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Willingness to accept vaccination against SARS-cov-2: A survey of junior doctors

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Abstract

Introduction: The Coronavirus disease 2019 (COVID-19) has become a cause of significant morbidity and mortality in the world. There are currently 4 COVID-19 vaccines have been developed for mass vaccination to combat the disease. Some people, however, have expressed safety and efficacy concerns with regards to the vaccines. In Ghana, junior doctors, being frontline doctors, are likely to first encounter patients presenting with COVID-19. They may also have the highest direct exposure to the virus even though their outcomes after infection may be good. The study sought to determine the potential acceptance rate of COVID-19 vaccine among junior doctors, the factors that will influence their acceptance and whether they will recommend the vaccine to their patients. **Methods:** The study was an ethically approved anonymous cross-sectional survey to determine the willingness to accept the SARS-CoV-2 vaccine among junior doctors in Ghana. The survey was designed using Google forms posted to the various junior doctor's social media group pages such as WhatsApp and Facebook with the study participants responding to 15 items. **Results:** Out of a total of 305 participants, females were 155 (50.8%). Of the respondents, 171/305 (56.1%) had cared for Covid-19 patients before, 51/305 (16.7%) had had Covid-19 infection previously and 204/305 (66.9%) will be willing to take the vaccine when available. Females were more likely to take the vaccine and those who were willing to accept the vaccine were more likely to recommend same to their family and others. **Conclusion:** This study has showed a more than average willingness to accept the COVID-19 vaccine. Female gender, living with the extended family and history of SARS-Cov-2 infection were positively associated with willingness to accept the COVID-19 vaccine. Doctors who were willing to accept the vaccine were also more likely to recommend their patients and family members to also accept the COVID-19 vaccine.

Keywords: COVID-19 vaccine; COVID-19; Coronavirus disease 2019; SARS-CoV-2; Severe Acute Respiratory Syndrome Coronavirus 2; Junior doctors.

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1. Introduction

The Coronavirus disease 2019 (COVID-19) outbreak was reported on December 30 2019 as a cluster of patients with pneumonia of an unknown aetiology in Wuhan City, Hubei Province, China [1]. The 2019 novel coronavirus was officially named Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) by the International Committee on Taxonomy of Viruses [2]. The World Health Organization subsequently renamed the disease caused by SARS-CoV-2 from novel coronavirus to COVID-19 [3].

COVID-19 has spread rapidly across the globe causing devastating impact on public health services and loss of lives. The World health organization characterized the COVID-19 as a pandemic on the March 11, 2020 [4].

COVID-19 cases has continued to increase with daily mortalities and globally, as of 10:33am CET, 27 February 2021, there have been 112,902,746 confirmed cases of COVID-19, including 2,508,679 deaths, reported to WHO [5]. In Ghana there has been 82,586 confirmed cumulative cases with 594 cumulative deaths reported [6].

There are four categories of vaccines: Whole Virus (Sinopharm, Sinovac), Protein Subunit (Novavax) , Non-replicating Viral Vector (Oxford-AstraZeneca, Sputnik V) and RNA or mRNA (Pfizer-BioNTech, Moderna) [7, 8], all with the objective of producing immunity to the SARS-CoV-2 virus.

Globally there is now a mass vaccination campaign mainly in the developed world to combat the COVID-19 pandemic. Several countries including United Kingdom, United States of America, Canada, Belgium, Canada, Chile, Argentina, Brazil, Chile, Germany, India, Russia, Belarus, Costa Rica, Croatia, Cyprus, China, The Czech Republic, Denmark, Finland, France, Greece, Hungary, Saudi Arabia, Israel, Italy, Kuwait, Malta, Mauritius, Mexico, Mauritius, Oman, Poland, Qatar, Romania, Serbia, Slovakia, Spain, Switzerland, Singapore, Turkey, United Arab Emirates among others have approved the administration of COVID-19 vaccinations for their populations [9]. There is very limited vaccine rollout in most African and other resource poor countries. Ghana is rolling out its COVID-19 vaccine campaign having received COVID-19 vaccine doses shipped via the COVAX Facility [10].

Even though the COVID-19 pandemic has caused significant mortalities and morbidities across the globe and overwhelmed global health care delivery, some people express concerns or fears with regards to the vaccines. These concerns involve the safety and efficacy of the vaccines. There has been various unfounded conspiracy theories and false information carried by the media especially social media about the SARS-CoV-2 vaccines and the vaccination process.

Studies on the willingness to accept the SARS-CoV-2 vaccine among the general public and various health worker groups has reported varying acceptance rates; 77.6% in France [11], 65.7% in Japan [12], 85.8% in Australia [13], 54% in Germany [14] and 69% in the USA [15].

Willingness to accept vaccines is not static. People may change their positions on vaccines based on the information available to them. For example, as of January 2021, 54% of Germans were definitely willing to get vaccinated against the coronavirus (COVID-19), however in November 2020, 37% gave the same answer [14]. Germany began its coronavirus vaccination rollout shortly after Christmas 2020 with the BioNTech vaccine. A survey by the University of Zurich on vaccination attitudes, suggests the percentage likely or very likely to get vaccinated against the SARS-CoV-2 virus in Switzerland has risen from 41% to 50% [16].

A survey conducted by the Africa Centre for Disease Control and Prevention, in partnership with the London School of Hygiene & Tropical Medicine across 15 African countries: Burkina Faso, Côte d'Ivoire, Democratic Republic of the Congo, Ethiopia, Gabon, Kenya, Malawi, Morocco, Niger, Nigeria, Senegal, South Africa, Sudan, Tunisia, and Uganda showed that a predominant majority (79% average) of respondents in Africa would take a COVID-19 vaccine if it were deemed safe and effective [17]. This survey showed significant variations in willingness across the African countries from 94% and 93% in Ethiopia and Niger respectively to 65% and 59% in Senegal and the Democratic Republic of Congo respectively [17].

Another study from Congo however reported that only 27.7% of health care workers were willing to accept a COVID-19 vaccine if it was available [18]. There is paucity of information about the willingness of Ghanaians to accept the SARS-CoV-2 vaccine.

Africans and people of African descent have a lot of mistrust towards vaccines and vaccinations due to historical experiences which were not so good. Rejection of vaccines has led to resurgence of some diseases for example Poliomyelitis in Nigeria [19, 20].

Health workers are generally expected to be more knowledgeable with vaccines and having used various vaccines themselves and for their patients and seeing the positive results of disease prevention, their willingness and confidence in the vaccination to prevent COVID-19 will go a long way to improve the acceptance of the vaccine by the general public. If health workers have confidence in the vaccine, they are more likely to recommend it to the general public for good uptake in order to curb the menace of COVID-19.

In Ghana, junior doctors are the first front line doctors patients encounter at the outpatients and emergency rooms. They are therefore the most likely group of doctors to first see any patient coming in with COVID-19. They may also have the highest direct exposure to the virus even though their outcomes after infection may be good. The acceptability of these health workers of the COVID-19 vaccine may be an important indicator as to the young health work force and also determine whether they will recommend the vaccine to their patients.

The study seeks to determine the potential acceptance rate among these group of health care workers and the factors that will influence their acceptance of COVID-19 vaccine.

2. Methods

The study was an anonymous cross-sectional survey designed to look at the willingness to accept the SARS-CoV-2 vaccine among junior doctors in Ghana. The survey was designed using Google forms with the study participants responding to 15 items. The survey link was posted to the various junior doctor's social media group pages such as WhatsApp and Facebook. Informed consent was obtained individually by agreeing to be part of the study.

The study objectives were:

- Proportion of junior doctors in Ghana who will accept to be vaccinated against SARS-Cov-2
- Proportion of junior doctors in Ghana who will convince their patients to accept SARS-CoV-2 vaccine
- Various concerns/fears of SARS-CoV-2 among junior doctors in Ghana
- Factors affecting the willingness of a junior doctor to accept SARS-CoV-2 vaccine in Ghana

Participant's data regarding age, gender, religion, who they live with, number of people in their households, if they provide direct care to COVID-19 patients, history of COVID-19 infection, information regarding years of practice, and COVID vaccine acceptability questions such as "will you take the SARS-CoV-2 vaccine available to you?", "do you have concerns about the SARS-CoV-2 vaccine?" "What will motivate them to take the SARS-CoV-2 vaccine?" "will they encourage their family members or patients to take the vaccine", "do they have any comorbidities" was obtained.

The data obtained was exported to excel and analyzed using Rstudio software version 1.41103

We analyzed the distribution of the responses against the different questions using numbers and percentages. Associations between main outcome (will you take SARS-CoV-2 vaccine) and other independent variables were analyzed using generalized linear model and reported as Odds ratio with 95% confidence intervals (95% CI) and p-values. Statistical significant was reported as p-value < 0.05.

The study participants were junior doctors defined as doctors who have practiced for up to 5 years. Junior doctors in Ghana make up the majority of the number of medical doctors who serve as the first point of contact for a lot of patients. The perception of junior doctors on SARS-CoV-2 vaccine have repercussive effects on the fight against COVID-19 infection in Ghana. Participants answered the questions voluntarily and no personally identifiable information collected or stored.

Ethical approval was obtained from the Institutional Review Board for Research and Development (IRB/R&D).

3. Results

A total of 305 participants had validated results available for analysis. Females were 155 (50.8%). The majority were in the age range 25-30 years ,253 (83%). Christians were 281 (92.1%). Majority, 172 (56.4%) had worked 1-3 years.

Participants who had cared for Covid-19 patients were 171 (56.1%). Those who had had Covid-19 infection previously were 51 (16.7%) and 204 (66.9%) will be willing to take the vaccine when available. Those with co-morbid condition were 41 (13.4%).

Table 1 shows the association between those willing to take the vaccine against independent variables. Females were more likely to accept the vaccine. Those who were willing to accept the vaccine were more likely to recommend same to their family and others.

Reasons given for concerns raised about the vaccines were, it was developed too fast; vaccine contains microchip; I will have adverse reaction from vaccine.

The motivations for covid19 vaccine included: to protect myself, elderly parents, external family, and my patients. Others stated it will be needed for future travel.

Table 1 Comparing vaccine acceptability with independent variables among young Doctors

	Accept vaccine N(%)=204	Reject vaccine N (%)=101	OR (95% CI)	p-value
Gender				
Female	109 (53.4)	41(40.6)	1.68 (1.04-2.72)	0.036
Male	95 (46.6)	60(59.4)		
Age range (years)				
18-24	12(5.9)	5(5.0)	ref	
25-30	173(84.8)	80(79.2)	1.11(0.38-3.65)	0.85
>30	19(9.3)	16(15.8)	2.02(0.59-6.96)	0.26
Religion				
Christians	186(91.2)	95(94.0)	2.55(0.29-22.17)	0.39
Muslims	13(6.4)	5(5.0)	1.92(0.18-20.8)	0.59
Others	5(2.5)	1(1.0)	ref	
Household type				
Nuclear	110(53.9)	65(64.4)	0.65(0.4-1.06)	0.08
Extended	94(46.1)	36(35.6)		
Number per household				
Up to 3	114(55.9)	55(54.5)	1.06(0.66-1.71)	0.81
More than 3	90(44.1)	46(45.5)		
How many years have you being working (years)				
< 1	28(13.7)	20(19.8)	ref	
1-3	124(60.8)	48(47.5)	1.85(0.95-3.58)	0.07
Above 3	52(25.5)	33(32.7)	1.13(0.55-2.31)	0.74
Cared for covid19 patient				
Yes	110(53.9)	61(60.4)	1.23(0.66-2.29)	0.52
No	52(25.5)	21(20.8)	0.89(0.43-1.87)	0.76
Unsure	42(20.6)	19(18.8)	ref	
Have you tested positive				
Yes	36(17.6)	15(14.9)	1.23(0.64-2.37)	0.53
No	168(82.4)	86(85.1)		

Would you recommend vaccine for your family				
Yes	171(83.8)	8(7.9)	47.0(20.5-107.8)	0.001
No	3(1.5)	27(26.7)	0.24(0.07-0.87)	0.029
Unsure	30(14.7)	66(65.4)	ref	
Would you recommend vaccine for your patients				
Yes	176(86.3)	17(16.8)	25.8(13.3-50.2)	0.001
No	0(0)	14(13.9)	-	0.987
Unsure	28(13.7)	70(69.3)	ref	
Any fears for the vaccine				
Yes	108(52.9)	95(94.1)	0.07(0.03-0.17)	0.001
No	96(47.1)	6(5.9)		
Co-morbidities				
Yes	30(14.7)	11(10.9)	1.41(0.68-2.95)	0.36
No	174(85.3)	90(89.1)		

4. Discussion

With the COVID-19 pandemic claiming so many lives all over the world with over 2.5 million deaths [21], there is a need for a more effective solution to help reduce the incidence and mortality associated with the disease. Vaccination has shown over the years to be effective in reducing the incidence and even caused eradication of some diseases. The rate of acceptability of COVID 19 vaccine can massively influence the fight against this pandemic.

In our study, it showed 66.9% of junior doctors willing to accept the COVID 19 vaccine. This is lower compared to 78% acceptability rate among doctors in Israel [22] however, higher than 61.8% among family physicians in Malta [23]. This low level of acceptance may be attributed to various concerns raised about the vaccine. This includes fast rate of development of the vaccine, vaccine might contain a microchip and the fear of adverse reactions of the vaccines. Again, this observation may be explained by the perception of only getting a mild COVID-19 in younger population such as junior doctors compared to moderate and severe disease in older population. This observation has been noticed in several countries [23, 24]. Junior doctors are also more likely to be influenced badly through misinformation about COVID-19 vaccines on various social media platforms [25] coupled with the high proportion (80%) of patients with COVID-19 having a mild disease [26].

More female doctors (53.4%) were willing to accept the vaccine compared to male counterparts (46.6%). This finding was in contrast to that observed in other studies amongst healthcare workers in Israel, Kingdom of Saudi Arabia and United States of America [22, 27, 28]. These studies showed a positive correlation between males and the willingness to accept COVID-19 vaccine. They attributed this correlation to the increased severity and mortality of COVID 19 in male patients [29].

Junior doctors who lived with their nuclear families were less likely to accept COVID-19 vaccination (64.4%) compared to the doctors who lived with their extended families (35.6%). This result may be due to the fact that the young doctors who live with the aged grandparents and relatives would want to protect their relatives. This may be attributed to age being a risk factor for development of severe COVID-19 disease. Older patients are also at risk of co-morbidities including Diabetes mellitus, Hypertension and Chronic Kidney Disease. All these risk factors may increase the probability of a severe or even critical COVID-19.

Among junior doctors who had already had COVID-19, slightly higher percentage of them (17.6%) were willing to accept a vaccine compared to their colleagues (14.9%). This finding is consistent with the findings in a study conducted among health workers in Saudi Arabia [27]. The study also demonstrated a significant positive relationship between acceptance of COVID-19 vaccination and being previously infected with SARS-Cov-2. This observation may be due to the perceived risk of reinfection with SARS-Cov-2. Individuals who have been infected may want to prevent a reinfection and the perceived thinking that a second infection may be more severe.

Another important observation made in this study was the high level of recommendation of the COVID-19 to patients (86.3%) and family members (83.3%) in doctors who are willing to take the vaccine. This same observation was seen in studies carried out among healthcare workers in France and United States [11, 28]. Many studies have also proven that doctors who accept a vaccine are more likely to recommend their family members and patients to accept that vaccine [30, 31, 32]. With junior doctors and other healthcare workers willing to accept the COVID-19 vaccine, they are likely to advise their family members and patients to also accept the vaccine. Patients are more likely to take medical advice given to them by their doctors and this will help improve the acceptance of COVID-19 vaccine among the general population.

Fear of adverse effects of the vaccine contributed massively (94.1%) to the rejection of the COVID-19 vaccine among junior doctors. This finding is consistent with findings from several studies as the fear of adverse effects of COVID-19 vaccines negatively influenced the acceptability of the vaccine [13, 22, 27, 33]. The presence of co-morbidities also positively influenced the willingness to accept the COVID-19 vaccine as reported by other studies [28, 29]. With a strong link between co-morbidities and increased severity of COVID-19 and even mortality, it is not surprising that the presence of a co-morbidity will influence a person in accepting a COVID-19 vaccine [34, 35].

5. Conclusion

Junior doctors form an important group of healthcare workers in the fight against COVID-19 as they are at high risk of being infected with the SARS-Cov-2. Again, these doctors can play a major role in encouraging the general population to accept the COVID-19 vaccine.

This study has showed a more than average willingness to accept the COVID-19 vaccine. This can be massively improved with appropriate education among junior doctors and the entire population on the importance of the vaccine in the fight against the pandemic, its safety, benefits and the risks associated with the vaccine. This will go a long way to improve the acceptability of the vaccine in the general population as a majority of doctors who were unwilling to accept the vaccine had fear of adverse effects as their main reason.

Female gender, living with the extended family and history of SARS-Cov-2 infection were positively associated with willingness to accept the COVID-19 vaccine. Doctors who were willing to accept the vaccine were also more likely to recommend their patients and family members to also accept the COVID-19 vaccine.

Compliance with ethical standards

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Disclosure of conflict of interest

All authors declare no competing interest.

Statement of ethical approval

Ethical approval was obtained from the Institutional Review Board for Research and Development (IRB/R&D).

Statement of informed consent

Informed consent was obtained individually by agreeing to be part of the study.

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