

## **Knowledge, Attitudes and Practices Towards Ebola Prevention and Control among Population in Rusizi District, Rwanda**

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### **Abstract**

Ebola Virus Disease (EVD) previously known as Ebola Hemorrhagic Fever (EHF) is a serious and highly contagious viral disease. The objective of this study was to assess the knowledge, attitude and practices of EVD prevention and control among population in Rusizi district, Rwanda. This research used a cross-sectional study design and stratified sampling was used. The quantitative approach was used to collect data on studied variables. The sample size was 399 participants selected from eight sectors of Rusizi district bordering DRC. A structured questionnaire was used to collect the data and data analyzed by using SPSS version 21. Research findings showed that 37.8% had low level of knowledge and the overall, 60.9% had negative attitudes towards EVD prevention and control. The overall, 28.6% showed poor practice towards EVD prevention and control. The multivariate analysis revealed that participants who had frequently crossed borders were 2.8 times [AOR = 2.8; 95% CI: 1.2 - 6.37; p = 0.017] more likely having good practice towards practices to EVD prevention and control than those who had not crossed borders. The respondents with high level of knowledge were more likely to have good practices towards EVD prevention [AOR = 2.4; 95% CI: 1.43 - 4.7; p = 0.004] compared to the respondents with low level of knowledge. It concludes that participants with low level of knowledge, negative attitude and poor practice towards EVD prevention have been identified. Hence, efforts should be focused to reach these people in future public educational campaigns to improve knowledge and change attitudes and practices towards Ebola prevention and control as this outbreak has not yet eradicated.

**Keywords:** Ebola; Knowledge; Attitudes; Practices; Rusizi

### **Introduction**

Ebola virus disease (EVD) previously known as Ebola hemorrhagic fever is a drastic, often lethal sickness in human beings. The case fatality rate of EVD is approximately 50%, and it has shown the variation from 25 to 90% in the precedent outbreaks [1].

On September 30, 2014, the Center for Disease Control and Prevention (CDC) confirmed the first Ebola case in the United States (US), with three further cases being widely reported thereafter [2]. The diagnosis of the Ebola virus in the US followed shortly after the World Health Organization (WHO) declared the Ebola outbreak "a public health emergency of international concern" [3].

Many surveys have been conducted in Africa especially in countries at risk, and the results revealed that there was a need of improving knowledge, attitudes and practice to mitigate the EVD. The first survey carried by the WHO outlined that 815 confirmed or probable

cases involving health workers have been recorded by and large, with two thirds of deaths among them [4]. This situation was explained by some facts, among others, such as the lack of preparation, experience and knowledge regarding this condition.

To identify misunderstandings, misconceptions and risk practices in people relating to EVD, KAP studies towards EVD amongst communities have been assessed in parts of Guinea during the EVD outbreak [5-7] two KAP studies conducted in Guinea's capital concluded a low knowledge, negative attitudes and practices of EVD in communities [5,6]. Another study found that the KAP of EVD suspect cases in healthcare workers were insufficient in regions less affected by EVD [7].

The largest Ebola virus occurred in West Africa from 2013 to 2016. It mainly affected Liberia, Sierra Leone and Guinea with a total of more than 28,000 cases [8]. High rates of occupational infection are not only due to the contagiousness of certain EVD, but also to increased exposure due to non-recognition of suspect cases, limited and incorrect use of personal protective equipment (PPE), shortcomings in general hygiene practices and infrastructural deficiencies in healthcare facilities [9]. Improvements in those areas have been linked to a decrease in occupational infections during outbreaks [10-12]. When people are on the frontline of outbreaks, their knowledge, attitudes and practices (KAP) form a central pillar of outbreak preparedness and infection prevention and control.

## Methods

### Study design

This research used a cross-sectional study design to determine KAP towards EVD prevention and control. The quantitative approach was used to collect data on studied variables. This study was conducted in eight sectors of Rusizi District bordering.

### Study population

The study population was 191,445 people from the targeted eight sectors of Rusizi district adjoining DRC where Ebola has become a public health emerging issue.

### Sample size and sampling procedure

The 399 participants were allocated proportionally in the targeted eight sectors of Rusizi district bordering with the DRC. Stratified sampling was used. This technique is one of the sampling methods in which the whole population is partitioned into minor groups or strata to fill the sampling progress. Those groups are created referring to common characters in the population data. After partitioning into strata, the surveyor selected at random the sample proportionally. Sectors were considered as strata in this study.

### Data management

Data entry and analysis were completed by using Statistical Package for Social Science software (SPSS v.21). Findings were presented as frequencies and percentages in tables. For determining the KAP-levels, overall scores were calculated for each respondent by adding up the scores thru the KAP-related questions by using SPSS Score Assessment. Odds ratio (OR) at 95% confidence interval were determined to analyze the extent to which extent dependent and independent variables were associated to.

### Data analysis and ethical consideration

Ethical clearance was obtained from the ethical review committee of Mount Kenya University Rwanda and a letter of the permission was obtained from Rusizi District administration. The objective of the study was explained to the participants. All information gathered during data collection was kept private; no personal information was left on the questionnaire. Data entry and analysis were completed by using Statistical Package for Social Science software (SPSS v.21). Findings were presented as frequencies and percentages in tables.

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## Results

### Socio demographic characteristics of respondents

Frequencies of socio demographic factors such as age, gender, education, marital status, and occupation was shown in this section.

Study findings in table 1 indicated that four out eight sectors targeted with the study including Bugarama, Gihundwe, Kamembe and Nzahaha were highly represented with 15.8%, 14.3%, 14.0% and 14.5% respectively. A big number of them (49.1%) was aged between 31-50 years, 67.2% were females, 62.4% were married, 40.8% had primary education level, 53.6% were self-employed, 87.2% were Protestants, and 51.9% were frequently crossing borders between Rwanda and DRC.

| Variables                            | Frequency (n=399)    | Percent (%) |      |
|--------------------------------------|----------------------|-------------|------|
| <b>Residence [Sector]</b>            | Bugarama             | 63          | 15.8 |
|                                      | Gashonga             | 48          | 12.0 |
|                                      | Gihundwe             | 57          | 14.3 |
|                                      | Kamembe              | 56          | 14.0 |
|                                      | Mururu               | 50          | 12.5 |
|                                      | Nkombo               | 35          | 8.8  |
|                                      | Nyakarenzo           | 32          | 8.0  |
|                                      | Nzahaha              | 58          | 14.5 |
| <b>Age category</b>                  | ≤ 30 years           | 172         | 43.1 |
|                                      | 31-50 years          | 196         | 49.1 |
|                                      | > 50 years           | 31          | 7.8  |
| <b>Gender</b>                        | Male                 | 131         | 32.8 |
|                                      | Female               | 268         | 67.2 |
| <b>Marital status</b>                | Single               | 150         | 37.6 |
|                                      | Married              | 249         | 62.4 |
| <b>Education</b>                     | Primary              | 163         | 40.8 |
|                                      | Secondary            | 150         | 37.6 |
|                                      | University           | 86          | 21.6 |
| <b>Occupation</b>                    | Unemployed           | 164         | 41.1 |
|                                      | Self-employed        | 214         | 53.6 |
|                                      | Employed             | 21          | 5.3  |
| <b>Religion</b>                      | Protestant           | 348         | 87.2 |
|                                      | Catholic             | 8           | 2.0  |
|                                      | Muslim               | 29          | 7.3  |
|                                      | No religion          | 14          | 3.5  |
| <b>Frequency of crossing borders</b> | Do not cross borders | 102         | 25.6 |
|                                      | Rarely               | 28          | 7.0  |
|                                      | Sometimes            | 62          | 15.5 |
|                                      | Frequently           | 207         | 51.9 |

**Table 1:** Presentation of demographic characteristics of Rusizi District.

Source: Primary data (2021).

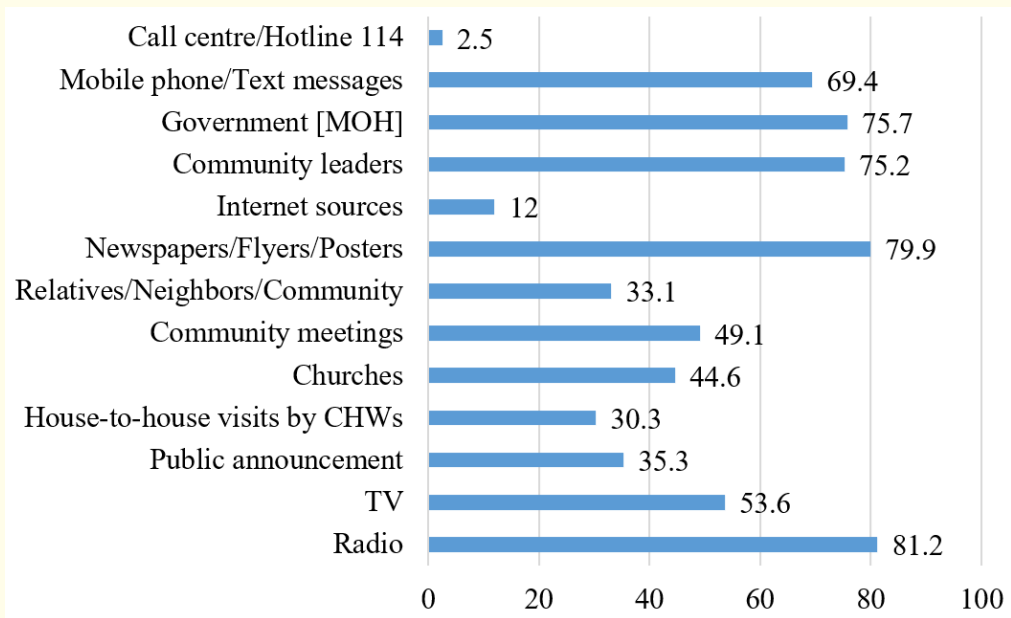
**Presentation of research findings**

This part displays findings related to the study objectives: population’s knowledge, attitudes and practices towards EVD prevention and control in eight targeted sectors bordering with DRC in Rusizi district.

**Knowledge of EVD among study population in Rusizi district**

The objective was to assess respondent’s knowledge on EVD prevention and control. Therefore, researcher firstly wanted to know their sources of information, whether the respondents had an idea about the causes of EVD. After hearing their perspectives, a researcher wanted to discover how someone gets Ebola, primary indications and symptoms of someone infected with EVD, and ultimately, if the respondents could prevent themselves from contracting the disease.

Figure 1 indicated the sources of information relating to EVD prevention and control. The researcher found five main sources including radio (81.2%), newspapers/flyers/posters (79.9%), Government through MOH mobilizations (75.7%), community leaders (75.2%) and text messages thru mobile phones (69.4%).



**Figure 1:** Sources of information towards EVD prevention and control.

Source: Primary data (2021).

As shown in table 2, the majority of respondents (76.7%) agreed they were aware of EVD, and almost all of them knew EVD signs and symptoms (on an average of 75.1%). Respondents identified the bush meat (chimpanzees, monkeys) (72.2%), blood of an infected person (77.7%) and shaking the hands of an infected person (73.6%) as the main modes of transmission of EVD. And last, study participants said that hand washing (83.7%), avoiding direct contact (82.0%) and avoiding funeral or burial rituals (81.7%) are the main prevention and control methods of EVD.

**Overall score of respondent’s knowledge towards EVD prevention and control**

Six (6) questions aimed to assess the participants’ knowledge towards EVD prevention and control were evaluated by using SPSS score assessment. The score was twelve (12) marks for a true answer and zero (0) for false answer. An overall knowledge score was calculated by adding up the scores for each respondent across all 6 questions.

Findings in table 3 indicate that 62.2% of respondents had a high level of knowledge towards EVD prevention and control while 37.8% had a low level of knowledge towards EVD prevention and control. The mean knowledge score for all respondents was 47.5 marks out of a possible 72 marks (SD = 7.1). The minimum score was 37 marks and the maximum score was 64 marks.

| Level                         | Frequency (n)                                    | Percent (%)  |
|-------------------------------|--|--------------|
| Low (Score <43.2 out of 72)   | 151  | 37.8         |
| High (Score ≥ 43.2 out of 72) | 248  | 62.2         |
| Total                         | <b>399</b>                                       | <b>100.0</b> |
| Minimum score: 37.0           | <b>Mean score:47.5</b><br><b>Stand. Dev.:7.1</b> |              |
| Maximum score: 64.0           |  |              |

**Table 3:** Distribution of respondents’ knowledge towards EVD prevention.

Source: Research Primary data (2021).

**Respondents’ attitudes towards EVD prevention and control**

The researcher tried to find out the respondents’ attitudes towards EVD prevention and control and the results are presented in table 4.

| Statements  | N (%)             |          |         |          |                |
|---|-------------------|----------|---------|----------|----------------|
|   | Strongly Disagree | Disagree | Neutral | Agree    | Strongly Agree |
| I could care for someone with Ebola.                              | 190(47.6)         | 28(7.0)  | 3(0.8)  | 42(10.5) | 136(34.1)      |
| Those who have Ebola are getting the reward of their sins.        | 288(72.2)         | 54(13.5) | 15(3.8) | 17(4.3)  | 25(6.3)        |
| I cannot stay in the same place with a recovered person from EVD. | 151(37.8)         | 75(18.8) | 15(3.8) | 67(16.8) | 91(22.8)       |
| It is a shame to have Ebola.                                      | 246(61.7)         | 83(20.8) | 2(0.5)  | 17(4.3)  | 51(12.8)       |
| If I think I have Ebola, I will go to the hospital.               | 123(30.8)         | 41(10.3) | -       | 59(14.8) | 176(44.1)      |
| I cannot accept a HCW who cured from Ebola to treat me.           | 229(57.4)         | 77(19.3) | 4(1.0)  | 24(6.0)  | 65(16.3)       |
| If there is a vaccine against Ebola, I will take it.              | 115(28.8)         | 38(9.5)  | 2(0.5)  | 62(15.5) | 182(45.6)      |
| There is nothing called Ebola.                                    | 258(64.7)         | 78(19.5) | 7(1.8)  | 14(3.5)  | 42(10.5)       |

**Table 4:** Respondents’ attitudes towards EVD prevention and control.

Source: Primary data (2021).

Study results presented in table 4 showed that 47.6% strongly disagreed that they could care for someone with Ebola, 72.2% strongly disagreed that those who have Ebola were getting the reward of their sins, 37.8% strongly disagreed that they cannot stay in the same place with a recovered person from EVD, 61.7% strongly disagreed that it is a shame to have Ebola, 44.1% strongly agreed that they would go to the hospital If they thought they had Ebola, 57.4% strongly disagreed that they could not accept a HCW who cured from Ebola to

take care of them, 45.6% strongly agreed that they could take a vaccine if there was and 64.7% strongly disagreed that there was nothing called Ebola.

**Overall attitude score**

The overall attitude score was computed for each respondent by adding up the scores across the eight (8) attitude-related questions. The true answer scored 5 marks and the false answer got zero. The answers were ranged in the Likert scale format.

From the findings presented in table 5, the researcher founded that 39.1% of the participants have positive attitude towards EVD prevention and control while 60.9% presented negative attitudes towards EVD prevention and control. The mean attitude score for all participants was 19.3 (SD = 9.5, Minimum score = 8 and Maximum score = 37marks).

| Level                           | Frequency (n)                                    | Percent (%)  |
|---------------------------------|--|--------------|
| Negative (Score < 24 out of 40) | 243  | 60.9         |
| Positive (Score ≥ 24 out of 40) | 156  | 39.1         |
| Total                           | <b>399</b>                                       | <b>100.0</b> |
| Minimum score: 8.0              | <b>Mean score:19.3</b><br><b>Stand. Dev.:9.5</b> |              |
| Maximum score: 37.0             |  |              |

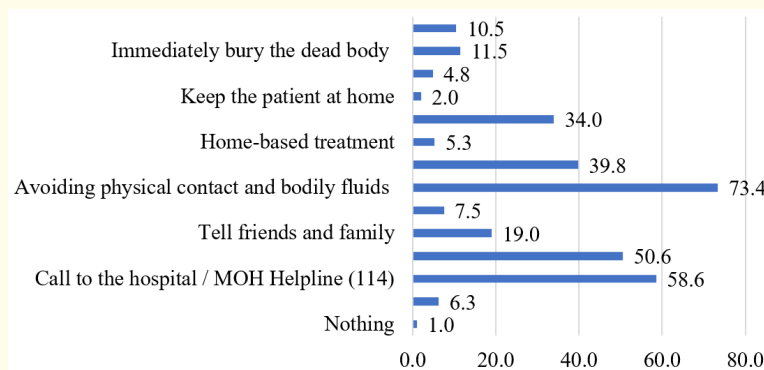
**Table 5:** Distribution of respondents' attitudes towards EVD prevention.

Source: Primary data (2021).

**Respondents' practices towards EVD prevention and control**

The researcher sought to determine the respondents' practices towards EVD prevention and control. The key findings are presented in figure 2.

Findings in figure 2 show that the majority of respondents considered avoiding physical contact and bodily fluids burning (73.4%), call to the hospital or MOH Helpline (58.6%) and tell the community leader/CHW (50.6%) as the main actions to be done to prevent and control EVD.



**Figure 3:** Respondents' practices towards EVD prevention and control.

Source: Primary data (2021).

**Overall practice score**

The practice’ section enclosed fifteen (15) questions related to EVD prevention and control and were marked for each respondent. If a respondent provided a correct response, he/she was given a score of 2 marks. If he/she provided a false response, he/she was marked by zero. An overall practices score was calculated for each respondent by adding up the scores across the 15 practice-related questions. The total score was 30 marks.

Research findings presented in table 6 indicated that 71.4% of respondents presented good practices towards EVD prevention and control whereas 28.6% showed poor practice towards EVD prevention and control. The mean practice score for all respondents was 22.1 (SD = 6.5). The minimum score was 4 out of 30 marks and the maximum score was 30 out 32 marks.

| Level                    | Frequency (n)                                    | Percent (%)  |
|--------------------------|--|--------------|
| Poor (Score <18 out 30)  | 114  | 28.6         |
| Good (Score ≥ 18 out 30) | 285  | 71.4         |
| Total                    | <b>399</b>                                       | <b>100.0</b> |
| Minimum score: 4.0       | <b>Mean score:22.1</b><br><b>Stand. Dev.:6.5</b> |              |
| Maximum score: 30.0      |  |              |

**Table 6:** Distribution of respondents’ practice towards EVD prevention.

Source: Primary data (2021).

**Factors associated with practices towards EVD prevention and control**

The factors associated with practices towards EVD prevention and control were determined by bivariate and multivariate analyses.

In the bivariate analysis, study findings as indicated in table 7 showed that gender (p = 0.041), religion (p < 0.001), frequency of crossing borders (p = 0.043), knowledge towards EVD prevention and control (p = 0.002), and attitude about EVD prevention and control (p = 0.033) were significantly associated with practices towards EVD prevention and control. No association was found between residence, age category, marital status, educational level, and occupational status (p > 0.05).

| Variables          | Practice Towards EVD Prevention |           | Pearson Chi-Square | P-Value |       |
|--------------------|---------------------------------|-----------|--------------------|---------|-------|
|                    | Poor                            | Good      |                    |         |       |
| Residence [Sector] | Bugarama                        | 21 (33.3) | 42 (66.7)          | 3.382   | 0.848 |
|                    | Gashonga                        | 11 (22.9) | 37 (77.1)          |         |       |
|                    | Gihundwe                        | 15 (26.3) | 42 (73.7)          |         |       |
|                    | Kamembe                         | 18 (32.1) | 38 (67.9)          |         |       |
|                    | Mururu                          | 15 (30.0) | 35 (70.0)          |         |       |
|                    | Nkombo                          | 7 (20.0)  | 28 (80.0)          |         |       |
|                    | Nyakarenzo                      | 10 (31.2) | 22 (68.8)          |         |       |
|                    | Nzahaha                         | 17 (29.3) | 41 (70.7)          |         |       |
| Age category       | ≤ 30 years                      | 48 (27.9) | 124 (72.1)         | 4.666   | 0.097 |
|                    | 31-50 years                     | 62 (31.6) | 134 (68.4)         |         |       |
|                    | > 50 years                      | 4 (12.9)  | 27 (87.1)          |         |       |

|                                  |                      |            |            |        |                  |
|----------------------------------|----------------------|------------|------------|--------|------------------|
| Gender                           | Male                 | 46 (35.1)  | 85 (64.9)  | 4.091  | 0.041            |
|                                  | Female               | 68 (25.4)  | 200 (74.6) |        |                  |
| Marital status                   | Single               | 48 (32.0)  | 102 (68.0) | 1.384  | 0.239            |
|                                  | Married              | 66 (26.5)  | 183 (73.5) |        |                  |
| Education                        | Primary              | 38 (23.3)  | 125 (76.7) | 4.385  | 0.112            |
|                                  | Secondary            | 51 (34.0)  | 99 (66.0)  |        |                  |
|                                  | University           | 25 (29.1)  | 61 (70.9)  |        |                  |
| Occupation                       | Unemployed           | 46 (28.0)  | 118 (72.0) | 0.334  | 0.846            |
|                                  | Self-employed        | 63 (29.4)  | 151 (70.6) |        |                  |
|                                  | Employed             | 5 (23.8)   | 16 (76.2)  |        |                  |
| Religion                         | Protestant           | 102 (29.3) | 246 (70.7) | 22.569 | <b>&lt;0.001</b> |
|                                  | Catholic             | 1 (12.5)   | 7 (87.5)   |        |                  |
|                                  | Muslim               | 2 (6.9)    | 27 (93.1)  |        |                  |
|                                  | No religion          | 10 (71.4)  | 4 (28.6)   |        |                  |
| Frequency of crossing borders    | Do not cross borders | 30 (29.4)  | 72 (70.6)  | 8.170  | <b>0.043</b>     |
|                                  | Rarely               | 11 (39.3)  | 17 (60.7)  |        |                  |
|                                  | Sometimes            | 9 (14.5)   | 53 (85.5)  |        |                  |
|                                  | Frequently           | 64 (30.9)  | 143 (69.1) |        |                  |
| Knowledge towards EVD prevention | Low                  | 101 (66.9) | 50 (33.1)  | 9.874  | <b>0.002</b>     |
|                                  | High                 | 184 (74.2) | 64 (25.8)  |        |                  |
| Attitude towards EVD prevention  | Negative             | 78 (32.1)  | 165 (67.9) | 3.789  | <b>0.033</b>     |
|                                  | Positive             | 36 (23.1)  | 120 (76.9) |        |                  |

**Table 7:** Factors associated with practices towards EVD prevention and control.

Source: Primary data (2021).

Variables found to be statistically significant in the bivariate analysis were yielded to the multivariate logistic regression analysis to determine to which extent variables are linked each other. Research findings presented in table 8 revealed that participants who had frequently crossed borders were 2.8 times (AOR = 2.8; 95% CI: [1.2 - 6.37]; p = 0.017) more likely having good practice towards practices to EVD prevention and control than those who had not crossed borders. This could be explained by the fact that more you travelled, more you gain new skills and become familiar with prevention measures at the borders.

| Variables | Items       | Crude OR (95%CI) | P-Value | Adjusted OR (95%CI) | P-Value |
|-----------|-------------|------------------|---------|---------------------|---------|
| Gender    | Male        | Ref              |         |                     |         |
|           | Female      | 0.6 (0.4-987)    | 0.44    | 0.4 (0.2-0.81)      | 0.38    |
| Religion  | Protestant  | Ref.             |         |                     |         |
|           | Catholic    | 0.8 (0.16-1.95)  |         | 0.9 (0.18-1.98)     | 0.536   |
|           | Muslim      | 0.5 (0.16-1.95)  | 0.369   | 0.4 (0.18-0.98)     | 0.342   |
|           | No religion | 0.4 (0.89-0.61)  | 0.810   | 0.3 (0.21-1.2)      | 0.796   |



|                                  |                      |                 |       |                 |       |
|----------------------------------|----------------------|-----------------|-------|-----------------|-------|
| Frequency of crossing borders    | Do not cross borders | Ref.            |       | Ref.            |       |
|                                  | Rarely               | 0.2 (0.08-0.70) | 0.546 | 0.4 (0.05-0.9)  | 0.498 |
|                                  | Sometimes            | 1.1 (0.48-1.68) | 0.799 | 0.9 (0.33-1.78) | 0.842 |
|                                  | Frequently           | 3.1 (1.04-7.41) | 0.010 | 2.8 (1.2-6.37)  | 0.017 |
| Knowledge towards EVD prevention | Low                  | Ref.            |       | Ref.            |       |
|                                  | High                 | 2.1 (1.31-3.32) | 0.002 | 2.4 (1.43-4.7)  | 0.004 |
| Attitude towards EVD prevention  | Negative             | Ref.            |       | Ref.            |       |
|                                  | Positive             | 1.5 (1.04-2.49) | 0.025 | 1.7 (1.36-5.1)  | 0.020 |

**Table 8:** Multivariate logistic regression analysis.

Source: Primary data (2021).

The odds of having good practice towards practices to EVD prevention and control were found to be 2.4 times (AOR = 2.4; 95% CI: [1.43 - 4.7]; p = 0.004) among respondents with high level of knowledge towards practices to EVD prevention and control compared to those with low level of knowledge towards practices to EVD prevention and control, and 1.7 times (AOR = 1.7; 95% CI: [1.36 - 5.1]; p = 0.020) among respondents with positive attitude compared to those with negative attitude towards practices to EVD prevention and control.

## Discussion

A number of communication tools and supports can be used to raise public awareness of the symptoms and prevention measures of the disease. In this study, the main sources of information for respondents about EVD were radio (81.2%), newspapers/flyers/posters (79.9%), Government through MOH mobilizations (75.7%), community leaders (75.2%) and text messages thru mobile phones (69.4%). Only 12% of respondents reported they had access to internet as sources of information related to EVD.

Undeniably [13,14], observed in their work that media such as television and radio were the main sources of information with 62% and 42% respectively. In contrast, another study conducted by Olowookere in Nigeria reported that colleagues (40%) and radio (37.2%) were the main sources of information [15].

As across-sectional community-based study on Ebola prevention and control was conducted, knowledge about EVD was found to be comprehensive and high in the communities studied. Comprehensive knowledge is a critical component for increasing the likelihood of adopting promoted prevention strategies and medical-seeking behaviors as found in three communities of Sierra Leone [16].

This finding was inconsistent with what found in our study where the high level of knowledge on EVD was not reflecting high positive attitude towards EVD prevention in the study areas (39.1%).

As found in this study, awareness of knowledge related to EVD prevention and control among the participants was very high (62.2%). This response might be attributable to the fact that individuals gained key information through the intensified education and mobilization. This was consistent with findings from a study conducted in five counties in Liberia [17].

For example, most of the respondents knew the correct mode of transmission of EVD, with as many as 77.7% correctly indicating blood of an infected person and shaking hands of an infected person (73.6%) as the main modes of transmission of EVD. This is comparable to the findings of a similar study conducted in Tehran, Iran where 74% of respondents knew the correct mode of transmission of the disease [18].

These study findings were similar with what found in Sierra Leone where nearly everyone knew the helpline to call to report a suspected EVD case and to stop a traditional burial [16]. Previous studies have shown that people's knowledge about Ebola might have been affected by education level of people [19-21]. This was totally different with the current study findings where no association has been found between level of education and practices towards EVD prevention and control ( $p = 0.112$ ).

The researcher found that the population surveyed in Rusizi district had a good knowledge of the main modes of transmission of EVD, which were known by more than 56.6% of the respondents in average. This is a positive point because the understanding this information should guarantee a reduction in the risk of transmission of EVD.

Participants' knowledge assessment about preventive measures revealed that hand washing (83.7%), avoiding direct contact (82.0%) and avoiding funeral or burial rituals (81.7%) were the main prevention and control methods of EVD. These findings were almost similar with what found by Mahwish in a survey conducted in Pakistan where 61.4% of respondents had mentioned patient isolation as one of the management measures [22]. Indeed, WHO recommends to place suspected or confirmed cases of hemorrhagic fever in individual rooms in isolation while strictly separating suspected and confirmed cases. While taking care of cases, it is also recommended to start with suspected cases and end with confirmed ones.

An overall knowledge score towards EVD prevention and control was high (score  $\geq 43.2$  out of 72) in 62.2% of respondents while low level of knowledge (score  $< 43.2$  out 72) was found in 37.8%. This research finding was in contrast with what found in a study conducted in Senegal where the global knowledge about EVD was good (score  $\geq 26$ ) in 39.6% of respondents [23].

The researcher noted that the odds of having good practice towards practices to EVD prevention and control were found to be 2.4 times among respondents with high level of knowledge towards practices to EVD prevention and control compared to those with low level of knowledge towards practices to EVD prevention and control. It was widely understood that inadequate knowledge has contributed to the emergence and spread of Ebola outbreak in some parts of world [20,21].

In this study, 47.6% strongly disagreed that they could care for someone with Ebola, 37.8% strongly disagreed that they cannot stay in the same place with a recovered person from EVD and 45.6% strongly agreed that they could take a vaccine if there was.

These study findings were somehow similar with what found in a study conducted in in Dakar, Senegal where the most common feelings raised by respondents when discussing the EVD were fear (68%), indifference (15%) and worry (3%) [23].

In their study, [23] stated that among six students, five had interrupted their internship because they were afraid of being infected. This main feeling of "fear" felt by students is probably related to the fact that EVD is a highly contagious disease, with high lethality and effective vaccine was yet to be available for therapeutic purpose.

In a study conducted in Ethiopia [13], 78% of health workers were afraid of being infected and 56% of respondents were "uncomfortable in hospitals to treat Ebola patients". These results were consistent with ours because 57.4% of respondents strongly disagreed that they could not accept a HCW who cured from Ebola to take care of them. The impact of this "fear" in managing the previous EVD outbreak that occurred in West Africa and in some countries of central Africa including our neighbor, Democratic of Republic of Congo, denote a range of measures undertaken by countries to deal with this epidemic, namely the closure of borders.

Less than a half (39.1%) of the participants had positive attitudes (score  $\geq 24$  out 40) towards EVD prevention and control while 60.9% presented negative attitudes (score  $< 24$  out 40) towards EVD prevention and control. Consequently, respondents with positive attitude were 1.7 times more likely to have good practices to EVD prevention and control than those with negative attitude towards.

This study revealed that avoiding physical contact and bodily fluids burning (73.4%), call to the hospital or MOH Helpline (58.6%) and tell the community leader/CHW (50.6%) were the main actions to be taken to prevent and control EVD. These results were similar to the literature data where the main prevention measures pointed out by respondents are hand washing with soap and water, avoiding contact with other people's blood or body fluids, and wearing gloves [14,24,25].

In Sierra Leone, 62% of participants had a history of travelling to urban areas, which may increase the risk of infection [16]. This finding was different with ours because the study finding revealed that 51.9% of participants were frequently crossing borders between Rwanda and DRC.

Respondents' acceptable practice regarding to Ebola can be explained positively with their levels of knowledge, which is consistent with other studies, where appropriate knowledge of Ebola was identified to be a predictor for positive practice towards Ebola prevention and control [21,26]. Subsequently, participants who had frequently crossed borders were 2.8 times more likely having good practice towards practices to EVD prevention and control than those who had not crossed borders.

### Conclusion

The present findings highlight important concerns regarding to knowledge, attitude, and practice among population in Rusizi district vis-à-vis Ebola virus disease outbreak. Although majority of them had favorable knowledge and practice towards EVD prevention, there was evidence of high rate of negative attitude towards EVD prevention and control that needs to be addressed. Study findings have identified participants with low level of knowledge, negative attitude and poor practice towards EVD prevention. Hence, efforts should be focused to reach these people in future public educational campaigns to improve knowledge and change attitudes and practices towards Ebola prevention and control as this outbreak has not yet eradicated.

### Bibliography

1. WHO. Ebola virus disease (2018).
2. CDC. Cases of Ebola diagnosed in the United States (2014).
3. WHO. WHO statement on the meeting of the International Health Regulations Emergency Committee regarding the 2014 Ebola outbreak in West Africa (2014).
4. UNICEF. Emergencies (2015).
5. Alioune C., *et al.* "Knowledge, attitudes and practices of health care workers on Ebola in hospital towards Ebola virus disease, Conakry, Guinea, 2016". *Central African Journal of Public Health* 4 (2018): 1.
6. Toure A., *et al.* "Knowledge, attitudes, and practices of health care workers on Ebola virus disease in Conakry, Guinea: a cross-sectional study". *Journal of Public Health and Emergency* 8 (2016): 12-16.
7. Sidibé S., *et al.* "Connaissances, attitudes et pratiques des prestataires de soins de santé de face aux cas suspects d'Ebola en Guinée". *Revue d'Epidémiologie et de Santé Publique* 66 (2018): 369-374.
8. WHO. Situation Report Ebola Virus Disease. World Health Organization (2016).
9. Selvaraj S., *et al.* "Infection rates and risk factors for infection among health workers during Ebola and Marburg virus outbreaks: a systematic review". *The Journal of Infectious Diseases* 218.5 (2018): S679-689.
10. WHO. Health worker Ebola infections in Guinea, Liberia and Sierra Leone. World Health Organization (2015).

11. Borchert M., *et al.* "Use of Protective Gear and the Occurrence of Occupational Marburg Hemorrhagic Fever in Health Workers from Watsa Health Zone, Democratic Republic of the Congo". *The Journal of Infectious Diseases* 196.2 (2017): S168-175.
12. Ratnayake R., *et al.* "Improving Ebola infection prevention and control in primary healthcare facilities in Sierra Leone: a single-group pretest post-test, mixed-methods study". *BMJ Global Health* (2016): 1.
13. Tamrat B., *et al.* "Healthcare professionals awareness, knowledge, attitudes, perceptions and beliefs about Ebola at Gondar University Hospital, Northwest Ethiopia: A cross-sectional study". *Journal of Public Health in Africa* 7 (2016): 570.
14. Mbuk E. "Knowledge, attitude and practice relating to Ebola Virus Disease (EVD) among residents of some military barracks in Kaduna State, Nigeria". *International Journal of Innovative Research and Advanced Studies* (2016): 3.
15. Olowookere Abioye-Kuteyi, E., *et al.* "Knowledge, attitude, and practice of health workers in a tertiary hospitals in Ile-Ife, Nigeria, towards Ebola viral disease". *Journal of Tropical Medicine* (2015): 431317.
16. Jiang H., *et al.* "Rapid assessment of knowledge, attitudes, practices, and risk perception related to the prevention and control of Ebola virus disease in three communities of Sierra Leone". *Infectious Diseases of Poverty* 5 (2016): 53.
17. Kobayashi M., *et al.* "Community Knowledge, Attitudes, and Practices Regarding Ebola Virus Disease - Five Counties, Liberia,, September-October". *Morbidity and Mortality Weekly Report* 64.26 (2014): 714-718.
18. Holakouie-Naieni K., *et al.* "Assessing the knowledge, attitudes, and practices of students regarding ebola virus disease outbreak". *Iranian Journal of Public Health* 44.12 (2015): 1670.
19. McCarthy M. "Four in 10 US people fear large outbreak of Ebola". *British Medical Journal* 349 (2014): g5321.
20. Alqahtani A., *et al.* "Australian Hajj pilgrims' knowledge, attitude and perception about Ebola, November 2014 to February 2015". *Eurosurveillance: European Communicable Disease Bulletin* 20.12 ( 2015): 21072.
21. Jamal A., *et al.* "Assessing Knowledge and Attitude about ebola in the US: a Cross Sectional Survey". *Value in Health* 3.18 (2015): A246.
22. Mahwish R. "Knowledge and awareness of Ebola virus disease among medical students". *Pakistan Journal of Medical and Health Sciences* (2015): 9.
23. Diallo MK., *et al.* "Knowledge, Attitudes and Practices Regarding Ebola Virus Disease among Students at a School of Medicine in Dakar, Senegal". *Journal of Infectious Diseases and Epidemiology* 5 (2019): 104.
24. Oladimedji A., *et al.* "Ebola virus disease - gaps in knowledge and practice among healthcare workers in Lagos, August 2014". *Tropical Medicine and International Health* 20 (2015): 1162-1170.
25. Adebimpe W. "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". *Annals of Global Health* 82 (2016): 897-902.
26. Tosh P and Sampathkumar P. "What clinicians should know about the 2014 Ebola outbreak". *Mayo Clinic Proceedings* 89.12 (2014): 1710-1717.

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