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Factors Associated with Covid-19 Vaccine Hesitancy Among Health Workers in The University of Port Harcourt Teaching Hospital Rivers State, Nigeria

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Introduction

Coronavirus disease 2019 (COVID-19), is a disease of public health importance. Coronaviruses (COVs) are a group of viruses that can infect both humans and animals, resulting in respiratory and gastrointestinal problems. These RNA viruses are single-stranded, enclosed, and belong to the Orthocoronavirinae subfamily of the Coronaviridae family [1]. There are four different coronavirus genera: Alpha coronavirus, Beta coronavirus, Delta coronavirus, and Gamma coronavirus [2]. Alpha coronaviruses and beta coronaviruses infect mammals, whereas gamma coronaviruses affect birds and delta coronaviruses infect both mammals and birds [2].

Coronavirus disease 2019 (COVID-19) is caused by the Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2),3 The World Health Organization (WHO) declared the outbreak a Public Health Emergency of International Concern (PHEIC) on January 30, 2020, following the Emergency Committee's recommendations.

In the first week of January 2021, there were more than 89 million verified COVID-19 illnesses around the world and an anticipated 2 million COVID-19 cases confirmed deaths [4]. The index case in Nigeria was reported on the 28th of February, 2020, [5] and in Rivers State on the 26th March, 2020 [6].

The deliberate practice of immunizing people against disease blossomed into mass vaccination campaigns in the 20th century, which had a significant impact on population expansion and mortality reduction [7]. Vaccination has helped to control many diseases; its invention marks a turning point in the battle between humans and germs because it is the most cost-effective life-saving invention ever developed [8]. An increase in immunization coverage globally will stop 2-4 million deaths annually [9].

The SARS-Cov-2 coronavirus' genomic sequence was made available to the general public on January 11, 2020. This sparked an upsurge in global research and development efforts to create a COVID-19 vaccine. Despite the favorable impact of the COVID-19 vaccine roll-out on the reduction of disease, some people and organizations still refused immunization [10]. Several vaccines are currently available and approved for use by the general public. These includes the Oxford/AstraZeneca viral vector vaccine, the Pfizer/BioNTech mRNA vaccine, the Moderna RNA vaccine, the Janssen/Johnson and Johnson viral vector vaccine, the Sinopharm and Sinovac inactivated viral vaccines, the Gamaleya viral vector vaccine, the Bharat Biotech inactivated viral vaccine (Covaxin), and the Novavax Protein subunit vaccine, [11] but their acceptance is low.

Vaccine acceptance can be defined as an individual or group's decision to accept or refuse when presented with an opportunity to vaccinate [12]. Acceptance can take the form of either an active response (adherence by an informed public who understands the importance of the need for a vaccine) or a passive response (recognition). A study has indicated that if acceptance rates are lower than 60%, managing and containing the COVID-19 pandemic may present significant difficulties [13].

Vaccine hesitancy is defined as ‘the reluctance or refusal to vaccinate despite the availability of vaccines – it threatens to reverse progress made in tackling vaccine-preventable diseases’ [9]. Vaccine hesitancy can be predisposed by factors like complacency, convenience, and confidence. It is complex and context-specific and varies across vaccines, place, and time [14]. According to Dube, the behavior of vaccine reluctance may be impacted by information or prior experiences [15]. Additionally, it might result from more extensive factors, therefore it should always be considered in light of the historical, political, and sociocultural context of vaccination.

Individual characteristics and sociodemographic factors like sex, age, education, occupation, religion, income, having children at home, and others may be linked to vaccine hesitancy [10]. According to a study, the rate of COVID-19 vaccine refusal is higher among those with little to no education or only a basic education, women, those who lost their jobs during the pandemic and have no income [4].

The World Health Organization (WHO) defined health workers to be “all people engaged in actions whose primary intent is to enhance health’’. This comprises doctors, nurses, midwives, paramedical staff, hospital administrators, support staff, and community workers; together this diverse group makes up the global health workforce [16]. Close contact between healthcare personnel and infected patients and co-workers during the pandemic increased the probability of COVID-19 transmission, putting them at a higher risk globally [17]. It is vital to consider the determinants of vaccine hesitancy among healthcare workers, who are crucial to the operation of most health systems, to address barriers to general vaccination acceptance more effectively.

Vaccines have proven essential in previous global disease outbreaks, such as the 2009–2010 H1N1 swine flu outbreak. Vaccination dramatically lowers disease, disability, mortality, inequity on a global scale. The ability of the immune system to resist SAR-CoV 2 is boosted by the COVID-19 vaccine [18]. High uptake rates are necessary for vaccination programs to reduce the prevalence and incidence of diseases that are preventable by vaccines (VPD) [15].

However, a substantial proportion of the population would need to be vaccinated to safely achieve herd immunity against COVID-19. Only 9.5% of people in low-income countries have received at least one dose of a COVID-19 vaccination, although 59.4% of the world's population has received at least one dose, over 9.53 billion doses have been administered globally, and approximately 35.06 million doses are currently administered each day [19,20].

Vaccine reluctance and refusal have all been linked to outbreaks of invasive Haemophilus influenzae type b disease, varicella, pneumococcal disease, measles, and pertussis [21]. The average rate of vaccination hesitancy was 21% globally in April 2020, rose to 36% in July 2020, and then fell to 16% in October 2020. High levels for COVID-19 vaccine hesitancy and wide variations in vaccination acceptance may have an impact on efforts to eradicate COVID-19 [22].

A major barrier to obtaining coverage and community immunity is vaccine hesitancy, which was named one of the top major global health challenges in 2019 [23,24]. The problems it raises are multifaceted, complicated, and context-dependent, necessitating simultaneous attention at the global, national, and sub-national levels. For instance, a recent study found a substantial correlation between trust, particularly trust in the government, and the successful uptake of the COVID-19 vaccine [25]. However, distrust is just one of several elements that could be to blame for COVID-19 vaccination resistance.

Given that healthcare workers (HCWs) are frequently seen as the most reliable source of information regarding vaccinations for their patients, a high rate of vaccine hesitancy among HCWs could pose a challenge to vaccine uptake [26]. Additionally, it may result in less-than-ideal vaccination rates, which was required to quickly acquire herd immunity in this pandemic. A lack of awareness about possible side effects, concerns about the vaccine's safety in clinical settings, and uncertainty about its capacity to protect against COVID-19 are the top three reasons given by those who are unsure if they will receive the vaccination in this region [27]. Thus, the study aimed to determine the prevalence of COVID-19 vaccine hesitancy and its associated factors among health workers at the University of Port Harcourt Teaching Hospital Rivers State Nigeria.

Methodology

Study area

The study was conducted at the University of Port Harcourt Teaching Hospital (UPTH), an 800-bed tertiary health facility which is situated in Rivers State, Nigeria.

Study design

The study was a descriptive cross-sectional study.

Study population

The population consist of health workers such as nurses, doctors, physiotherapists, dieticians, medical laboratory scientists and technicians, optometrists, and pharmacists at the University of Port Harcourt Teaching Hospital Rivers State Nigeria. Health workers at the hospital who are directly involved in the provision of care, who have worked for more than six months and agreed to participate in the study were included in the study. Those who were on leave were excluded.

Sample size determination

The minimum sample size was determined using the Fischer formula [28] for cross-sectional studies. The prevalence of vaccine hesitancy in a previous study [29] 35.4%, was used and adjusted for a 10% non-response rate, to get a total sample size of 391.

Sampling method

Health care workers were stratified in to the various professional groups e.g Doctors, Nurses, Pharmacists, etc. thereafter a proportion to size allocation was used to select the required number of respondents from each professional group, using the formula nh = (Nh / N) * n where nh= sample size for hth stratum, N= size of the entire population and n= size of the entire sample. The participants were selected from a list of the various professional groups via a simple random sampling using a table of random numbers generated from the Google random calculator application.

Study Instrument

It was a pre-tested structured self-administered questionnaire adapted and developed from existing tools that have been used in similar studies [30]. The study tool was a 42-item questionnaire divided into 5 sections. Section A describes the socio-demographic profile of the participant, Section B measures COVID-19 hesitancy using a 15-item COVID-19 scale. Section C measures knowledge of the COVID-19 vaccine, Section D describes attitudes to COVID-19 vaccination, while Section E deals with concerns about COVID-19 vaccines.

Data Management

Data entry plan

Data were collected and entered in the Microsoft Excel Sheet (2016 version) on windows 10. Data obtained was computed, sorted, and cleaned using a Microsoft Excel sheet (2016 version) on windows 10 and analysed using IBM SPSS version 25.

Categorical data were presented in the form of frequencies and percentages (%) and continuous data in means and standard deviation (SD) with results presented in tables. The level of vaccine hesitancy was determined by computing a percentage score for the vaccine hesitancy questions, the percentage score when then grouped into low hesitancy (0-49%), high hesitancy (50-100%). In measuring the overall level of knowledge of the COVID-19 vaccine, 16-point questions were used. Those that were in favour of eligibility were scored 1 point while those that favored ineligibility and "don't know" were scored 0 points. Participants that scored 8 and above out of the 16 questions were noted to have good knowledge while those below 8 out of the 16 questions were noted to have poor knowledge.

The Chi-square ($\chi 2$) test analysis was performed to test for association between the dependent variable which is the COVID-19 vaccine hesitancy and independent variables such as sex, age, occupation, income, marital status, duration of service and to determine the level of statistical significance between the variables associated. An observation was said to be statistically significant if the "p-value is less than or equal to 0.05 (≤0.05).

Ethical Considerations

Ethical approval to carry out the study was obtained from the ethics committee of the University of Port Harcourt (UPH/CEREMAD/REC/MM84/031) and permission was obtained from the hospital management, informed consent from the participants before commencement of the study.

Result

Response rate

A total of 395 questionnaires were administered, however, 386 questionnaires were properly filled and analysed. Hence the study had a response rate of 97.7%.

Variable	Frequency n=386	Percent%
Sex		
Male	178	46.1
Female	208	53.9
Age	group	
20-29	133	34.5
30-39	181	46.9
40-49	49	12.7
50-59	21	5.4
60 and above	2	0.5
Marital Status		
Single	199	51.6
Married	181	46.9
Separated	4	1
Divorced	1	0.3
Widowed	1	0.3

Professions		
Doctors	182	47.2
Nurses	151	39.1
Lab Scientists	26	3.9
Physiotherapists	7	1.8
Dieticians	3	0.8
Optometrists	2	0.5
Pharmacists	15	3.9
Education		
University/First Degree	322	83.4
Diploma Completed	19	4.9
Masters completed	33	8.5
Fellowship Completed	18	4.7
Monthly Income		
<100000	59	15.3
100000-199999	208	53.9
200000-299999	69	17.9
300000-399999	30	7.8
400000-499999	17	4.4
≥500000	3	0.8
Duration of Service		
<5 years	227	58.8
5-9 years	92	23.8
10-14 years	39	10.1
15-19 year	17	4.4
≥20 years	11	2.8

Table 1: Shows that more than half 208 (53.9%) of the respondents were females, 181(46.9%) of the respondents were between the age of 30-39 years, and about half 199 (51.6%) were singles, 182(47.2%) were doctors, and more than half, 227(58.8%) had been in service for less than 5 years.

Variable	**Frequency n=386**	**Percent (%)**
Legally mandatory to take COVID 19		
Yes	76	19.7
No	218	56.5
Don't know	92	23.8

Infants less than one year eligible		
Eligible	39	10.1
Not eligible	285	73.8
Don't know	62	16.1
Children/Adolescents less than 18 eligible		
Eligible	193	50
Not eligible	126	32.6
Don't know	67	17.4
Adults 18 or above eligible		
Eligible	330	85.5
Not eligible	28	7.3
Don't know	28	7.3
Pregnant Ladies/Lactating mothers eligible		
Eligible	137	35.5
Not eligible	162	42
Don't know	87	22.5
Patients with chronic diseases are eligible		
Eligible	222	57.5
Not eligible	87	22.5
Don't know	77	19.9
Active COVID patients are eligible		
Eligible	234	60.6
Not eligible	99	25.6
Don't know	53	13.7
Recovered COVID patients are eligible		
Eligible	278	72
Not eligible	50	13
Don't know	58	15

Persons allergic to food/drugs eligible		
Eligible	180	46.6
Not eligible	72	18.7
Don't know	134	34.7
Immune comprised patients eligible		
Eligible	148	38.3
Not eligible	112	29
Don't know	126	32.6
Immunity will be achieved		
First dose	126	32.6
Second dose	119	30.8
Fourteen days after the first dose	141	36.5
Source of news		
Eligible	54	14
Not eligible	163	42.2
Don't know	169	43.8
Overall level of Knowledge on a dichotomous scale		
Poor	293	75.9
Good	93	24.1

Table 2: The level of knowledge of COVID-19 of the respondents

Table 2 shows that 218(56.5%) of the respondents reported that it is not mandatory to take the COVID-19 vaccine, 285(73.8%) reported that infants less than one are not eligible to take the vaccine, 193(50.0%) reported that children/adolescents less than 18 are eligible, 330(85.5%) reported that adult 18 or above are eligible, 162(42.0%) reported that pregnant ladies/lactating mothers are not eligible and finally, 222(57.5%) reported that patients with chronic diseases are eligible to get the COVID-19 vaccine. The result shows that 234(60.6%) of the respondents reported that active COVID-19 patients are eligible to receive the COVID-19 vaccine, 278(72.0%) reported that recovered COVID-19 patients are eligible to receive the vaccine, 180(46.6%) reported that persons allergic to food/drugs are eligible, 148(38.3%)

reported that immune-compromised patients are eligible, 126(32.6%) reported that immunity will be achieved after the first doses.

The overall level of knowledge above shows that 93(24.1%) of the respondents had good knowledge of the COVID-19 Vaccine.

Variable	**Frequency n=386**	**Percent (%)**
National TV/Radio		
Insignificant effect	54	14
Somewhat significant effect	163	42.2
Very significant effect	169	43.8
Government agencies		
Insignificant effect	88	22.8
Somewhat significant effect	149	38.6
Very significant effect	149	38.6
Social media		
Insignificant effect	26	6.7
Somewhat significant effect	95	24.6
Very significant effect	265	68.7
Discussions with family and friends		
Insignificant effect	60	15.5
Somewhat significant effect	169	43.8
Very significant effect	157	40.7

Health care provider		
Insignificant effect	63	16.3
Somewhat significant effect	153	39.6
Very significant effect	170	44.1

Table 3: Perception of the source of information among respondents.

Table 3 shows that more than two thirds 265(68.7%) of respondents considered the social media as having a very significant effect on COVID-19 information. This was followed by health care providers 170(44.0%).

Variable	**Frequency n=386**	**Percent (%)**
Preferred vaccine brand		
Astrazeneca	184	47.7
Moderna	120	31.1
Johnson&Johnson	82	21.2
Vaccinated		
Yes	215	55.7
No	171	44.3
Received any COVID 19 vaccine n=215		
Yes (First dose)	61	28.4
Yes (Both doses)	137	63.7
Yes (2 doses + booster dose)	17	7.9
Tested for COVID-19		
Yes	119	30.8
No	267	69.2
OVERALL **n=386**		
Yes (Both doses)	137	35.4
Yes (2 doses + booster dose)	17	4.4

Table 4: Vaccination history and preference among respondents.

Table 4 shows that in the overall study population only 17(4.4%) have been fully vaccinated, 137(35.4%) of the respondents had received both doses, among those vaccinated, 184(47.7%) preferred AstraZeneca and 267(69.2%) have never tested for COVID-19.

Variable	**Frequency n=386**	**Percent (%)**
Would delay in getting the COVID-19 vaccine		
Agree	139	36
Undecided	90	23.3
Disagree	157	40.7
Get any of the recommended vaccines at any time		
Agree	230	59.6
Undecided	92	23.8
Disagree	64	16.6
Believe the COVID-19 vaccine can prevent disease		
Agree	262	67.9
Undecided	65	16.8
Disagree	59	15.3
Better to develop immunity by getting COVID than to receive the vaccine		
Agree	189	49
Undecided	71	18.4
Disagree	126	32.6
Better to get fewer vaccines at the same time		
Agree	93	24.1
Undecided	113	29.3
Disagree	180	46.6
Concerned that COVID 19 not safe		
Agree	156	40.4
Undecided	69	17.9
Disagree	161	41.7
Concerned that a shot may not prevent COVID-19		
Agree	115	29.8
Undecided	63	16.3
Disagree	208	53.9

consider myself hesitant to receive the COVID-19 vaccine		
Agree	135	35
Undecided	95	24.6
Disagree	156	40.4
Trust the information I receive about COVID 19 vaccine		
Agree	194	50.3
Undecided	108	28
Disagree	84	21.8
Openly discuss concerns with Doctor		
Agree	276	71.5
Undecided	57	14.8
Disagree	53	13.7
Overall Level of vaccine hesitancy on dichotomous scale		
Low	90	23.3
High	296	66.7

Table 5: Level of vaccine hesitancy of the respondents.

Table 5 shows that 139(36.0%) of the respondents would delay getting the vaccine, 230(59.6%) agree to get any of the recommended vaccines at any time, 262(67.9%) believe COVID-19 vaccine can prevent disease, 189(49.0%) agreed that it is better to develop immunity and 180(46.6%) disagreed that it is better to get fewer vaccines at the same time.

The result also shows that 156(40.4%) were concerned about COVID-19 vaccine safety, 115(29.8%) were concerned that a shot may not prevent COVID, 135(35.0%) consider themselves hesitant to receive the COVID-19 vaccine, 194(50.3%) trust the information they receive and 276(71.5%) openly discuss concerns with their doctor.

The result showed that 296(66.7%) of the respondents had high COVID-19 vaccine hesitancy.

Variable	**Vaccine Hesitancy**		c^2 **(p-value)**
	Low	**High**	
Sex			
Male	43(24.2)	135(75.8)	0.131(0.718)
Females	47(22.6)	161(77.4)	
Marital status			

Single/Divorced/Widowed	41(20.0)	164(80.0)	2.689(0.101)
Married	71(39.2)	110(60.8)	
Profession			
Doctors/Nurses	88(37.3)	249(73.9)	11.613(0.001)*
Others	2(4.1)	47(95.9)	
Education			
Diploma	3(84.2)	16(84.2)	0.633(0.426)
First-degree/Postgraduate	87(23.7)	280(75.2)	
Income group			
< 100000	9(15.3)	50(84.7)	2.532(0.112)
≥100000	81(24.8)	246(75.2)	
Years of experience			
< 5 Years	42(18.5)	185(81.5)	7.142(0.008)*
≥ 5 Years	63(39.6)	96(60.4)	
*Statistical significance			

Table 6: Sociodemographic associated with COVID-19 Vaccine Hesitancy.

Table 6 shows that profession (□2 =11.613, p=0.001), and years of experience (□2=7142, p=0.008) was significantly associated with the level of COVID-19 hesitancy.

Discussion

To halt the pandemic, different COVID-19 vaccines have been distributed to various nations, including Nigeria. The goal of this study was to identify the contributing variables to health professionals' hesitation to receive the COVID-19 vaccine at the University of Port Harcourt Teaching Hospital.

Findings in this study showed that only about a quarter of the respondents had a good knowledge of the COVID-19 vaccine with their source of information being the social media. The majority of the respondents had poor knowledge and this reflects in the COVID-19 vaccine uptake. This may be because of misinformation from social media about the COVID-19 vaccine at the time of the study. This is contrary to the results of a study on COVID-19 vaccine knowledge and acceptability among healthcare providers in Nigeria which showed that majority of the healthcare providers had a good knowledge of the COVID-19 vaccine [31]. This finding was also not different from the result that was observed on knowledge, attitudes, and perceptions of the COVID-19 vaccine and refusal to receive COVID-19 vaccine among healthcare workers in Northeastern Ethiopia [32] which showed that about two thirds of the health care workers had good knowledge reported that Likewise more than half of the participants among healthcare workers in the United States had a good knowledge of the COVID-19 vaccine. The higher knowledge of

COVID-19 vaccines in these countries could be linked to the higher awareness of the importance of these vaccines. This could have influenced the knowledge and perceptions of the healthcare workers. The level of knowledge observed in index study may be due to the period of data collection. Data collection was carried out when detailed information about the vaccine was not yet available. The public health implication of this finding is that healthcare workers may not be able to fully health educate patients on the need to get vaccinated.

Slightly above half of the respondents were vaccinated against COVID-19, less than one in twenty of the respondents have completed their COVID-19 vaccination with a booster dose and slightly less than a third had taken at least 2 doses of the vaccine. This shows some form of reluctance in taking the vaccine at all and among those who have in taking the booster dose. This may be the effects of the pandemic in the background of harmful political have, rhetoric with an excess of misinformation, disinformation and conspiracy theories. Similarly, in a study on COVID-19 vaccine uptake amongst healthcare workers in Nigeria [33] only a third of healthcare workers reported that they had been fully vaccinated (gotten two doses of a COVID-19 vaccine) at the time of the study. Furthermore, a study on COVID-19 vaccine coverage and potential drivers of vaccine uptake among healthcare workers in Somalia reported similar findings in their study with slightly more than a third of Somali healthcare professionals being fully vaccinated (gotten two doses of COVID-19 vaccine) against COVID-19 at the time of the study [34]. This may be because of the misinformation driven by social media platforms that the COVID-19 vaccines tend to make one infertile amongst others. On the contrary, higher findings were reported in proportion who had received at least 2 doses of the vaccine in a study on COVID-19 vaccination and intent among healthcare personnel, in the united states [35] this may be because of increased morbidity and mortality among health workers. Low COVID-19 uptake implies that it threatens the ability to establish herd immunity and therefore poses a significant risk to public health.

This study showed that two-thirds of the participants were hesitant to COVID-19 vaccine, may be because they wanted to see the effects of the vaccination on others. This is quite high and has serious implications for the uptake of the vaccine among the general populace. Results of a study on COVID-19 vaccine hesitancy among healthcare workers and its socio-demographic determinants in Abia State, South-eastern Nigeria was less than that of this study [16]. This may be due to the lack of trust in the government regarding the response activities to the pandemic and fear of unknown consequences of the vaccine that was rapidly produced and administered without the standard processes of a vaccine trial and roll out due to the pandemic. A study done on Racial/Ethnic Differences in COVID-19 vaccine hesitancy among healthcare workers in two large academic hospitals showed that participants mostly Black and Hispanic or Latino healthcare workers were hesitant this is because they wanted to wait for safety data before deciding on vaccination [36]. On the contrary, much lower rates were recorded in Saudi Arabia from a study on COVID-19 vaccine confidence and hesitancy among healthcare workers due to their perception of inadequate data on the safety of a new vaccine [37]. The public health implication is that high COVID-19 vaccine hesitancy limits the effectiveness of the COVID-19 outbreak response thereby increasing mortality and morbidity among healthcare workers and their families.

Health care workers who were not doctors or nurses and had less than 5 years of work experience were significantly associated with COVID-19 vaccine hesitancy, this may be because the other healthcare professional may not have the same knowledge of the vaccine as doctors and nurses. This is similar to a study among French healthcare worker where physicians proved to be more supportive concerning accepting the vaccines, [38] furthermore, profession was a statistically significant socio-demographic predictor of COVID-19 vaccine hesitancy amongst healthcare workers [16]. This may be because doctors/nurses have more access to scientific sources of information regarding the COVID-19 vaccine in their occupation and training. Vaccine hesitancy was less likely to occur amongst clinical staff consisting of doctors, nurses, and other clinical health professionals compared to the non-clinical staff. At the onset of the COVID-19 pandemic, doctors and nurses received trainings which some of the other healthcare workers did not.

A similar finding in a study of Hesitant or Not? The Association of Age, Gender, and Education with Potential Acceptance of a COVID-19 Vaccine: A Country-level Analysis observed that in Canada, Spain, and the UK, the highly educated were linked to lower acceptance of the COVID-19 vaccine [26]. The implication is that the doctors/nurse with a good knowledge of the COVID-19 vaccine will educate the other cadres of health workers thereby reducing mortality and morbidity associated with COVID-19 disease.

Conclusion

Only approximately one in four HCW had a good knowledge of COVID-19 vaccine. Majority reported the social media as a very significant source of information. Overall, slightly above half of the respondents were vaccinated against COVID-19, among those vaccinated, less than one-tenth of the respondents have completed their COVID-19 vaccination with a booster dose and slightly less than two thirds had taken at least 2 doses of the vaccine. Astra Zeneca and Modena were the preferred choice of vaccines. High COVID-19 vaccine hesitancy was reported in about two-thirds of the HCWs. Healthcare workers who were not a doctor or nurse and had less than 5 years of working experience were significantly more likely to exhibit vaccine hesitancy. There is a need to address the gap in COVID-19 knowledge, and encourage the uptake of the vaccine, while making available the preferred vaccine

Limitations

The research is limited to a cross section of health workers at the prestigious tertiary hospital, who are believe to have a fair knowledge and understanding of the aetiology and management of disease, as well as vaccinology. Therefore, factors associated with, and or reasons for hesitancy cannot be used to make inference on the general public.

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