 20 years	61 (92.4)	5 (7.6)			
21 - 30 years	28 (84.8)	5 (15.2)			
		Mean Practice score		Chi-square	p-value
Sex			2.324	0.127	
Male	47 (100.0)	0 (0.0)			
Female	261 (95.3)	13 (4.7)			
Working experience			6.156	0.046	
1 - 10 years	205 (94.0)	13 (6.0)			
11 - 20 years	66 (100.0)	0 (0.0)			
21 - 30 years	33 (100.0)	0 (0.0)			
Binary Logistic Regression					
	OR	95%CI		p- value	
Good knowledge of disease prevention and preparedness					
Working experience (Reference Category= 1 -10 years)	0.24	0.066	1.093	0.200	
Favourable attitude to disease prevention and preparedness					
Gender (Reference Category = female)	0.37	0.125	1.069	0.066	
Working experience (Reference Category = 1 -10 years)	0.39	0.192	0.802	0.004	
Good practice of disease prevention and preparedness					
Working experience (Reference Category = 1 -10 years)	0.32	0.072	1.469	0.063	

**Discussions**

In this study, good knowledge of prevention and preparedness for infectious disease control, signs and general symptoms of common infectious disease,

treatment and prevention of infectious disease was found among majority of respondent. Similar high knowledge was found in other studies.<sup>12,13</sup> A much lower figure were obtained in a study in which the

level of knowledge on infection control was described as good among a little more than half of respondents.<sup>14</sup> In yet another study, only two-fifth had good knowledge while only about one quarter knew that there was no vaccine presently to prevent EVD.<sup>15</sup> The discrepancy might be due to the differences in study setup and methods. However, having a good knowledge is a pointer to ones attitude and practice of the subject matter.

Good knowledge of infectious disease reporting was reported in only among half of respondents in our study. This is similar to study having similar pattern of under-notification<sup>16</sup> Though reporting is an important aspect of disease outbreak management and response, underreporting of notifiable diseases is a common problem for passive surveillance systems in many countries.<sup>17</sup> Majority of our respondents said they washed their hand regularly before and after procedures. This supports another study that majority (about 91%) reported hand washing with soap and water and 64% for alcohol based rub.<sup>18</sup> Hand hygiene in form of hand washing with soap and water has long been considered one of the most important IDPC measures.<sup>19</sup> A little over one third said they still recap used needles in our study, this supports a study in which about a third of participants recapped used needles,<sup>20</sup> and another study where about a third also always recapped used needles while a little less than two-thirds of respondents always used personal protective equipment.<sup>21</sup> In yet another study, about a quarter of the respondents do not recap needles after use.<sup>22</sup> These findings implies poor practice of injection safety among these respondents. There is a need to train all health workers on injection safety and standard precaution in infectious disease prevention and control.

In our study, a little less than one third (31.8%) said they had infectious disease control committee in their health facility/LGA, This agreed with another study in which a little over one quarter of respondents sometimes promptly wipe all blood spills,<sup>22</sup> but lower when compared to another study in which about three-fifths said they normally practice quarantine for eligible suspected cases.<sup>23</sup> In another similar study, the vast majority of the HCWs self-reported that they perform the disinfection in their working activity.<sup>24</sup> There is a need for establishment of infectious disease preparedness and control teams or committees in all health facilities and provision of appropriate resources to manage infectious disease outbreak.

About two thirds of our study participants said they were willing to be part of epidemic investigation team. This is a favourable trend since effective preparedness and then quick and efficient response to infectious disease emergencies and outbreaks depends on the ability and willingness of the public health workforce to respond.<sup>25</sup> However, the implementation of this favourable submission from the health care workers could be hampered by the result of our study that reported that about another two thirds (66.2) said their health care facility was well equipped to handle infectious diseases. This is also similar to findings in a study where almost two-third of the respondents identified lack of appropriate or adequate resources to practice standard precautions as a challenge to practice of standard precaution in disease prevention.<sup>20</sup>

A little over half of the respondents said they were adequately trained on infectious disease prevention and control and preparedness. This indicate a dire need for training healthcare professionals on public



health management of infectious disease emergencies, as it was done during SARS epidemic, the threat of bioterrorism and other outbreaks in Europe.<sup>26</sup> Majority of our study participants perceived themselves to be at risk of contracting infectious disease, This pattern supports another study in which only about one-quarter had low risk perception, while about two-fifth considered self to be at risk of EVD<sup>15</sup> However, another study reported that HCWs were assessed to have underestimated their likelihood for contracting Ebola compared to their colleagues of same age and sex.<sup>27</sup> Perception, especially perceived risk of disease could determine attitude to and practice of infectious disease prevention and control among health workers. Majority of our respondents having favorable attitude towards prevention and preparedness for infectious disease control supports another study.<sup>28</sup> However, two thirds having good practice of preparedness is better when compared to a similar study on infectious disease that reported unsatisfactory practice score towards tuberculosis infection control in about half of their respondents.<sup>29</sup> Our study reported predictors of good knowledge, attitude and practice of epidemic preparedness as having a working experience of more than ten years, while being a female was a predictor of good attitude to epidemic preparedness. In a similar study, having more than six years working experience in health facility and having been trained on infectious diseases were significantly associated with knowledge on tuberculosis infection control.<sup>29</sup> This predictor is not unexpected since respondents who have spent considerable number of years on service should have attended quite a number of trainings, and would have had more on the job experience compared to the newly recruited.

### **Conclusion**

Though high awareness of IDPC was reported in this study, attitude was lower while practice was much more lower compared to knowledge of IDPC. The gap existing between knowledge and practice of preparedness for IDPC calls for improved awareness among health care workers, while formal and on the job training could be organized to bridge the gap between knowledge and practice of IDPC with consistent monitoring of their activities towards a positive behavioural change.

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