

# Factors associated with Ebola preventive measures adherence among refugees in Kampala : A cross-sectional study

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## Abstract

### Background:

Since last September, when it was declared an outbreak, the Ebola virus disease (EVD) has increased fear and threatened the public health system in Uganda. Cases registered in Kampala worsen the situation and raise public concern. The primary concern of all populations, including refugees, is avoiding disease transmission. Public health recommendations emphasize the importance of observation, including movement restrictions, social distancing, and hand-washing, in limiting the virus's transmission and spread. However, a challenge for vulnerable populations due to their socioeconomic status is noted. The present study examined factors associated with the practice of EVD preventive measures among refugees in Kampala.

### Methodology:

A cross-sectional study design was conducted using a structured questionnaire, focusing on refugee practices against EVD. With SPSS version 21, variables were analyzed and compared for association with data collected from 207 refugees in Kampala. Descriptive and inferential statistical analysis was done, and a Chi-square test set at a 0.05 level of significance was performed.

### Results:

The findings revealed a high level of general awareness about EVD, with a mean age of 28.38 years. However, understanding Luganda, regular seeking of information, having enough water and sanitizer, being willing to take the vaccine, having a close friend or relative who has ever been suspected of or diagnosed with EVD, and denial of its existence in Kampala all impacted the adherence to preventive practices among refugees in Kampala ( $p < .05$ ).

### Conclusion:

Practicing Ebola preventive measures effectively is not always easy for vulnerable groups of populations, such as refugees. Understanding the local language is a major factor in getting accurate information and practicing the right measures to avoid getting or spreading the disease.

### Recommendation:

Involving refugees in response teams and focusing on refugee informal settlements is key to easing information transmission and increasing adhesion to preventive measures among refugees.

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## 1. Background of the study

Ebola virus disease (EVD) also known as viral hemorrhagic fever and hereinafter referred to as Ebola, is a deadly illness. The virus is transmitted to people from wild animals and spreads in the human population through human-to-human transmission (July *et al.*, 2021). Uganda is currently facing its sixth EVD outbreak. Overall, nine districts have been affected, including Kampala, and 142 confirmed cases and 55 confirmed deaths have been reported since the outbreak began; among the confirmed cases, 19 health workers and 7 patients have died (ECDC, 2022). A total number of 22 probable cases died before samples were obtained for confirmation and 87 cases have recovered. In Kampala, 18 confirmed cases and 2 deaths were registered so far (Geoscope and Levels, 2022). According to leaked government projections, there will be 1,200 cases and 500 deaths by late April (The Telegraph, 2022). Vulnerable populations, including refugees, are the most at risk of getting and transmitting the virus due to their low socioeconomic status.

Kampala hosts more than 100,000 refugees and the majority are located in slums, where most services are difficult to access, including access information (AGORA, 2018) (UNHCR, 2022). Understanding the disease during an outbreak is a major factor for the response actions as shown in a study conducted in west Africa that the community's insufficient general understanding of the disease was among the factors that prevented the spread of the disease (Spengler *et al.*, 2016). In the case of EVD, the measures include basic hand hygiene, social distancing, the use of personal protective equipment, and safe burial practices (Nyampong, 2015). The case-fatality proportion (CFP) in the current outbreak in Uganda was initially very high (76%), but it decreased (20%) due to better case management after reinforcing the response team. However, mobilizing the community for response efforts was difficult at first, as the response team had to combat fear, panic, and mistrust (Borchert *et al.*, 2011). A lack of public knowledge and education can contribute to panic, anxiety, and psychoso-

cial trauma; fear and distrust in the treatment unit and workers, sometimes leading to violence; and community isolation, stigma, and ostracism against survivors and family members (Spengler *et al.*, 2016). The global narrative outlined above frequently portrays some vulnerable communities as ignorant and backward, promoting behaviors and beliefs that hasten the emergence and spread of EVD (Ryan, 2018). Increasing people's knowledge by educating, influencing, and motivating individuals, organizations, and the general public about the important attitudes toward health and measures to reduce the risk of EVD are key to preventing the spread of EVD outbreaks. It is essential to proactively interact with affected and high-risk communities such as refugees to provide timely and accurate health advice to encourage positive health behaviors and to address issues. address public concerns and rumors that may affect disease control (Information and Assessment, 2019). A study conducted in Uganda revealed that conflict or discord between refugees and host communities could present a challenge to EVD preparedness and uptake of EVD messages (Mafigiri and Schmidt-sane, 2019). Surveys led by UNICEF also indicated high levels of general awareness about EVD in the affected areas, and knowledge of basic transmission modes, signs, symptoms, and prevention practices appeared to be higher in areas with active cases. Radio, churches, health centers, and community channels are cited as the most common sources of Ebola-related information, although there were variations between studies and field sites (Gercama, 2019). Radio communication bridges the gap for those who are unable to read due to low literacy levels. Village Health Workers were also cited as a trusted source of information (Mafigiri and Schmidt-sane, 2019).

People respond differently to information about the illness. A survey conducted in the Democratic Republic of the Congo found that the majority of respondents showed a docile attitude towards EVD control, few believed that EVD does not exist in the region, it was invented and 72% are dissatisfied or suspect EVD response teams. In the same survey, 15% of respondents would not com-

ply, such as hiding from health authorities, touching dead bodies, or refusing to welcome the official funeral team, in the event of EVD or the death of a family member (Claude, Unterschultz and Id, 2019). A study conducted in Uganda during the recent Covid-19 pandemic suggests that it may be rather derogatory to view refugees as deliberately non-adherent to precautionary measures (Okot *et al.*, 2021). Factors such as social and economic poverty, lack of water and sanitation, ongoing violence, food insecurity, poor hygiene, comorbidities, personal health, health literacy, and other education-related factors can contribute to community vulnerability and adherence to preventive measures (Toyin, Ademola, and Oluwadare, 2020) (Insight, 2020).

There are also beliefs and practices that shape and influence how individuals and groups view health problems and remedies to them. In West Africa, according to Roca and colleagues, many communities

attribute EVD to evil spirits, witchcraft, or sorcery. For some Sierra Leoneans is a curse from the gods or the spirits of deceased ancestors (Sous-prefecture *et al.*, 2014). Religious and traditional beliefs also influence health-seeking behavior, including when it is appropriate to seek help from a traditional healer rather than the formal health sector (Mafigiri and Schmidt-sane, 2019). In Uganda, a study considering conspiracy theories revealed that Ebola was a hype to raise money for health workers (Coltart *et al.*, 2017). As for vaccinations, an investigation in the Democratic Republic of the Congo has revealed rumors that indigenous populations were infected with Ebola through lethal injections or that health workers were "sucking" people's blood and selling it (Esaro, 2022). Up until the 2,000 Gulu outbreak in Uganda, the opacity of the Ebola Treatment Units (ETUs) operations also created suspicion, as if they had something to hide, thus fueling negative theories about robbery and experimentation spread in the region (Jalloh, 2019). In the Isiro outbreak in DRC, ETUs were described as 'death camps' (Esaro, 2022). Nonetheless, in North Kivu in the DRC, several behavioral changes were observed during the EVD outbreak. Communities

are adhering to movement restrictions and avoiding large gatherings, have stopped shaking hands or embracing (kissing), have adhered to regular hand washing, and have placed hand washing stations and disinfection points in the square (Esaro, 2022). Hence, this study sought to assess awareness, beliefs, and attitudes as predictors of EVD prevention practices among refugees living in Kampala.

## 2. Methodology

### 2.1. Study design

A cross-sectional study design with quantitative approaches was conducted to collect and analyze data on Ebola preventive measures practiced among refugees.

### 2.2. Study area

The study was conducted in the different divisions of Kampala, namely, Central, Kawempe, Makindye, Nakawa, and Rubaga. Kampala is a city that hosts different groups of people, including refugees, mostly from neighboring countries. It mixes commercial, industrial, and residential settlements. The information was gathered between November 7th and November 24th, 2022.

### 2.3. Study population

All refugees aged 18 to 60 years old, living in any of the 5 divisions (Central, Kawempe, Makindye, Nakawa, Rubaga) in Kampala were concerned without any restrictions on gender and nationality.

### 2.4. Sample size determination

A sample of 384 refugees was obtained using the Cochran formula for categorical variables:  $n = \frac{Z^2pq}{e^2}$  (Soemari *et al.*, 2020), where  $n$  is the sample size;  $Z$  is the standard normal deviation set at 1.96 at a 95% confidence level;  $e$  the margin of error, absolute size precision set to 5%. The level of significance is 0.05;  $p$  is the estimated proportion of an attribute that is present in the population. The target population's characteristics are not known, so (50% or 0.5), which is the standard for unknown populations, and  $q = 1-p$ .  $n$

$= (1.96)^2 (0.5) (1-0.5) / (0.05)^2 = 384$ . Due to financial and time limitations, data was collected from only 207 respondents.

### 2.5. Sampling procedure

This study used the snowball sampling method, mixing a soft copy and a hard copy of the research tool for data collection. Following this method, 7 initial subjects (refugee leaders) were selected to fill out the form in soft or hard copy, depending on one's choice, and then helped share the soft copy via any connected devices using emails or WhatsApp accounts with known refugees who met the criteria and who, at their turn, agreed to also do the same with refugees they know. This was strictly between refugee community members living in Kampala. This procedure allowed for a quick understanding of trends during this sensitive period of the outbreak.

### 2.6. Data collection method and tools

A soft (online) or hard copy (paper) of the questionnaire was self-administered to collect data with closed-ended and open-ended questions. The link to the soft copy or the hard copy was shared with individuals through emails or social media accounts or physically (hard copy) by known refugee leaders. The online data instrument developed by the researcher, through a Google form, was associated with a link. The questionnaire was written in simple English with a French translation attached to allow every refugee, regardless of knowledge level, to understand the questions and fill out the form either alone or with the assistance of a close person (for translation). The questionnaire had four parts: socio-demography, awareness of EVD, attitudes toward preventive measures, and the practice of Ebola preventive measures.

### 2.7. Quality control

In order to minimize errors such as multiple responses due to open access to the survey link, the researcher developed a tool with IP address restriction so that only one respondent could use one device though it limited participants who may be sharing the same devices (family members,

couples, etc.). The survey saved the data automatically on a Google form. During data collection, the researcher was regularly checking the entered data to ensure the right data was collected without errors, and continuous cleaning was done to further ensure the integrity of the data. An immediate rectification was done at the different levels. The questionnaire was pretested on ten refugees in Kampala to test the validity and reliability of the questions. Participants who took part in this testing process were automatically excluded during the final data collection.

### 2.8. Selection criteria

#### Inclusion criteria

All refugees aged 18–60 living in any of the five divisions of Kampala with the capacity to use a connected smartphone or computer or be able to read questions on a hard copy and be capable of giving consent were included in the survey.

#### Exclusion criteria

Refugees living outside of Kampala, as well as those living in Kampala but under the age of 18 or over the age of 60, were not permitted to complete the questionnaire and were thus excluded. Refugees who were not in a position to give consent were also not included.

### 2.9. Data collection procedure

A letter from the head of the Faculty of Science and Technology at Cavendish University Uganda with details on the purpose of the study allowed the researcher to introduce himself to refugee community leaders and respondents for a better understanding and collaboration. The link to the online questionnaire was sent to emails or inboxes of refugee social media contacts in Kampala, whereas hard copies were shared physically on one's accordance with a self-administered questionnaire. The survey took each respondent 5 to 10 minutes to complete.

### 2.10. Data management

The survey was designed in such a way that loss of data could not be a threat. All collected data were transferred into an Excel sheet (a database)

and later on into SPSS for analysis. This process eliminated transcription errors and avoided data manipulation and modification by respondents. Respondents' answers were kept on a secured computer under lock and key, accessible only to the researcher.

### 2.11. Variables

In the present research study, the independent variables were sociodemographic characteristics, awareness of EVD and preventive measures, and attitudes towards EVD and its preventive measures, whereas the dependent variable was the practice of the preventive measures.

### 2.12. Data process

Once in the Excel sheet, the collected raw data captured was checked for validity, cleaned, and then transferred to SPSS version 21 for statistical analysis. Various tests were performed to describe and validate the associations between variables. We summarized the data using frequencies and percentages. Hypotheses were tested using chi-square, and Fisher's exact test was performed on each variable with an expected count of less than 5 in cells. A p-value less than 0.05 was accepted as statistically significant with a 95% confidence interval.

### 2.13. Ethical considerations

To apply the WHO ethical recommendations, participants' freedom, privacy, and confidentiality were respected, as participation was voluntary, and those who participated were not permitted to reveal personal information such as their names, phone numbers, or addresses. The respondents were requested to fill out the form personally with their own original answers. A consent form was written in bold on the first page of the questionnaire with all information regarding the study participant's rights and the researcher's contact details in case of any query; thus, the participant could accept (YES) to be included in the study after being informed of the risks and benefits of participating. If participants were uncomfortable with some of the questions, they could withdraw at any time during the survey and delete all completed information.

### 2.14. Bias

The ability to use connected devices and the credibility and personalities of respondents are major challenges in managing information bias. As it combines a hard copy and online survey, this may occur, especially for the online form, due to hurried filling of the form, a lack of explanations, and a misinterpretation of questions by the respondent, who might be alone while filling out the form. Thus, the researcher formulated the questions in a way that minimizes the risk of inappropriate answers by using simple words and focusing questions on the objectives of the study. A selection bias might occur because the online survey might leave out a concerned participant because filling out the form depends on respondents having access to smartphones, computers, and the internet access.

## 3. Results

### 3.1. Socio-demographic characteristics

The study collected data from 207 respondents, and Table 1 shows that the majority of respondents (61%) were between 18 and 28 years old, a minority (1%) were over 50 years old, and the average age was 28.38 years old, mostly male (56%). The majority of respondents (72%) were single, with an average household size of 5.84. The results of the education survey show that most of the respondents went on to secondary school (47.3%) and 43.5% to university. Protestants made up the majority of respondents (65.7%), and the list was made up of traditionalists (.5%). Most respondents were unemployed (40.1%), 24.6% were in school, 18.8% were self-employed, and 16.4% were employed.

### 3.2. Awareness of Ebola disease and preventive measures

According to the survey results, the majority (94.2%) of respondents had heard of EVD. As Table 2 shows, the majority of respondents (59.0%) do not understand Luganda, while 25.6% do not understand English, and 1.9% do not understand any. Only 35.7% of respondents can understand all three. The main sources of information are

Table 1: Socio-demographic characteristics of respondents (n=207)

	Frequency (n)	Percentage (%)
Age (Mean=28.38)		
18-28	128	61.8
29-39	47	22.7
40-50	30	14.5
>50	2	1.0
Gender		
Female	91	44.0
Male	116	56.0
Marital Status		
Single	149	72.0
Married	56	27.1
Widowed	2	1.0
Household size (Mean=5.84)		
Mean=5.84		
1-3	57	27.5
3-5	49	23.7
>5	101	48.8
Education attainment		
Non-Formal	7	3.4
Primary	12	5.8
Secondary	98	47.3
University	90	43.5
Religion		
Catholic	67	32.4
Muslim	3	1.4
Protestant	136	65.7
Traditionalist	1	.5
Occupation		
Employed	34	16.4
School	51	24.6
Self-Employed	39	18.8
Unemployed	83	40.1

television (37.4%), the internet or social media (30.3%), and the community (19.0%). Regarding the pathogen, most of the respondents (67.7%) indicated that EVD is caused by a virus, and 23.1% were unaware. The majority of respondents (95.4%) are aware that Uganda is currently experiencing an outbreak, while 4.6% believe the opposite, and 77.4% of respondents believe that people in Kampala have been infected with EVD, while 22.6% believe they do not. Contact (or touch-

ing) (71.3%) was the main mode of transmission reported, and 22.6% were unaware of her EVD mode of transmission. 45.1% of those who have heard of EVD know three or more symptoms of the disease.

In Figure 1, the majority of respondents (35.7%) understand the three local languages (Luganda, English and Swahili), while 1.9% do not understand them at all.

Table 2: Findings on awareness and knowledge of EVD

	Frequency (n)	Percentage (%)
Local languages (spoken/understood)		
English	32	15.5
English, Kiswahili	43	20.8
Kiswahili	47	22.7
Luganda	2	1.0
Luganda, English	3	1.4
Luganda, English, Kiswahili	74	35.7
Luganda, Kiswahili	2	1.0
None of the above	4	1.9
Ever heard of EVD		
Yes	195	94.2
No	12	5.8
Total	207	100
Source of information		
Community	37	19.0
Internet/social media	59	30.3
Newspapers	6	3.1
Radio	20	10.3
TV	73	37.4
Causal agent		
Bacteria	14	7.2
Don't know	45	23.1
Parasite	4	2.1
Virus	132	67.7
EVD outbreak currently in Uganda		
Yes	186	95.4
No	9	4.6
EVD outbreak currently in Kampala		
Yes	151	77.4
No	44	22.6
Transmission mode		
Contact (touching)	139	71.3
Air (breathing)	26	13.3
Don't know	30	15.4
Number of symptoms known		
1	31	15.9
2	32	16.4
3 or more	88	45.1
Don't know	44	22.6
Total	195	100

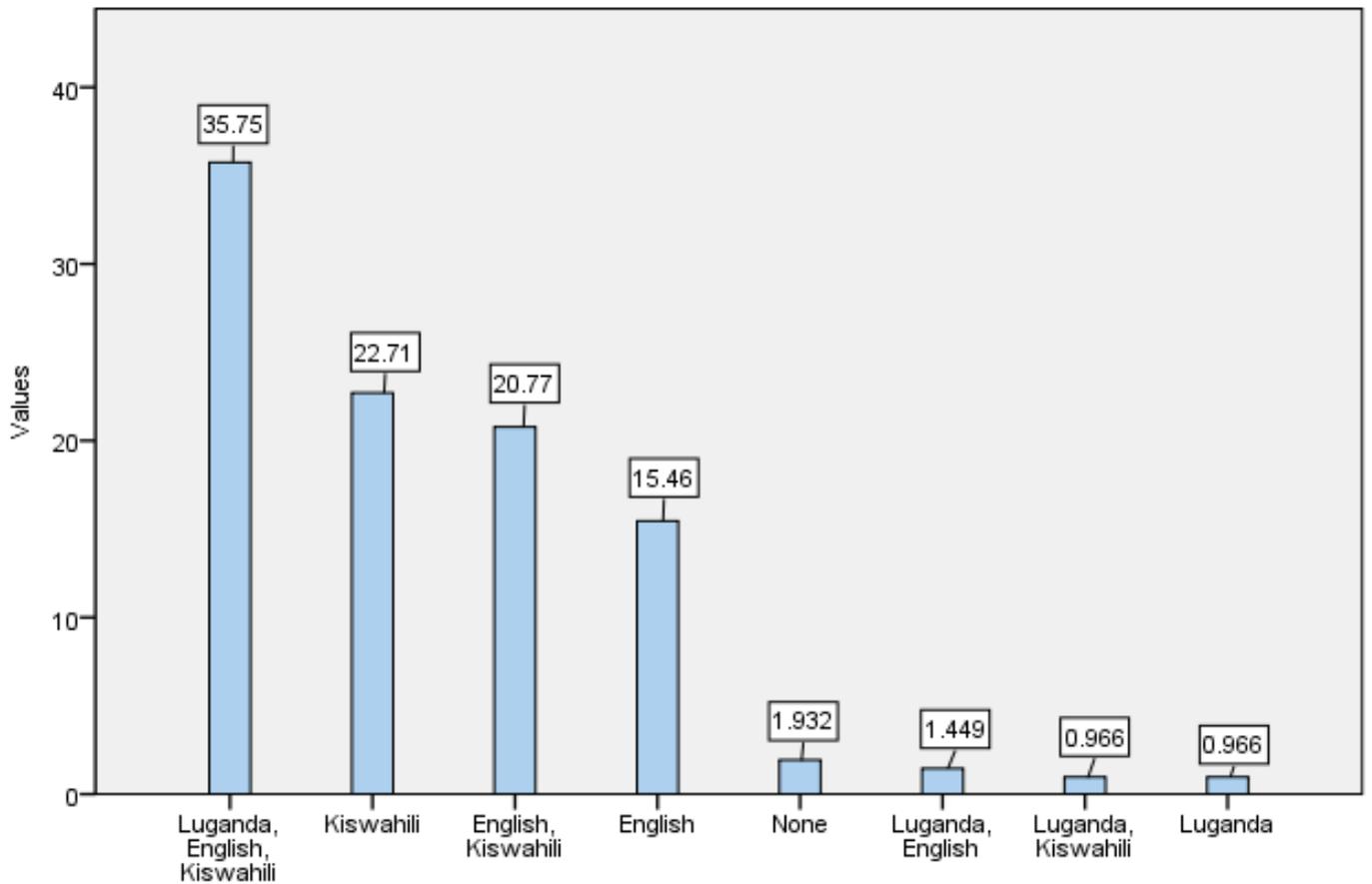


Figure 1: Local languages understood by respondents

### 3.3. Awareness of Ebola disease and preventive measures

According to the survey results, the majority (94.2%) of respondents had heard of EVD. As Table 2 shows, the majority of respondents (59.0%) do not understand Luganda, while 25.6% do not understand English, and 1.9% do not understand any. Only 35.7% of respondents can understand all three. The main sources of information are television (37.4%), the internet or social media (30.3%), and the community (19.0%). Regarding the pathogen, most of the respondents (67.7%) indicated that EVD is caused by a virus, and 23.1% were unaware. The majority of respondents (95.4%) are aware that Uganda is currently expe-

riencing an outbreak, while 4.6% believe the opposite, and 77.4% of respondents believe that people in Kampala have been infected with EVD, while 22.6% believe they do not. Contact (or touching) (71.3%) was the main mode of transmission reported, and 22.6% were unaware of her EVD mode of transmission. 45.1% of those who have heard of EVD know three or more symptoms of the disease.

### 3.4. Attitudes towards the EVD preventive measures

shows that 32.3% of respondents disagreed that washing hands with soap will not prevent EVD, and the same percentage (26.2%) were uncer-

Table 3: Findings on attitudes towards EVD outbreak (n=195)

Statements for consideration	Strongly Dis-agree		Disagree		Uncertain		Agree		Strongly Agree	
	N	%	N	%	N	%	N	%	N	%
Government's information (EVD), not clear	52	<b>26.7</b>	37	19.0	36	18.5	42	21.5	28	14.4
Information means not favoring refugees	38	19.5	46	<b>23.6</b>	40	20.5	42	21.5	29	14.9
Refugees are not concerned with the EVD	92	<b>47.2</b>	65	33.3	17	8.7	11	5.6	10	5.1
Ebola is not that dangerous	95	<b>48.7</b>	57	29.2	16	8.2	15	7.7	12	6.2
Ebola doesn't Exist in Uganda	87	<b>44.6</b>	53	27.2	27	13.8	20	10.3	8	4.1
Ebola doesn't Exist in Kampala	61	<b>31.3</b>	60	30.8	33	16.9	29	14.9	12	6.2
The government is just looking for funds	58	<b>29.7</b>	48	24.6	52	26.7	22	11.3	15	7.7
All Ebola cases in Uganda are not real	57	<b>29.2</b>	56	28.7	50	25.6	20	10.3	12	6.2
All Ebola cases in Kampala are not real	58	<b>29.7</b>	47	24.1	53	27.2	22	11.3	15	7.7

tain and agreed that they were not washing their hands regularly because there were no public places for hand washing as there were during the COVID-19 pandemic. 32.3% of respondents strongly disagreed that they wash their hands because they are afraid of the police, whereas 29.7% agreed that they wash their hands regularly. After all, it is required to enter certain places. The majority of respondents (25.6%) were unsure that wearing a facemask would prevent EVD. Most respondents (32.8%) did not agree with the statement that avoiding crowds does not prevent EVD. Regarding vaccines, the same proportion of respondents was unsure and agreed that only vaccination could control the EVD outbreak.

### 3.5. Individual considerations and attitudes towards EVD

According to Table 5, the majority of respondents (84.11%) believe EVD can be prevented, while a few (9.7%) are unsure and the fewest (6.2%) do not believe it can be prevented. The vast majority of respondents (36.9%) believe they are at risk of contracting EVD, while a few (34.4%) believe they are not, and the fewest (28.7%) are unsure. The majority of respondents (50.3%) believed they could not contract Ebola, while the other half (49.7%) believed they could. According to 47.2 percent of respondents, getting

Ebola is just bad luck, while the remaining 52.8% believe the opposite. The majority of respondents (66.7%) reported looking for Ebola information regularly; however, 39.5% reported being under-informed due to a language barrier. When asked if they would be willing to receive the EVD vaccine once it became available, 37.9% said yes, 25.1% said no, and 36.9% said they were unsure. The most common reason given by those who were unwilling or unsure about taking the vaccine was a lack of trust in it, as shown in Figure 2.

shows that the majority of respondents (96.9) believed that the disease could be transmitted and its transmission or spread could be prevented (84.11). Almost the same percentage of respondents said they considered themselves or not at risk of getting the disease, respectively 36.9% and 34.4% whereas 28.7 were not sure. 49.7% of respondents believed they could not get the disease and 47.2% thought getting EVD was just bad luck. Respondents who were regularly searching for EVD information represented 66.7% while 39.5 claimed to not be well informed due to the language barrier. Concerning vaccination, 37.9% were willing to receive it and 25.1% were not whereas 36.9% were not sure.

Although the majority of respondents (32.8%) said they always have enough water and 40.5% had enough sanitizer some of the time, when

Table 4: Findings on EVD preventive measures practice(n=195)

Statements for consideration	<b>Strongly Disagree</b>		<b>Disagree</b>		<b>Uncertain</b>		<b>Agree</b>		<b>Strongly Agree</b>	
	N	%	N	%	N	%	N	%	N	%
	Washing hands will not prevent Ebola	53	27.2	63	<b>32.3</b>	27	13.8	41	21.0	11
Not washing hands regularly because there are no public places to do it as it was with covid-19	35	17.9	51	<b>26.2</b>	25	12.8	51	<b>26.2</b>	33	16.9
Wash hands because of fear of the police	63	<b>32.3</b>	51	26.2	17	8.7	38	19.5	26	13.3
Wash hands because it's an obligation	47	24.1	32	16.4	24	12.3	58	<b>29.7</b>	34	17.4
Wearing a face mask will not prevent Ebola	44	22.6	43	22.1	50	<b>25.6</b>	40	20.5	18	9.2
Avoiding crowds will not prevent Ebola	50	25.6	64	<b>32.8</b>	27	13.8	33	16.9	21	10.8
A Lockdown measure will not prevent Ebola	46	<b>23.6</b>	42	21.5	35	17.9	46	<b>23.6</b>	26	13.3
Only vaccination can help control EVD spread	38	19.5	39	20.0	44	<b>22.6</b>	44	<b>22.6</b>	30	15.4

Table 5: Findings on individual consideration towards EVD (n=195)

	<b>Frequency (n)</b>	<b>Percentage (%)</b>
Can EVD be transmitted		
Yes	189	96.9
No	6	3.1
Can EVD transmission/spread be prevented		
Yes	164	84.11
No	12	6.2
Not sure	19	9.7
At risk of getting EVD		
Yes	72	36.9
No	67	34.4
Not sure	56	28.7
Cannot get EVD		
Yes	98	50.3
No	97	49.7
Getting EVD is just a bad luck		
Yes	92	47.2
No	103	52.8
Regularly looking for information		
Yes	130	66.7
No	65	33.3
Not well informed due to language barrier		
Yes	77	39.5
No	118	60.5
Willing to get the EVD vaccine		
Yes	74	37.9
No	49	25.1
Not sure	72	36.9

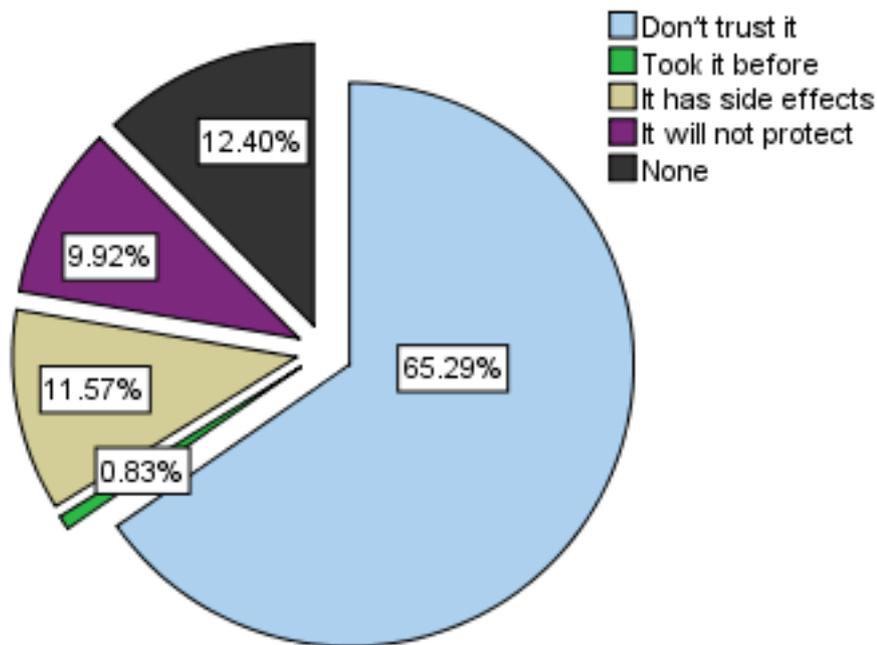


Figure 2: Shows reasons for not willing to take the EVD vaccine once available

it came to washing hands with soap, avoiding crowds, shaking hands, and taking public transportation, the majority of respondents said "some of the time," 36.9%, 38.5%, 36.9%, and 37.4%, respectively, whereas boda-bodas were avoided by a large number (43.1%).

### 3.6. The relationship between individual factors and the use of preventive measures

The results show a statistically significant relationship between understanding Luganda and practicing preventive measures ( $p < .05$ ). There is also a statistically significant relationship between the belief that Ebola does not exist in Kampala and the use of preventive measures ( $p < .05$ ). Having enough water and sanitizer was also linked to the use of preventive measures. Regularly seek-

Table 6: Findings on preventive measures practice (n=195)

Statements for consideration	None		Some		Most		All of	
	of the		of the		of the		the	
	time		time		time		time	
	N	%	N	%	N	%	N	%
I have enough water to wash my hands	18	9.2	51	26.2	62	31.8	64	<b>32.8</b>
I have enough sanitizer for my hand	49	25.1	79	<b>40.5</b>	48	24.6	19	9.7
I wash my hands with soap	7	3.6	72	<b>36.9</b>	60	30.8	56	28.7
I avoid crowded areas	30	15.4	75	<b>38.5</b>	51	26.2	39	20.0
I avoid shaking hands	31	15.9	72	<b>36.9</b>	44	22.6	48	24.6
I avoid public transport	56	28.7	73	<b>37.4</b>	42	21.5	24	12.3
I avoid boda-bodas	84	<b>43.1</b>	69	35.4	26	13.3	16	8.2

ing information, being willing to take the vaccine once it becomes available, and having a close friend or relative who has ever been diagnosed with or suspected of having Ebola were all associated with the practice of Ebola preventive measures ( $p < .05$ ).

Figure 3 shows that most respondents who agreed that Ebola doesn't exist in Kampala do not practice the preventive measures, whereas those who disagree that Ebola doesn't exist in Kampala practice the preventive measures most of the time.

## 4. Discussion

### 4.1. Awareness of EVD and preventive measures

The study sought to assess the awareness of the participants regarding EVD and preventive measures and practices. This study captured data from two hundred and seven (207) refugees living in Kampala and the findings revealed that the majority (94.2%) of them had heard of EVD. And the three main sources of information are television, the internet or social media, and the community. In west Africa, a study revealed a low knowledge and understanding of EVD symptoms (Spengler *et al.*, 2016) while in Ituri (DRC), high levels of general awareness about EVD in the affected areas were reported, transmission modes, signs, symptoms and prevention practices. Radio, churches, health centers, and community channels

are cited as the most common sources of information (Gercama, 2019). A study conducted in west Africa revealed that a lack of public knowledge and education can contribute to panic (Spengler *et al.*, 2016). Radio communication bridges the gap for those who are unable to read due to low literacy levels. Village Health Workers were also cited as a trusted source of information (Mafigiri and Schmidt-sane, 2019). In the present study, though literacy is not linked to the awareness and practice of preventive measures, however, it noted that the majority of refugees (59.0%) in Kampala do not understand Luganda which is the common local language mostly used in community sensitization campaigns and the study found that there was a link between understanding Luganda and preventive measures practice ( $p < .05$ ). The global narrative frequently frames some vulnerable communities as ignorant and backward conveying behaviors and beliefs that accelerate EVD emergence and amplification (Ryan, 2018). This may be taken into consideration, particularly for refugee communities that face various challenges and the major one is access to accurate information due to language or communication barriers.

Though most of the participants were aware that there was an ongoing EVD outbreak in Kampala, the majority could wash their hands just some of the time as study results show, and this was also associated with the practice of other preventive measures ( $p < .05$ ). In a study conducted in west Africa it was showed that the community's

Table 7: Findings on factors of preventive measures practice

	Practice of preventive measures				X <sup>2</sup>	P-value
	None of the time N (%)	Some of the time N (%)	Most of the time N (%)	All of the time N (%)		
Local language (Luganda)						
No	12 (10.4)	37 (32.2)	45 (39.1)	21 (18.3)	9.970	<b>.019</b>
Yes	21 (26.3)	20 (25.0)	31 (38.8)	8 (10.0)		
EVD doesn't exist in Kampala						
Strongly disagree	6 (20.7)	7 (24.1)	12 (41.4)	4 (13.8)	21.505	<b>.043</b>
Disagree	5 (8.3)	20 (33.3)	26 (43.3)	9 (15.0)		
Uncertain	1 (8.3)	6 (50.0)	4 (33.3)	1 (8.3)		
Agree	19 (31.1)	17 (27.9)	18 (29.5)	7 (11.5)		
Strong Agree	2 (6.1)	7 (21.2)	16 (48.5)	8 (24.2)		
Having enough water						
None of the time	21 (32.8)	18 (28.1)	19 (29.7)	6 (9.4)	26.101	<b>.002</b>
Some of the time	5 (8.1)	19 (30.6)	30 (48.4)	8 (12.9)		
Most of the time	3 (16.7)	8 (44.4)	5 (27.8)	2 (11.1)		
All of the time	4 (7.8)	12 (23.5)	22 (43.1)	13 (25.5)		
Having enough sanitizer						
None of the time	8 (42.1)	7 (36.8)	4 (21.1)	0 (0.0)	21.127	<b>.012</b>
Some of the time	9 (18.8)	14 (29.2)	21 (43.8)	4 (8.3)		
Most of the time	4 (8.2)	14 (28.6)	24 (49.0)	7 (14.3)		
All of the time	12 (15.2)	22 (27.8)	27 (34.2)	18 (22.8)		
Regularly look for information						
No	8 (12.3)	12 (18.5)	33 (50.8)	12 (18.5)	9.421	<b>.024</b>
Yes	25 (19.2)	45 (34.6)	43 (33.1)	17 (13.1)		
Willing to get the EVD vaccine						
No	9 (12.5)	18 (25.0)	32 (44.4)	13 (18.1)	18.370	<b>.005</b>
Not sure	4 (8.2)	13 (26.5)	20 (40.8)	12 (24.5)		
Yes	20 (27.0)	26 (35.1)	24 (32.4)	4 (5.4)		
Having a close friend or relative						
No	32 (17.9)	46 (25.7)	72 (40.2)	29 (16.2)	13.952	<b>.003</b>
Yes	1 (6.3)	11 (68.8)	4 (25.0)	0 (0.0)		

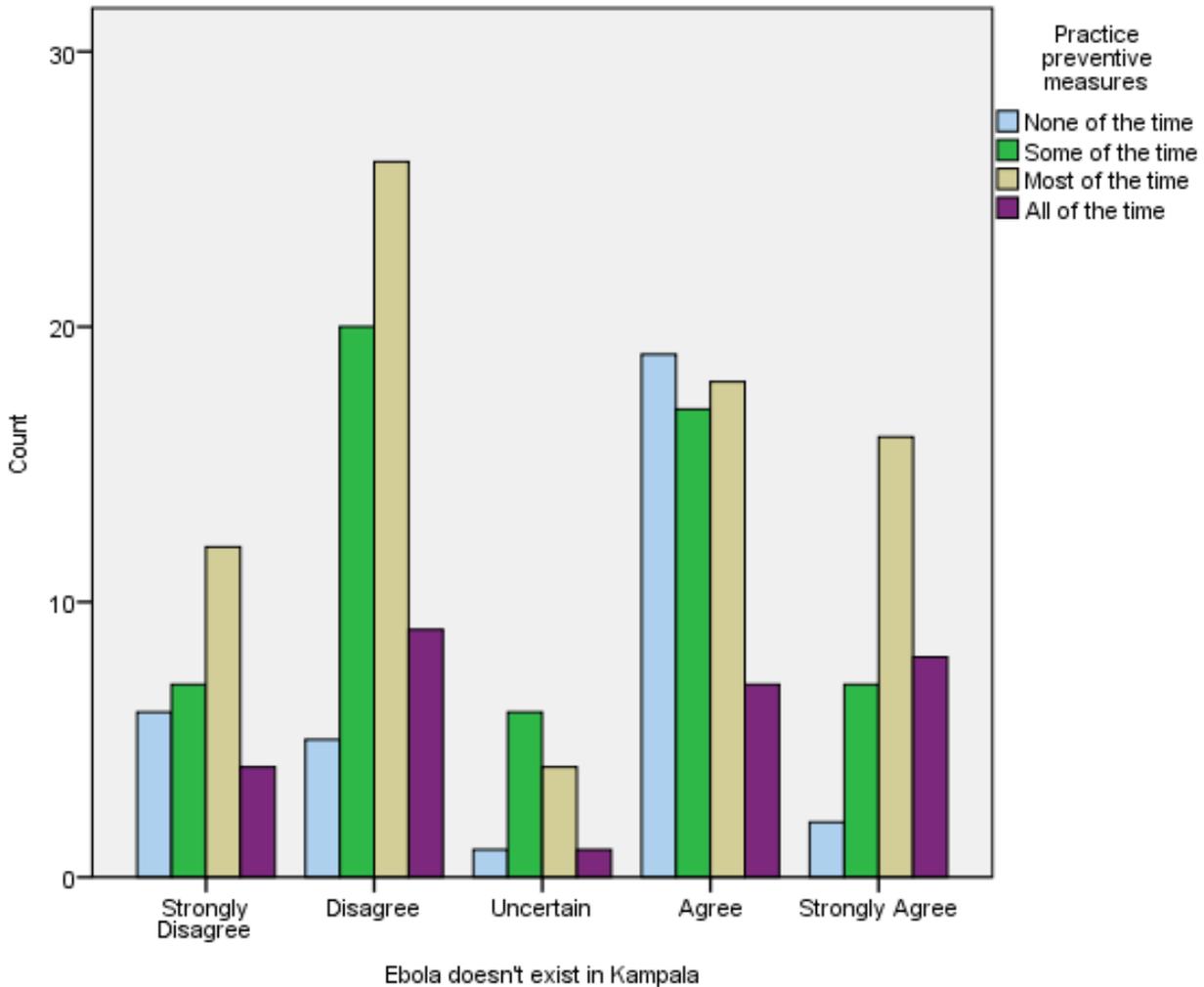


Figure 3: Conviction of existence of Ebola in Kampala and the practice of preventive measures

insufficient general understanding about the disease was among factors that prevented the spread of the disease (Spengler *et al.*, 2016). This may constitute the cornerstone of refugees' obstacle to preventive measures in Kampala due to the language barrier, these come from different countries with different languages and cultures.

Regular seeking for information was also shown to be associated with the practice of EVD preventive measures. And the findings revealed that the majority of respondents (66.7%) were regularly looking for information concerning the ongoing outbreak. In North Kivu in the DRC, several behavioral changes were observed during the EVD outbreak. Communities are adhering to the right

information spreading about preventive measures (Esaro, 2022). Seeking accurate information necessarily leads to right and best practices indications from response teams.

#### 4.2. *Social, Political, and Economic factors around EVD*

The majority of respondents were aware of the ongoing EVD outbreak in Kampala, and have enough water and sanitizer for hand cleaning, They also disagreed (32.3%) that washing hands with soap will not prevent EVD and that they wash hands because they fear the police. Thus, this study found an association between having enough water and sanitizer with the practice of

preventive measures ( $p < .05$ ). A study conducted in DRC found that the majority of respondents had compliant attitudes with respect to EVD control. Nonetheless, few believed that EVD was fabricated and did not exist in the area, as shown in the study conducted in Ituri, people agreed with the statement that ‘Ebola did not exist (Gercama, 2019). and 72% were dissatisfied with or mistrustful of the EVD response (Claude, Underschultz, and Id, 2019). Denial of the EVD response actions was statistically significantly associated with indicators of social resistance (Claude, Underschultz, and Id, 2019). This is in line with the present study’s findings, thus, 14.9% and 6.2% respectively agreed and strongly agreed that there was not an ongoing EVD outbreak in Kampala while 11.3% and 7.7% respectively agreed and strongly agreed that the government was just looking for funds. Though the majority strongly disagree (47.2%) and disagree (29.2%) that refugees are not concerned with the EVD ongoing outbreak, no association was found with preventive measures practice. A study in Uganda revealed that conflict or discord between refugees and host communities could present a challenge to EVD preparedness and uptake of EVD messages (Mafigiri and Schmidt-sane, 2019). In DRC, a study revealed that proactively interacting with affected and high-risk communities such as refugees is key to providing timely and accurate information (Information and Assessment, 2019). This may encourage positive health behaviors by addressing public concerns and dispelling rumors. The present findings also reveal that having a friend or relative who has been suspected or diagnosed with the disease was associated with the practice of preventive measures ( $p < .05$ ), however a study conducted in Uganda revealed that although community members might be afraid of Ebola, they cannot easily change the way that they are behaving due to economic constraints (Mafigiri and Schmidt-sane, 2019). This is a very big challenge during outbreaks because in an area with people of a poor economic situation, such as refugees, they travel extensively, and interact closely with many people to win their daily bread.

#### 4.3. *Religious and traditional beliefs on EVD*

A significant number of respondents (47.2%) believe getting EVD was just bad luck. In a study conducted in Sierra Leone, some participants believed that the disease and rapid death inflicted on the country were the results of a curse from the gods or the spirits of deceased ancestors (Sous-prefecture et al., 2014). Though the present study doesn’t show any association between the belief and the practice of preventive measures. This may influence health-seeking behavior, including when it is appropriate to seek help from a traditional healer or spiritual leader rather than the formal health sector.

#### 4.4. *Health beliefs on EVD and trust between the communities and authority*

Almost an equal number of respondents were willing (37.9%), and not sure (36.9%) while slightly fewer (25.1%) were categorically against it. This also showed a statistical association between attitudes towards the vaccine and the practice of preventive measures ( $p < .05$ ). In a study conducted in Uganda, there were conspiracy theories that Ebola was an exaggeration to raise funds for medical personnel (Coltart *et al.*, 2017) or robbery and experimentation (Jalloh, 2019). Vaccination drive During the 2014 Boende outbreak in Tshuapa province (DRC), there were rumors that response workers were injecting indigenous groups with Ebola and ‘sucking’ people’s blood to sell it. The current findings revealed that 19.5% and 20.0% respectively disagreed and strongly disagreed that only vaccination can stop the spread of the current disease and the majority among those who are unsure or not willing to take did not trust it. This attitude may be triggered by the last vaccination campaigns during the Covid-19 pandemic. The present findings revealed that there was an equal percentage of respondents who strongly disagreed and those who agreed that a lockdown measure will not prevent the current EVD outbreak. However, a study conducted during the last Covid-19 pandemic in Uganda, suggested that it might be rather disparaging to view

refugees as deliberately non-compliant with preventive measures (Okot *et al.*, 2021) since a closer look at their situation reveals that social distancing and movement restrictions are rather irreconcilable with their living conditions and livelihood needs.

## 5. Lessons learned from the study

When all communities involved are concerned, outbreaks can be effectively controlled globally. Proactive engagement with high-risk communities, such as refugees, is critical for providing timely and accurate information in understandable formats and languages and thus encouraging positive health behaviors by addressing public concerns and dispelling rumors. Clearly, country-specific studies, or at best systematic reviews and meta-analyses of the issues considered in the study, need to be conducted to establish a true profile of factors associated with the practice of Ebola virus disease prevention measures among refugees.

## 6. Conclusion

This study reported that understanding Uganda, regular seeking of information, having enough water and sanitizer, being willing to take the vaccine, having a friend or relative who has ever been suspected of or diagnosed with EVD, and denial of its existence in Kampala impacted the adherence to preventive practices among refugees in Kampala.

## 7. Limitations of the study

A misinterpretation of questions might occur due to a language barrier and participants not responding truthfully for fear of political considerations and rumors surrounding the Ebola outbreak. And as a combined sample collection technique was used for the online part, respondents might also lack the data to open the online link. The writing, data collection, and publication processes were affected by limited resources such as funds and time. As a result, the sample size may be affected.

## 8. Recommendation

1. Training and the inclusion of refugees on the Ebola response team are needed for clear risk communication, social mobilization, and community engagement. For that, the UNHCR and the MoH should organize participatory social mobilization on EVD preventive measures practices (e.g., involving refugee local organizations and leaders) as a sustainable means of supporting improved uptake of messages and adherence.

2. Initiate public awareness activities on EVD in refugee communities (how it spreads, signs and symptoms, how the treatment is usually arranged, what the key risk factors are, etc.). For that, the UNHCR and the MoH, in collaboration with local refugee organizations and refugee leaders, should think of an information channel to minimize the spread of misinformation. Information should be made available in the languages of the different refugee populations.

3. Design refugee population-friendly mobilization practices targeting high-population areas such as refugee informal settlements. For that, the UNHCR and the MoH, in collaboration with local refugee organizations and refugee leaders, deploy mixed teams with host and refugee community members on the ground to give confidence to all refugees.

4. The government, in collaboration with the UNHCR, should facilitate refugee populations at high risk, especially those living in informal settlements, accessing, at an affordable cost, means of prevention such as water (e.g., public hand washing stations) and sanitizer.

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## 10. List of Abbreviations

CDC: Centers for Disease Control  
CFR: Case Fatality Rate  
ETU: Ebola Treatment Unit  
EVD: Ebola Virus Disease  
MoH: Ministry of Health  
PPDR: People for Peace and Defense of Rights  
RDC: Democratic Republic of Congo  
UNHCR: United Nations High Commissioner for Refugees  
WHO: World Health Organization  
YARID: Young African Refugees for Integral Development

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We declare no conflict of interests.

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