

Acceptance and Risk Perception of COVID-19 Vaccine in Uganda: A Cross Sectional Study in Western Uganda

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Abstract

Background: Many countries have drawn their attention on developing Corona virus disease 2019 vaccine however there is less emphasis on whether this vaccine could be accepted in most of these countries. This study aimed to investigate acceptance and risk perception of COVID-19 vaccine in Uganda.

Method: A simplified snowball sampling technique was used to select 1067 respondents of 18-70 years in western Uganda using an online questionnaire from July to September 2020. Vaccine acceptability and risk perception was assessed using odds ratio at 95% confidence interval using R software version 3.6.3.

Results: The acceptance rate for vaccination against COVID-19 was (53.6%; 572/1067) with participants in the reference age group 18-20 (OR: 1; 95%CI: NA); males (OR: 2.1; 95%CI: 1.56-2.71; $P=0.000$); tertiary level of education (OR: 2.8; 95%CI: 1.25-6.11; $P=0.009$); students (OR: 3.19; 95%CI: 1.98-5.15; $P=0.000$) and non-salary earners (OR: 2.29; 95%CI: 1.53-3.44; $P=0.000$) significantly more likely to accept the vaccine. Results also showed that (46.4%; 495/1067) of the respondents were un-likely to accept the vaccine. About (44.6%; 476/1067) of the respondents were likely to accept vaccine clinical trials with participants in the reference age group 18-20 (OR: 1; 95%CI: NA), students (OR: 2.37; 95%CI: 1.49-3.77; $P=0.000$), marrieds (OR: 1.3; 95%CI: 1.03-1.69; $P=0.028$), and non-salary (OR: 1.56; 95%CI: 1.05-2.30; $P=0.029$) significantly more likely to accept clinical trials. There were (46.7%; 500/1067) of the respondents who perceived the vaccine as being risky with males (OR: 3.13; 95%CI: 2.33-4.21; $P=0.000$); students (OR: 2.59; 95%CI: 1.63-4.13; $P=0.000$); Civil servants (OR: 1.49; 95%CI: 0.98-2.25; $P=0.063$); and non-salary earners; (OR: 2.34; 95%CI: 1.57-3.47; $P=0.000$) who significantly perceived the vaccine as being more risky.

Conclusion: The level of vaccine acceptance (53.6%) and risk perception (46.7%) was relatively average in western Uganda. In order to ensure successful vaccination process, the government needs to prioritize vaccine acceptance strategies especially among the risky group in the community.

Background

Many countries have drawn their attention on developing Corona virus disease 2019 (COVID-19) vaccine however there is less emphasis on whether this vaccine could be accepted in most of these countries. In Africa, COVID-19 outbreak continues to evolve many new numbers of infections and deaths. As of 7 July, there have been 493131 cases of COVID-19 and 11643 deaths reported from the African continent with a 25% increase in cases (2). Apparently, there are several clinical trials that have started in some parts of the world (3) but according to the African Academy of Sciences, only 2% of global clinical trials, for all types of vaccines take place in African (4). This is may be challenging because people of different ethnic backgrounds could react differently to the vaccine.

There is currently one clinical trial of a COVID-19 vaccine in sub-Saharan Africa taking place in South Africa, being run by the University of the Witwatersrand, in Johannesburg (4). Before the vaccine reaches to different parts of the African continent, it is paramount to establish vaccine acceptance in the region. This is because fear of vaccines has grown radically in the past years (5). In some communities, this fear has led to significantly increased rates of vaccine refusal which is associated with increases in illness and death from vaccine preventable diseases and imposing of large economic costs for health care to the society (5) (6). A widely accessible and acceptable vaccine is essential to mitigate the health and economic ravages of coronavirus disease 2019 (6). Scientist have previously argued out that the public must be helped to easily understand the huge influence that vaccines have on the health of the population and we must continue to improve our ability to keep terrible diseases in check through the use of this tool (7) (8). There is presently no COVID-19 vaccine in Uganda however the ministry of health Uganda is working hard to acquire the vaccine by the end of 2020. However, before COVID-19 vaccine is introduced, it is suitable that public health officials and policymakers prioritize effective COVID-19 vaccine-acceptance messages, especially those who are most vulnerable.

There are no studies that have been conducted about acceptance and risk perception of COVID-19 vaccine in Uganda. This study aimed at determining acceptability and risk perception of hypothetical COVID-19 vaccine in western Uganda. Our prospective hypothesis was that there will be a high vaccine acceptance and high risk perception of COVID-19 vaccine in western Uganda. The results from this study could help the government in identifying the risk population and develop better strategies for mass vaccination against COVID-19.

Methods And Materials

Study design

The present study was a cross sectional study based on the survey data that was collected. The study population consisted of participants aged between 18 to 70 years of age. This study occurred between 3rd July and 5th September 2020 with in western Uganda. We used a simplified snowball sampling technique where respondents were requested to pass the invitations through emails or WhatsApp contacts. We designed a questionnaire that was administered online through Google forms on <https://docs.google.com/forms/> due to limitations of person to person contact as a measure to minimize the virus spread. To ascertain quality, the questionnaire was pretested before the final draft was made (additional file 1). The final version contained demographic characteristics, and questions regarding to vaccine acceptance, willingness to participate in vaccine trials and risk perception of COVID-19 vaccine. Our inclusion criteria had adults above 18 years of age; those capable of using internet on a smart phone or computer; residents with in western Uganda and only those who gave consent to participate in the study. Further details of sample collection procedure are described by Harapan et al (9) (10)

Study variables

This study was based on the assumption that the vaccine would freely be availed and provided by the government of Uganda to its people.

The independent variables were the demographic characteristics that included; age, gender, education status, religion, occupation, marital status, monthly income, employment status, occupation and residence of the respondents.

The dependent variables were; vaccine acceptance; vaccine trial acceptance and risk perception of the vaccine. The response required for dependent variables was either "YES" or "NO"

1. Vaccine acceptance: the question asked was developed in line with Harapan *et al* (9) (11) however, it was modified to suit our study design. The question was "If the government of Uganda is to provide free COVID-19 vaccine, would you accept to be vaccinated?"
2. Vaccine trial acceptance: the questions asked here were developed according to Harapan *et al* (9) and it was modified to suit our study design. The questions were "Have you ever participated in any vaccine trial before?" "When approached, would you accept to participate in COVID-19 vaccine trial?"
3. Risk perception of the vaccine: The source of this question was according to Malik *et al* (11) and we redesigned it as follows "Even before COVID-19 vaccine is available, what is your risk perception about this vaccine?"

In order to minimize bias, we tried to remove unnecessary questions, broad questions like what do you think of covid-19 vaccine? We asked them simple, direct and balanced questions. We also kept the questionnaire short to at most 5 minutes completion. Long questionnaires irritate participants; and they begin giving random answers so as to complete the survey.

Sample size calculation

With a population size of 8,874,860 in western Uganda (24) a margin of error of 3%, confidence interval of 95% and a response distribution of 50% was assumed. The minimum recommended sample size calculated was 1067 individuals.

Statistical analysis

Data was cleaned and analyzed in R studio software version 3.6.3. Descriptive statistics (frequencies, percentage) were calculated for the sample demographic characteristics. Contingency tables were drawn and all responses concerning acceptance of COVID-19 vaccine; acceptance to participate in vaccine trials were compared against demographic characteristics. Odds Ratio, were calculated at 95% confidence interval with statistical significance when $P \leq 0.05$ using Fisher exact two tailed.

Results

Demographic characteristics of the respondents

There were 1067 participants from western Uganda. Majority were 31–40 years of age (32.6%, 348/1067) while male participants dominated the study (73.2%, 781/1067). Most of our respondents were of tertiary level of education (86.9%, 927/1067) and civil servants (39.1%, 417/1067). Majority of the respondents were Christians (88.5%, 944/1067), marrieds (634/1067; 59.4%) and those with a salary income of more than 2,000,000 Ugandan shillings (35.6%, 380/1067). There were also more respondents who lived in urban centers than rural areas (65.1%, 695/1067) as shown in Table 1, 2&3.

Respondents likely to accept COVID-19 Vaccine

Results show that the acceptance rate for vaccination against COVID-19 was (53.6%; 572/1067) as shown in Table 1. Participants in the reference age group 18-20 were more likely to accept the vaccine (OR: 1; 95%CI: NA). Male subjects were twice as likely to accept the vaccine (OR: 2.1; 95%CI: 1.56-2.71; $P=0.000$). Those who ended at tertiary level of education and students were more likely to accept the vaccine (OR: 2.8; 95%CI: 1.25-6.11; $P=0.009$) and (OR: 3.19; 95%CI: 1.98-5.15; $P=0.000$) respectively. Muslims and non-salary earners were more likely to accept the vaccine (OR: 1.05; 95%CI: 0.69-1.59; $P=0.834$); (OR: 2.29; 95%CI: 1.53-3.44; $P=0.000$) respectively.

Respondents who were un-likely to accept COVID-19 vaccine

Results show that (46.4%; 495/1067) were un-likely to accept the vaccine as shown in Table 1. Those aged 61-70 years were unlikely to accept the vaccine (OR: 0.17; 95%CI: 0.08-0.36; $P=0.000$). Participants who were unemployed and the pagans were unlikely to accept the vaccine (OR: 0.21; 95%CI: 0.06-0.75; $P=0.012$) and (OR: 0.24; 95%CI: 0.09-0.68; $P=0.004$) respectively. The unmarried and urban dwellers were also unlikely to accept the vaccine (OR: 0.73; 95%CI: 0.57-0.93; $P=0.012$), and (OR: 0.78; 95%CI: 0.61-1.01; $P=0.062$) respectively.

Table 1
Analysis of responses regarding acceptance of COVID-19 vaccine among different variables

VACCINE ACCEPTANCE										
N = 1067										
Demographics		NO	%	YES	%	TOTAL	%	OR	CI	P-VALUE
Age	18–20	17	18.9	73	81.1	90	8.4	1		
	21–30	182	62.8	108	37.2	290	27.2	0.14	0.08–0.24	0.000
	31–40	163	46.8	185	53.2	348	32.6	0.27	0.15–0.47	0.000
	41–50	72	43.1	95	56.9	167	15.7	0.31	0.17–0.57	0.000
	51–60	32	26.2	90	73.8	122	11.4	0.65	0.34–1.27	0.249
	61–70	29	58.0	21	42.0	50	4.7	0.17	0.08–0.36	0.000
	TOTAL	495	46.4	572	53.6	1067	100			
Gender	Female	170	59.4	116	40.6	286	26.8	1		
	Male	325	41.6	456	58.4	781	73.2	2.1	1.56–2.71	0.000
	TOTAL	495	46.4	572	53.6	1067	100			
Education	Primary	21	70.0	9	30.0	30	2.8	1		
	Secondary	50	45.5	60	54.5	110	10.3	2.8	1.18–6.66	0.022
	Tertiary	424	45.7	503	54.3	927	86.9	2.8	1.25–6.11	0.009
	TOTAL	495	46.4	572	53.6	1067	100			
Occupation	Business	66	54.1	56	45.9	122	11.4	1		
	Civil servant	187	44.8	230	55.2	417	39.1	1.45	0.97–2.17	0.079
	Private sector	163	54.0	139	46.0	302	28.3	1.00	0.66–1.53	1.000
	Retired	10	76.9	3	23.1	13	1.2	0.35	0.09–1.34	0.146
	Student	52	26.9	141	73.1	193	18.1	3.19	1.98–5.15	0.000
	Unemployed	17	85.0	3	15.0	20	1.9	0.21	0.06–0.75	0.012
	TOTAL	495	46.4	572	53.6	1067	100			
Religion	Christian	433	45.9	511	54.1	944	88.5	1		
	Muslim	45	44.6	56	55.4	101	9.5	1.05	0.69–1.59	0.834
	Pagans	17	77.3	5	22.7	22	2.1	0.24	0.09–0.68	0.004
	TOTAL	495	46.4	572	53.6	1067	100			
Marital status	Married	274	43.2	360	56.8	634	59.42	1		
	Not married	221	51.0	212	49.0	433	40.58	0.73	0.57–0.93	0.012
	TOTAL	495	46.4	572	53.6	1067	100			
Monthly income	1,000,000–2,000,000	132	53.0	117	47.0	249	23.34	1		
	< 1,000,000	111	41.9	154	58.1	265	24.84	1.56	1.10–2.22	0.013
	> 2,000,000	195	51.3	185	48.7	380	35.61	1.07	0.77–1.47	0.684
	No salary	57	32.9	116	67.1	173	16.21	2.29	1.53–3.44	0.000
	TOTAL	495	46.4	572	53.6	1067	100			
Residence	Rural	158	42.5	214	57.5	372	34.86	1		
	Urban	337	48.5	358	51.5	695	65.14	0.78	0.61–1.01	0.062
	TOTAL	495	46.4	572	53.6	1067	100			

There were (46.7%; 500/1067) of the respondents who perceived the vaccine as being risky as shown in Table 2. Participants in the age group 51-60 years perceived that the vaccine would be risky (OR: 1.26; 95%CI: 0.72-2.23; $P=0.471$). The male respondents were three times more likely to perceive the vaccine (OR: 3.13; 95%CI: 2.33-4.21; $P=0.000$). Those ended at tertiary level of education and the students considered the vaccine being more risky (OR: 1.46; 95%CI: 0.69-3.08; $P=0.356$) and (OR: 2.59; 95%CI: 1.63-4.13; $P=0.000$) respectively. Civil servants and Muslims perceived the vaccine as being risky (OR: 1.49; 95%CI: 0.98-2.25; $P=0.063$); (OR: 1.08; 95%CI: 0.72-1.64; $P=0.753$) respectively. It was also shown that those who were non-salary earners regarded the vaccine as being more risky (OR: 2.34; 95%CI: 1.57-3.47; $P=0.000$).

Table 2
Analysis of responses regarding risk perception of COVID-19 vaccine among different variables

		RISK PERCEPTION									
		N = 1067									
Demographics		NO	%	YES	%	TOTAL	%	OR	CI	P-VALUE	
Age	18-20	36	40.0	54	60.0	90	8.4	1			
	21-30	186	64.1	104	35.9	290	27.2	0.37	0.23-0.61	0.000	
	31-40	184	52.9	164	47.1	348	32.6	0.59	0.37-0.95	0.033	
	41-50	82	49.1	85	50.9	167	15.7	0.69	0.41-1.16	0.189	
	51-60	42	34.4	80	65.6	122	11.4	1.26	0.72-2.23	0.471	
	61-70	37	74.0	13	26.0	50	4.7	0.23	0.11-0.50	0.000	
Gender	TOTAL	567	53.1	500	46.9	1067	100				
	Female	208	72.7	78	27.3	286	26.8	1			
	Male	359	46.0	422	54.0	781	73.2	3.13	2.33-4.21	0.000	
Education	TOTAL	567	53.1	500	46.9	1067	100				
	Primary	18	60.0	12	40.0	30	2.8	1			
	Secondary	80	72.7	30	27.3	110	10.3	0.56	0.24-1.31	0.185	
	Tertiary	469	50.6	458	49.4	927	86.9	1.46	0.69-3.08	0.356	
Occupation	TOTAL	567	53.1	500	46.9	1067	100				
	Business	74	60.7	48	39.3	122	11.4	1			
	Civil servant	212	50.8	205	49.2	417	39.1	1.49	0.98-2.25	0.063	
	Private sector	183	60.6	119	39.4	302	28.3	1.00	0.65-1.54	1.000	
	Retired	10	76.9	3	23.1	13	1.2	0.46	0.12-1.77	0.369	
	Student	72	37.3	121	62.7	193	18.1	2.59	1.63-4.13	0.000	
	Unemployed	16	80.0	4	20.0	20	1.9	0.39	0.12-1.22	0.133	
	TOTAL	567	53.1	500	46.9	1067	100				
Religion	Christian	496	52.5	448	47.5	944	88.5	1			
	Muslim	51	50.5	50	49.5	101	9.5	1.08	0.72-1.64	0.753	
	Pagans	20	90.9	2	9.1	22	2.1	0.11	0.03-0.48	0.000	
	TOTAL	567	53.1	500	46.9	1067	100				
Marital status	Married	326	51.4	308	48.6	634	59.42	1			
	Not married	241	55.7	192	44.3	433	40.58	0.84	0.66-1.08	0.189	
Monthly income	TOTAL	567	53.1	500	46.9	1067	100				
	1,000,000-2,000,000	161	64.7	88	35.3	249	23.34	1			
	< 1,000,000	122	46.0	143	54.0	265	24.84	2.14	1.50-3.06	0.000	
	> 2,000,000	208	54.7	172	45.3	380	35.61	1.51	1.09-2.10	0.016	
	No salary	76	43.9	97	56.1	173	16.21	2.34	1.57-3.47	0.000	
Residence	TOTAL	567	53.1	500	46.9	1067	100				
	Rural	186	50.0	186	50.0	372	34.86	1			
	Urban	381	54.8	314	45.2	695	65.14	0.82	0.64-1.06	0.132	
	TOTAL	567	53.1	500	46.9	1067	100				

Respondents likely to accept COVID-19 Vaccine clinical trials

Our results showed that the acceptance level for COVID-19 vaccination trial was (44.6%; 476/1067) as shown in Table 3. Participants in the reference age group 18-20 were more likely to accept clinical trials (OR: 1; 95%CI: NA). Male subjects were 1.1 times likely to accept clinical trials as compared to females (OR: 1.1; 95%CI: 0.84-1.46; $P=0.445$). Students and civil servants were more likely to accept clinical trials as compared to the business group (OR: 2.37; 95%CI: 1.49-3.77; $P=0.000$) and (OR: 1.19; 95%CI: 0.79-1.80; $P=0.407$) respectively. Participants who were not married and those had no salary were more likely to accept clinical trials (OR: 1.3; 95%CI: 1.03-1.69; $P=0.028$) and (OR: 1.56; 95%CI: 1.05-2.30; $P=0.029$) respectively.

Respondents NOT likely to accept COVID-19 vaccine clinical trials

Results show that (55.4%; 591/1067) of the respondents were not likely to acceptance COVID-19 vaccine clinical trial as shown in Table 3. Participants in the reference age group 21-30 and 61-70 were less likely to accept clinical trials (OR: 0.47; 95%CI: 0.29-0.75; $P=0.002$) and (OR: 0.18; 95%CI: 0.08-0.41; $P=0.000$) respectively. Those in the retirement group and the unemployed were unlikely to participate in the clinical trials (OR: 0.46; 95%CI: 0.12-1.77; $P=0.369$) and (OR: 0.83; 95%CI: 0.31-2.23; $P=0.808$) respectively. Muslims and pagans were also more unlikely to participate in the clinical trials (OR: 0.59; 95%CI: 0.39-0.92; $P=0.020$) and (OR: 0.82; 95%CI: 0.34-1.92; $P=0.672$) respectively. Participants who lived in urban places were unlikely to participate in clinical trials (OR: 0.69; 95%CI: 0.53-0.89; $P=0.004$).

Table 3
Analysis of responses regarding clinical trial COVID-19 vaccine acceptance

VACCINE TRIAL ACCEPTANCE										
N = 1067										
Demographics		NO	%	YES	%	TOTAL	%	OR	CI	P-VALUE
Age	18–20	38	42.2	52	57.8	90	8.4	1		
	21–30	177	61.0	113	39.0	290	27.2	0.47	0.29–0.75	0.002
	31–40	181	52.0	167	48.0	348	32.6	0.67	0.42–1.08	0.123
	41–50	84	50.3	83	49.7	167	15.7	0.72	0.43–1.21	0.239
	51–60	71	58.2	51	41.8	122	11.4	0.52	0.30–0.91	0.026
	61–70	40	80.0	10	20.0	50	4.7	0.18	0.08–0.41	0.000
	TOTAL	591	55.4	476	44.6	1067	100			
Gender	Female	164	57.3	122	42.7	286	26.8	1		
	Male	427	54.7	354	45.3	781	73.2	1.1	0.84–1.46	0.445
	TOTAL	591	55.4	476	44.6	1067	100			
Education	Primary	15	50.0	15	50.0	30	2.8	1		
	Secondary	61	55.5	49	44.5	110	10.3	0.80	0.36–1.80	0.681
	Tertiary	515	55.6	412	44.4	927	86.9	0.80	0.39–1.65	0.552
	TOTAL	591	55.4	476	44.6	1067	100			
Occupation	Business	74	60.7	48	39.3	122	11.4	1		
	Civil servant	235	56.4	182	43.6	417	39.1	1.19	0.79–1.80	0.407
	Private sector	183	60.6	119	39.4	302	28.3	1.00	0.65–1.54	1.000
	Retired	10	76.9	3	23.1	13	1.2	0.46	0.12–1.77	0.369
	Student	76	39.4	117	60.6	193	18.1	2.37	1.49–3.77	0.000
	Unemployed	13	65.0	7	35.0	20	1.9	0.83	0.31–2.23	0.808
	TOTAL	591	55.4	476	44.6	1067	100			
Religion	Christian	511	54.1	433	45.9	944	88.5	1		
	Muslim	67	66.3	34	33.7	101	9.5	0.59	0.39–0.92	0.020
	Pagans	13	59.1	9	40.9	22	2.1	0.82	0.34–1.92	0.672
	TOTAL	591	55.4	476	44.6	1067	100			
Marital status	Married	369	58.2	265	41.8	634	59.4	1		
	Not married	222	51.3	211	48.7	433	40.6	1.3	1.03–1.69	0.028
	TOTAL	591	55.4	476	44.6	1067	100.0			
Monthly income	1,000,000–2,000,000	134	53.8	115	46.2	249	23.3	1		
	< 1,000,000	153	57.7	112	42.3	265	24.8	0.85	0.60–1.21	0.376
	> 2,000,000	230	60.5	150	39.5	380	35.6	0.75	0.55–1.04	0.099
	No salary	74	42.8	99	57.2	173	16.2	1.56	1.05–2.30	0.029
	TOTAL	591	55.4	476	44.6	1067	100			
Residence	Rural	184	49.5	188	50.5	372	34.9	1		
	Urban	407	58.6	288	41.4	695	65.1	0.69	0.53–0.89	0.004
	TOTAL	591	55.4	476	44.6	1067	100			

Discussion

With the assumption that COVID-19 vaccine would freely be provided by the government, the level of vaccine acceptance (53.6%); risk perception (46%) and acceptance of clinical trials (44.6%) is relatively average. According to the East African Consortium for Clinical Research (25), the Uganda Virus Research

Institute (UVRI) is partnering with Imperial College London to start the first Covid-19 vaccine trial in the country by December, 2020. However, the success or failures of vaccine trials are community driven (12). In order to avoid anti-vaccination campaigns like in the early 1996 and 1997, where the oral polio vaccine was criticized by the public that the oral poliovirus vaccine was contaminated with HIV and ineffective, the government needs proper mobilization and community engagement (13) (26). In 2019, the Congo's Ebola vaccine hesitancy was geared by community mistrust due to social and cultural factors that arose during the West Africa Ebola outbreak, even though these communities seriously needed the Ebola vaccine (14). Studies have shown that vaccine refusal is associated with increases in illness and death from vaccine preventable diseases which is also secondary to large economic costs for health care (6). Our study shows that 46.4% (Table 1,2&3) are not willing to take the vaccine however despite the very high benefit-to-risk ratio of vaccines, the fear of negative side effects can discourage many people from getting vaccinated from killer diseases (15).

In general comparison of vaccine acceptance levels in our findings (Table 1), there were higher acceptance levels of hypothetical COVID-19 vaccine in countries such as China (91.3% (16); Indonesia (93.3%) (9) and USA (69%) (17). We attribute these differences to low levels of global vaccine clinical trials in African (4), inadequate research facilities and limited funding needed in development of vaccines (18). Financial and knowledge constraints in most African countries, have caused highest mortality rates by infectious diseases (19). However, low vaccine acceptance in Uganda could be attributed to fear or potential risks that can be encountered especially where a vaccine has not been well evaluated. A similar study in sub-Saharan Africa showed an overall positive acceptance towards the new malaria vaccine however there were challenges of inadequate community engagement due to lack of information about the vaccine and fear of the vaccine side effects (20).

Africa has a high population and a growing economy (21), which would be an advantage for increasing potential market for vaccines however there is a lot of political prejudice and policy setting influence which may be a factor hindering good health service delivery to the people (18). It is popular that in most African countries political leaders often misuse government resources meant for health service procurements (22).

According to our results, it shows that 46.9% of the respondents had fear for the vaccine. Previous study on HIV vaccine trial in Uganda showed that before researchers start any trials of HIV vaccines, they need to gain support from politicians, the media, and the general public. Generally, all stakeholders must be involved in discussions about important scientific, social, legal, ethical, and other concerns before the study begins (23). We believe that this approach could help mitigate fears about COVID-19 vaccination and clinical trials in the community.

Among the most risky group were the males respondents, students, low income earners (< 1,000, 000) and those with no salary income who perceived the vaccine as being risky. When carrying out community sensitization, efforts have to be made by the government to ensure that this group of people is followed closely.

Therefore the government of Uganda through its Scientists, policymakers, and public health experts must start involving communities now as discussions and plans progress toward finding a vaccine not after the scientific breakthrough but before. There is need to sensitize the population against their fears early enough before the trials can progress. The government can establish messages and trainings for its people especially the risky group regarding vaccination against COVID-19. This can be done through radios, televisions, newspapers, seminars and phone messages.

Conclusion

The level of vaccine acceptance (53.6%) and risk perception (46.7%) was relatively average in western Uganda. Most risky groups unlikely to receive the vaccine included those aged 61–70, unemployed; pagans; unmarried and urban dwellers. Additionally, male participants; students; civil servants and non-salary earners; regarded the vaccine as being more risky. If this group is not attended to, it may lead to increased COVID-19 infections; deaths which can propagate to economic down fall of the country. In order to ensure successful vaccination process, the government needs to prioritize vaccine acceptance strategies especially among the risky group in the community.

Study Limitations

With this study being purely an online based survey, it was not possible to know if the responses were really genuine. The study being online based could also have omitted those without phones, computer and internet. We could have left out more vulnerable persons or persons who could have preferred vaccination hence the low level of acceptance obtained.

Abbreviations

?: Percentage

CI: Confidence interval

COVID-19: Corona virus disease 2019

HIV: Human Immune Virus

OR: Odds ratio

P-Value: Probability value

UVRI: Uganda Virus Research Institute

Declarations

Ethical approval and consent to participate

The study protocol was approved by the research and ethic committee of Kampala International University, western campus, Uganda. Written informed consent was obtained from all participants in an ethical statement in the questionnaire prior to answering preceding questions.

Consent to publish

Participants gave consent regarding to publication of this report.

Availability of data and materials

Data used is accessible on fig share through the link: <https://figshare.com/s/46d3ef8e7c4553f3c4e6>

Competing interests

All authors have no competing interests to declare.

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Authors' contribution

IE designed the first draft of the study. IE, PDA and EMB carried out data collection while IE and PDA analyzed the data and wrote the manuscript. IE, PDA and EMB critically reviewed the manuscript to its final stage.

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