

COVID-19 VACCINE ACCEPTANCE AMONG STUDENTS AT THE COLLEGE OF MEDICINE AND ALLIED HEALTH SCIENCES, UNIVERSITY OF SIERRA LEONE.

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ABSTRACT

Background: The COVID-19 pandemic has emphasized the need for an effective vaccine to combat the spread of the virus. However, less attention has been paid to vaccine hesitancy and acceptance, particularly among healthcare students in Africa. The study aimed to assess vaccine hesitancy and acceptance among clinical year students of a novel COVID-19 vaccine in Sierra Leone.

Methods: We conducted a cross-sectional online survey among 250 healthcare students at the University of Sierra Leone. Descriptive statistics and chi-square test were applied to analyse data.

Results: Our findings showed that 46 (18.4%) of the medical students and 6(2.4%) of pharmacy students doubted the COVID-19 vaccine's safety. 34(13.6%) of medical students questioned the effectiveness of the vaccine, while 25 (10%) of medical students, 53 (21.2%) of nursing students, and 4 (1.6%) of pharmacy students feared the side effects that were still unknown. 28 (11.2%) of the medical students, 7 (2.8%) of nursing students, and 21 (8.4%) of pharmacy students feared that some types of vaccine would have adverse effects on their health.

Discussion: The study found that a significant proportion of medical and pharmacy students expressed doubts about the safety, effectiveness, and side effects of the vaccine. A small proportion of the students also feared adverse effects of certain types of vaccines on their health. These findings suggest that there is a need for targeted education and communication campaigns to address the reasons for vaccine hesitancy among healthcare students.

Keywords: Vaccine Hesitancy, COVID-19, Medical Students, Sierra Leone

INTRODUCTION

The COVID-19 pandemic has resulted in significant morbidity and mortality worldwide, prompting the development and deployment of vaccines to curb its spread. However, vaccine hesitancy remains a significant barrier to achieving herd immunity and ending the pandemic. The COVID-19 pandemic presents a global challenge, and the World Health Organization (WHO) has initiated a worldwide campaign to prevent and manage the disease. Immunization is a successful public health intervention and has been vital in controlling many infectious diseases (Zhour et al., 2019). However, vaccine hesitancy poses a significant obstacle to achieving coverage and community immunity.

The WHO defines vaccine hesitancy as a delay in accepting or refusing vaccination despite its availability (Schmid *et al.*, 2017). Vaccine hesitancy and misinformation is a growing concern globally, creating significant obstacles in achieving coverage and herd immunity (Zhour et al., 2019). The WHO considers vaccine hesitancy a significant threat to global health. A recent global report on COVID-19 vaccine acceptance found that nearly 30% of the participants investigated would refuse or hesitate to take a COVID-19 vaccine when it becomes available (Sallam et al., 2021).

Many factors contribute to vaccine hesitancy, including doubts about safety and efficacy, misinformation, and a lack of trust. Despite vaccine availability, vaccine compliance remains inconsistent, making public education campaigns on vaccine safety and efficacy essential. Healthcare students are an influential group in the healthcare system, and their acceptance of the COVID-19 vaccine is a matter of concern. Limited research has addressed vaccine hesitancy and acceptance among healthcare students, making this study necessary.

As healthcare students play a crucial role in the dissemination of health information and the

promotion of public health practices, it is essential to understand their attitudes towards COVID-19 vaccination. Despite the increasing demand for healthcare students' involvement in vaccination campaigns, limited research has investigated their vaccine acceptance and hesitancy rates, particularly concerning the COVID-19 vaccine. Moreover, as the COVID-19 vaccine continues to be administered worldwide, understanding the factors that influence vaccine acceptance among healthcare students is crucial for improving vaccine uptake rates and achieving herd immunity. Thus, this study aims to assess COVID-19 vaccine hesitancy among healthcare students at the College of Medicine and Allied Health Sciences, University of Sierra Leone (COMAHS, USL).

MATERIALS AND METHODS

Study design

This study was a cross-sectional online survey conducted at COMAHS, USL from June 1-30, 2021. The targeted sample size was 250 respondents, and the survey received a total of 250 responses. Healthcare students in their clinical year of study who had access to smart phones and the internet were invited to participate, provided they gave their consent to do so. The survey was administered through the Google online survey platform, with data protection and management procedures in place.

Participants' responses were kept anonymous, and personally identifiable information was not collected. The data collected were analysed using simple statistical methods and SPSS software version 25.0 for windows. The chi-square test was used to evaluate the relationship between the decision to be vaccinated with the COVID-19 vaccine and some characteristics of the clinical year students. Results were presented using appropriate tables, frequencies, and charts. A significance level of $P < 0.05$ was accepted.

Results

This study presents an online survey on COVID-19 vaccine hesitancy among clinical year students at COMAHS, USL. The sampled population age was within the 18-to-45-year age range with a mean age of 28 years. The majority of participants were in the age group 25-34 years (64%) (Table 1).

Table 1: Socio-demographic characteristics

Socio-demographic characteristics		Frequency (N= 250)	Percentage (%)
Age (years)	19-24	64	25.6
	25-34	160	64.0
	35-44	20	8.0
	45+	6	2.4
Gender	Female	123	49.2
	Male	127	50.8
Course of study	Medicine	141	56.4
	Nursing	69	27.6
	Pharmacy	40	16.0
Year or Level	3rd year	36	14.4
	Fifth-year	76	30.4
	Final year	48	19.2
	Fourth-year	90	36.0
Social and Economic Statu	High	10	4.0
	Low	24	9.6
	Middle	154	61.6
	Rather not disclose	62	24.8

A total of 250 students participated in the survey, with a mean age of 28 years. The majority of participants were in the age group 25-34 years (64%). The gender distribution was almost equal, with 123 (49.2%) females and 127 (50.8%) males (Table 1). Medicine was the most common course of study (56.4%), followed by nursing (27.6%) and pharmacy (16%). Most participants (61.6%) belonged to the middle-income class, and the majority rated their health status as good (59.2%) (Table 1).

In regards of knowledge of COVID-19, most participants (52.4%) had good knowledge of the disease (Table 2). The majority of participants (93.2%) had never been diagnosed with COVID-19 at the time of the study, and 68.4% had not had a close friend or family member infected with the disease (Table 2).

Table 2: Survey responses among COVID-19 vaccine acceptance and hesitant groups.

Vaccine Acceptance	Response	Freq	Percentage	
How do you assess your health condition in general?	Bad	11	4.4	
	Fair	44	17.6	
	Good	148	59.2	
	Very Bad	4	1.6	
	Very Good	43	17.2	
How would you rate the level of your knowledge about Covid19?	Bad	7	2.8	
	Fair	65	26.0	
	Good	131	52.4	
	Very Bad	5	2.0	
Very Good		42	16.8	
	Have you been diagnosed with Covid19 before?	I have no idea	7	2.8
		No, I have not been diagnosed before.	233	93.2
		No, I have not been diagnosed before., I have no idea	1	.4
Yes, a confirmed laboratory case.		4	1.6	
Yes, but the infection is not confirmed.		5	2.0	
Has someone in your close circle (such as a family Member or close friends) been infected with the Covid-19 before?	I have no idea	16	6.4	
	No, they have not had covid19.	171	68.4	
	Yes, a confirmed laboratory case.	50	20.0	
	Yes, but the infection is not confirmed.	13	5.2	
How would you rate your risk of exposure to Covid19?	1	16	6.4	
	2	10	4.0	
	3	11	4.4	
	4	15	6.0	
	5	54	21.6	
	6	33	13.2	
	7	30	12.0	
	8	32	12.8	
	9	12	4.8	
	10	37	14.8	

Frequency (N =250) Percentage (100%)

Table 3: Cont... Survey responses among COVID-19 vaccine acceptance and hesitant groups

Responses	Medicine		Nursing		Pharmacy		Total		pValue
	N	%	N	%	N	%	N	%	
Do you intend to take the Covid19 vaccine?									
No, never.	28	11.2	17	6.8	4	1.6	49	19.6	0.004
Yes, as soon as possible.	43	17.2	29	11.6	14	5.6	86	34.4	
Yes, but after postponing	70	28	23	9.2	22	8.8	115	46	

ng it until all is clear.										
If you agree to take the vaccine; What are your motivations?										
Fear of getting infected	105	42	3	1.2	8	3.2	116	46.4	0.001	
Belief in its safety and effectiveness.	1	0.4	55	22	2	0.8	58	23.2		
Fear for family members especially those who are susceptible	1	0.4	7	2.8	24	9.6	32	12.8		
Free vaccination and availability	7	2.8	3	1.2	6	2.4	16	6.4		
Contributing to the scientific knowledge	3	1.2	0	0	0	0	3	1.2		
If there is no other option/ its effectiveness has increased.	6	2.4	0	0	0	0	6	2.4		
If compelled	4	1.6	0	0	0	0	4	1.6		
None of these options apply; not convinced of its effectiveness.	7	2.8	0	0	0	0	7	2.8		
Mandatory for travellers	4	1.6	0	0	0	0	4	1.6		
Others	3	1.2	1	0.4	0	0	4	1.6		
If you refuse, what are your reasons for refusing to take the vaccine?										
I doubt its safety	46	18.4	0	0	6	2.4	52	20.8		
I doubt its effectiveness	34	13.6	0	0	0	0	34	13.6		
Fear of unknown side effects	25	10	53	21.2	4	1.6	82	32.8		
Insufficient information on	2	0.8	8	3.2	9	3.6	19	7.6	< 0.001	

various vaccines									
None	2	0.8	0	0	0	0	2	0.8	
Fear that some types will have an adverse effect on my health	28	11.2	7	2.8	21	8.4	56	22.4	
Others	4	1.6	1	0.4	0	0	5	2	
None	2	0.8	0	0	0	0	2	0.8	
Fear that some types will have an adverse effect on my health	28	11.2	7	2.8	21	8.4	56	22.4	
Others	4	1.6	1	0.4	0	0	5	2	

Regarding vaccine hesitancy, 56.4% of participants had intention to take the vaccine, but only after postponing it until all is clear (Table 3). Fear of getting infected was the primary motivation for 42% of medical students who agreed to take the vaccine, while belief in its safety and effectiveness was the primary motivation for 22% of nursing students (Table 3).

Table 4: Cont... Survey responses among COVID-19 vaccine acceptance and hesitant groups.

Response	Medicine		Nursing		Pharmacy		Total		P-value
	N	%	N	%	N	%	N	%	
Do you think there is enough information on the safety of vaccines against covid19?									
I don't think so, but it's exceptional, considering the nature of the virus.	0	0	0	0	1	0.4	1	0.4	0.003
No	131	52	52	21	33	13	216	86	
Not really	1	0.4	0	0	0	0	1	0.4	

Yes	9	3.6	17	6.8	6	2.4	32	13	
Which type of the following vaccines do you prefer if you are to be vaccinated?									
Chinese - Sinopharm	3	1.2	3	1.2	4	1.6	10	4	0.012
Chinese - Sinovac	8	3.2	5	2	1	0.4	14	5.6	
Moderna	0	0	0	0	2	0.8	2	0.8	
No knowledge between the different types	38	15	29	12	7	2.8	74	30	
None	0	0	0	0	1	0.4	1	0.4	
Oxford - AstraZeneca	51	20	23	9.2	14	5.6	88	35	
Pfizer	40	16	4	1.6	11	4.4	55	22	
Russian - Sputnik V	0	0	5	2	0	0	5	2	
Sinopharm	1	0.4	0	0	0	0	1	0.4	
Do you think that the Covid19 vaccine should be made Mandatory for everybody?									
Maybe	20	8	20	8	3	1.2	43	17	0.002
No	111	44	30	12	32	13	173	69	
Yes	10	4	19	7.6	5	2	34	14	
Do you think that all Healthcare workers should be vaccinated?									
Maybe	31	12	19	7.6	2	0.8	52	21	0.007
No	45	18	12	4.8	18	7.2	75	30	
Yes	65	26	38	15	20	8	123	49	

When participants were asked if they think there was enough information on the safety of vaccines against COVID-19:131(52.4%) of the medical students responded no, 52(20.8%) of nursing students responded no. Also, 33(13.2%) of the pharmacy students responded no, 9(3.6%) of the medical students responded yes, 17(6.8%) of nursing students responded yes and 6(2.4%) of pharmacy students also responded yes, based on the Pearson correlation test, significant correlations were found between the course of

study and inadequate information on the safety of COVID-19 vaccines among students (p = 0.003)

Table 5: Survey responses among COVID-19 vaccine acceptance and hesitant among medical students

Response	Year or Level								Total		P-value
	3 rd year		5 th year		6 th year		4 th year				
	N	%	N	%	N	%	N	%	N	%	
Do you intend to take the Covid19 vaccine?											
No, never.	10	40	15	6	9	3.6	5	6	49	20	0.184
Yes, as soon as possible.	16	6	29	12	12	4.8	29	12	86	34	
Yes, but after postponing it until all is clear.	10	4	32	13	27	11	46	18	115	46	
If you refuse, what are your reasons for refusing to take the vaccine?											
No sufficient information on the various vaccines	1	0	7	2.8	0	0	11	4.4	19	7.6	0.184
None	0	0	0	0	2	0.8	0	0	2	0.8	
Fear that some types of vaccine will have an adverse effect on my health	0	0	32	13	3	1.2	21	8.4	56	22	
Others	2	1	0	0	1	0.4	2	0.8	5	2	

DISCUSSION

The findings of this study indicate that a significant proportion of clinical year students at COMAHS, USL were hesitant to take the COVID-19 vaccine. Similar findings were found in a previous large-scale survey conducted in

October 2020 that included 18,526 adults across 15 countries; 73% strongly agreed or agreed that they would be vaccinated if a vaccine COVID 19 were available. However, of those, less than a quarter agreed that they would be vaccinated 'immediately' after the vaccine is available, while some others chose that they would wait for a year and even longer period.

This hesitancy may be due to concerns about the safety and effectiveness of the vaccine, as well as a lack of trust in the vaccine development process. Consistently across groups of medical students of different level in their clinical years, many doubted the efficacy and safety of the vaccines, and fear that some types of vaccine will have an adverse effect on their health. Reasons for COVID-19 vaccine hesitancy among medical students, 8(3.2%) of 5th-year medical students, 30(12%) of 6th-year medical students, and 14(5.6%) of 4th-year medical students doubted the safety of the vaccine. 11(4.4%) of 5th-year medical students, 5(2%) of 6th-year medical students, 18(7.2%) of 4th-year medical students doubted the effectiveness of the vaccine. 7(2.8%) of 5th-year medical students and 11(4.4%) of 4th-year medical students responded, no sufficient information on the various vaccines. 32(12.8%) of 5th-year medical students, 3(1.2%) of 6th-year medical students, and 21(8.4%) of 4th-year medical students responded to fear that some types of vaccine will have an adverse effect on their health.

With regards to participants assessing their health condition in general, 148(59.2%) responded good, 44(17.6%) fair, 43(17.2%) very good, and 11(4.4%) bad, 131(52.4%) had good knowledge about COVID-19, 65(26%) fair,

42(16.8%) very good of knowledge about COVID-19, 7(2.8%) bad of knowledge about COVID-19.

Most participants 233 (93.2%) responded no they had not been diagnosed with COVID-19 before, 7 (2.8%) they had no idea, 4 (1.6%) yes, through a confirmed laboratory case, 5(2%) yes, but the infection was not confirmed. 171(68.4%) participants responded no, none of their close circle (such as a family member or close friends) have been infected with the COVID-19 before, 50 (20%) responded yes through a confirmed laboratory case, 16 (6.4%) responded they had no idea, 13 (5.2%) responded yes, but the infection was not confirmed.

STRENGTHS AND LIMITATIONS

This study is the first to investigate COVID-19 vaccine acceptance and hesitancy among students at across different jurisdictions at COMAHS, USL. However, some limitations should be acknowledged. First, the survey was conducted online, making it inaccessible to those without internet access. Second, the study only reflects the perspectives of students at one institution, so the findings cannot be generalized to a national level. Response bias is also a potential issue due to the self-reported nature of the survey. Lastly, the study does not aim to establish causal inferences, but rather to provide a snapshot of prevalent attitudes and perspectives at the time of the study.

CONCLUSION

In conclusion, this study highlights the prevalence of vaccine hesitancy among healthcare students in Sierra Leone towards the COVID-19 vaccine. The findings indicate that concerns about the safety, effectiveness, and side effects of the vaccine, as well as a lack of trust in the vaccine development process, may be contributing to vaccine hesitancy. The study underscores the need for targeted education and

communication campaigns to address the reasons for vaccine hesitancy among healthcare students. Ensuring that students have access to accurate information about the vaccine's safety and efficacy is crucial in combating vaccine hesitancy and promoting vaccine acceptance. Ultimately, increasing vaccine uptake among healthcare students can help build confidence in the vaccine among the wider population and contribute to controlling the spread of COVID-19.

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