



Delay of Acceptance of Covid-19 Vaccine Among Health Care Workers in Western Kenya

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Abstract

BACKGROUND

Healthcare workers play a key role in the prevention and control of communicable diseases but some studies have reported concerns with their vaccine hesitancy. To address the concerns, there is a need to investigate the time to acceptance to inform programmatic interventions. This study determined the time to acceptance and further investigated the possible reasons for the time to acceptance of the COVID-19 vaccine among the 256 healthcare workers in Homa Bay town sub-county, Homa Bay county in western Kenya.

METHOD

A cross-sectional web-based study was done between August 2022 to October 2022. An online survey was used to collect quantitative data, which was analyzed using SPSS version 23 and Pearson's Chi-square test. However, the qualitative data was analyzed using thematic.

RESULTS

The uptake level was at 98.8% and 60.9% of HCWs accepted the vaccine within the first six months of rollout, 83.6% accepted it within the first year of vaccine rollout and 1.2% did not accept it after more than one year of rollout. The qualitative results suggest the reason for the slow time to acceptance of the vaccine is side effects and concerns with the safety and effectiveness.

CONCLUSION

The study shows that the time to acceptance of the vaccine by the HCW remains a public health concern. Consequently, there is a need to explore strategies to improve the time to acceptance of the vaccines given the increasing pandemics. We recommend further studies on time to acceptance with a cost-effective programmatic intervention.

Keywords: Health Care Worker, COVID-19, Vaccine Acceptance, Time to acceptance

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Introduction

COVID-19 caused by the SARS-CoV-2 virus is a communicable disease of great public health concern worldwide (1). It can also be transmitted through contact with hands or surfaces that contain the virus by touching their eyes, nose, or mouth with the contaminated hands. (2). However, there's still no cure except for the vaccine, which prevents its spread since it

causes serious public health problems and economic crises worldwide (3). Common symptoms are fever, dry cough, and fatigue and other less common symptoms are aches, sore throat, diarrhoea, conjunctivitis, headache loss of taste or smell, a rash on the skin, and discolouration of fingers or toes (4). The spread of COVID-19 has been rapid since its emergence and scientists have been working on discovering its cure as about 67 % of the population needs to



be vaccinated for herd immunity to be realized.(5)

It was noted that the outbreak had advanced in the WHO African Region since the first case was reported, with an increased incidence as a result of inter-border spread from the porous borders hence it was under community transmission and was no longer localized to a particular region (6). WHO preventive methods like hand washing, maintaining distance, and confinement were implemented to contain the spread of coronavirus. However, the vaccination drive seemed to protect against the virus (7). An Ethiopian study by Aemro *et al* 2022 on prevention measures and their associated factors reported that a large proportion of healthcare workers were non-adherent to COVID-19 mitigation measures. Adherence of 50.24% was reported in the study (8).

As of 3rd Dec 2022, the total number of cases reported for COVID-19 infection was 645 million with deaths related to COVID-19 being at 6.64 million and 5,024,984,837(64.6%) of the population being vaccinated (1). The numbers were not constant since new cases were being reported daily with some countries like South Africa experiencing their fourth wave In Africa 47 countries were affected with over 9,007,048 million cases reported, out of which 81785 people died due to COVID-19 (9). As of 28th November 2022, in Kenya, the total number of cases reported was 341,515 with the number of deaths associated with COVID-19 being 5,684 people (1).

Kenya rolled out vaccination for COVID-19 in March 2021 and planned to fully vaccinate 19 million adults (70% of the adult population) by the end of June 2022 so far, 8,462,289 have been vaccinated and the Homa Bay County has done this study, 166,030 adults had been vaccinated (27.3%) of the population (10).

The Centres for Diseases developed a vaccination framework that prioritized people at

high risk for acquiring and transmitting COVID-19 and those with pre-existing medical cases, therefore, vaccination of HCWs was prioritized to be able to provide services to COVID-19-infected patients (11). A systematic and meta-analysis review of studies done among HCWs in Africa showed the acceptance at 28% with vaccine acceptance intention at 51% (5). Another survey carried out in China among HCWs reported a 77% acceptance rate with an 18.3% hesitancy rate (12). A different study done in Kenya in January 2021 before the availability of the COVID-19 vaccine by Abdulle *et al* on the acceptability of COVID-19 among HCWs showed that 29% of HCWs would decline it but this was before the availability of the vaccine (13). Given the low acceptability as earlier reported, the government of Kenya enhanced the campaign to improve the acceptability by HCWs however, there has been no evaluation of the improvement of the acceptability. This study explored the level of COVID-19 vaccine acceptance, time to acceptance and reasons for low or high time to acceptance among healthcare workers in western Kenya.

Methodology

Study area

The study area was Homa Bay Town Sub County which is one of the 8 sub-counties in Homa Bay County. It lies on the south shore of Winam Gulf of Lake Victoria, in western Kenya. It lies near Mount Homa with a population of 117,439 (2009 census). Homa Bay Town Sub County has a total of 23 health facilities out of which 2 are Sub-county hospitals, 10 health centres, 3 dispensaries with 7 private practices, and one County Referral and Teaching Hospital.

Study design

A web-based cross-sectional survey using a validated questionnaire assessed the uptake of the COVID-19 vaccine, time to vaccine acceptance and reasons for time to acceptance.

Study population



The study targeted 300 HCWs (98 clinical officers and 202 nurses) from different Health facilities within Homa Bay town Sub County. The participants were considered because they were frontline HCWs the inclusion Criteria was either a nurse or a clinical officer. The key informants were the sub-county Public Health nurse and Sub-County clinical officer who are responsible for vaccine-related activities in the subcounty. However, those without smartphones were excluded from the study.

Sample size determination

The study targeted 300 HCWs, 279 respondents consented to participate in the study while only 256 (171 nurses and 84 Cos) completely and correctly filled out the questionnaire.

Data collection tools

A structured questionnaire (google-link form) was used to collect quantitative data while an unstructured questionnaire was used to collect qualitative data through key informants. The unstructured questionnaire allowed the respondents to give their responses.

Validity and reliability test

Validation of the questionnaire was done through content validity where the researcher engaged the relevant experts to review the questions to ensure they were relevant to the topic and research questions. For reliability, a pilot test was done with 10 % of the sample size from a different sub-county (Rangwe). This included 30 HCWs from Rangwe Sub-county and the questionnaires were reviewed. Suggestions made during the pre-testing were used to improve the instrument. The researcher employed Cronbach's alpha test method to establish reliability. A coefficient value of 0.8 was obtained in the test. Thus, the tool used for the study was acceptable and reliable.

Sampling technique

Non-probability sampling technique (convenience sampling) was used to recruit the Health care workers for the study. A purposive sampling technique was used to recruit Key informant interviewees.

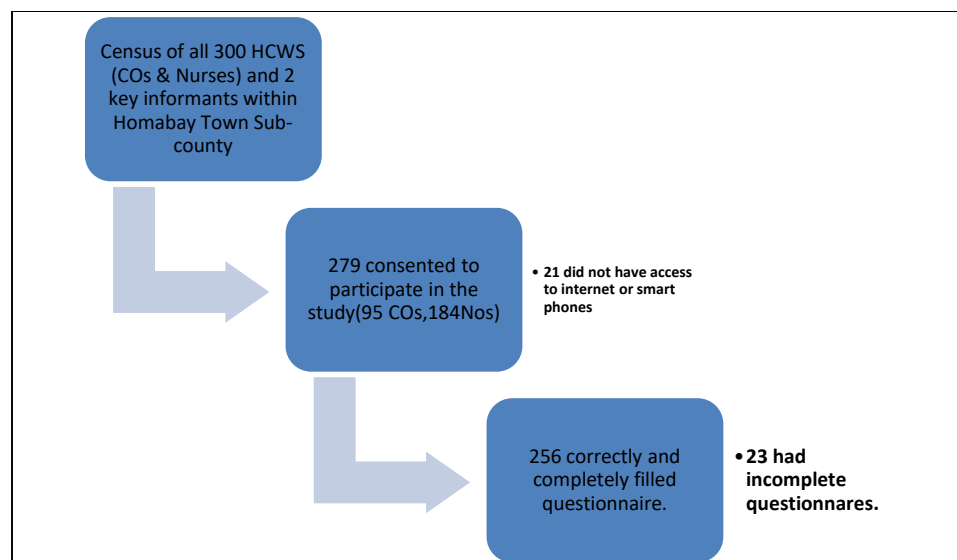


Figure 1:
Illustration of the sample size



Data collection procedures

Quantitative data was collected through a structured questionnaire in the form of a Google Link Form-online survey and qualitative data was collected by key informant interviews.

The researcher signed into her Google account, created a customized Google form and then shared the form with the different WhatsApp groups for nurses and clinical officers. Each time a form was filled by the respondent, it was automatically added and saved in Google Sheets spreadsheets.

For qualitative data, the researcher had a face-to-face interview with the key informants after being briefed about the study and consenting to the study. The sessions were transcribed verbatim and also recorded.

Data analysis and presentation

Grouping and coding of data collected was done to ease sorting. The completeness and consistency of the information obtained was checked. Data was entered in an Excel sheet and then exported to SPSS version 23.0 for analysis of both descriptive and inferential statistics. Descriptive analysis was computed to describe the socio-demographic characteristics of the participants and measure the time to Covid-19 vaccine acceptance. The chi-square test of association was also used to test for association between categorical and outcome variables. Only a P-value less than 0.05 was considered statistically significant. Findings were presented in the form of tables for easy interpretation. On the other hand, the qualitative data collected from the key informants was analyzed thematically and verbatimly within the result section of this work.

Ethical considerations

The study proposal was submitted to the Board of Postgraduate Studies, then (ERB) Ethical Review Board at Jaramogi Oginga Odinga Teaching and Referral Hospital to ensure the study was valid and promoted contribution to scientific knowledge. After approval by ERB, the researcher applied for a NACOSTI permit. Then

approval from the Homa Bay County Director of Health to commence data collection was also sought. Informed consent from the respondents was also sought before the filling of questionnaires. The participants were not exposed to any harm during the study.

Results

Two hundred and seventy-nine participants consented to participate and filled out the online version of the questionnaire out of which two hundred and fifty-six returned a correctly filled form that yielded an 85.3% response rate.

Table 1 The table shows two hundred and fifty-six returned a correctly filled form that yielded an 85.3% response rate 121(47.3%) were aged between 31 to 40 years. Fifty-seven percent, 147(57.4%) of the respondents were female and sixty-six percent of the respondents, 171(66.8%) were nurses. The majority of nurses had a diploma level of education 192 (75%) and were employed in the sub-county hospitals 104(40.6%). Gender was significantly associated with vaccine acceptance ($p < 0.043$). However, age category, Cadre, education level, religion, marital status, and facility level were not significantly associated with vaccine acceptance.

Uptake of COVID-19 vaccine

The level of Covid-19 vaccine uptake was over ninety-eight percent, 253(98.8%). The overall vaccine uptake level was equally distributed among the two cadres of healthcare workers (Figure 1). As much as there was a high uptake among the health care workers, 1.2% were hesitant and the reasons for hesitancy were vaccine side effects, safety concerns, and perceived low risk of getting infected with COVID-19 as reasons for the lack of uptake of vaccination. These are the issues pointed out during the study. "Concerns about safety" 27-year-old clinician "Perceived low risk of getting COVID-19" 27-year-old nurse "Because of adverse side effects" 25-year-old clinician, "I believe that a single jab is enough to boost



immunity" 32-year-old nurse and "It was a once / single dose drug" 31-year-old nurse.

The majority of respondents 61.7% (156) accepted the vaccine within 6 months of rollout. However, the acceptance of AstraZeneca

was the highest with 73% followed up by Moderna. The overall acceptance for each vaccine was;64.4% for AstraZeneca,8.7% for Moderna,20.9% for Johnson and Johnson, and 5.9% for Pfizer (Table 2).

Table 1:
Socio-demographic characteristics

Factor	Total (%)	Hesitant (%)	Non-hesitant (%)	P value
Age Category(years)				
21-30	110(43%)	1(0.9%)	109(99.1%)	0.896
31-40	121(47.3%)	2(1.7%)	119(98.3%)	
41-50	22(8.6%)	0	22(100%)	
51 and above	3(1.2%)	0	3(100%)	
Gender				
Female	147(57.4%)	0	147(100%)	0.043
Male	109(42.6%)	3(2.8%)	106(97.2%)	
Cadre				
Nursing Officer	171(66.8%)	2(1.2%)	169(98.8%)	0.996
Clinical Officer	85(33.2%)	1(1.2%)	84(98.8%)	
Education Level				
Specialist	12(4.7%)	0	12(100%)	0.896
Degree	47(18.4%)	1(2.1%)	46(97.9%)	
Diploma	192(75%)	2(1%)	190(99%)	
Certificate	5(2%)	0	5(100%)	
Healthcare facility level				
Dispensary	45(17.6%)	0	45(100%)	0.419
Sub county hospital	104(40.6%)	2(1.9%)	102(98.1%)	
County hospital	34(13.3%)	1(2.9%)	33(97.1%)	
Referral hospital	73(28.5%)	0	73(100%)	
Total	256(100%)	3(1.2%)	253(98.8%)	

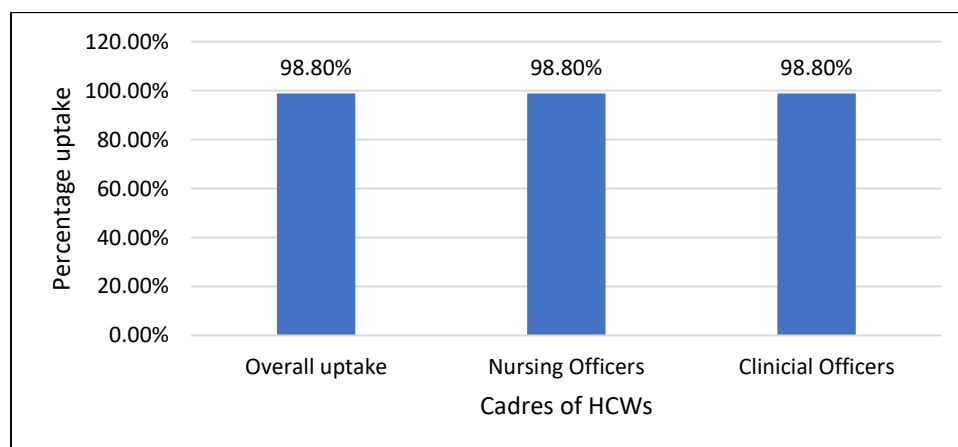


Figure 1:
Level of COVID-19 vaccine uptake



As shown in Figure 2, within a period of 6 months of the roll-out, the acceptance was 60.9% and six months later it was 83.6% and after one year it was 98.8%. With the concerns with the time to the vaccine acceptance, we sought the views of the sub-county public health nurse. She acknowledged low acceptance of the HCWs during the rollout of the vaccine regardless of the cadre (a nurse or clinical officer). She said:

"Acceptance of vaccine is very low generally amongst all HCWs regardless of the cadre being a nurse or clinical officer. Some got first doses but did not turn up for 2nd doses or booster doses"

We further asked some of the HCWs why they were not ready to go for the vaccine. The vaccine coordinator said:

"Lack of adequate knowledge; Rumours and misconception e.g. that it's associated

with blood clotting and also that exposure to COVID-19 infection confers lifelong immunity against future infection. The policy of liberty to opt out. It's not mandatory". - HCW

In addition, The Sub-County Clinical Officer raised concerns about the lack of information:

"There's inadequate information about the vaccine that needs to be shared".

Other concerns were lack of the proper documentation of the adverse events and this was noted as a concern:

"Common side effects of vaccines and possible management should be shared. However, there are no reported adverse events because they are never reported for documentation and classification". - HCW

Table 2:
Time to Vaccine Acceptance

Time to vaccination	AstraZeneca	Moderna	Johnson & Johnson	Pfizer	Total
<6months	119(73%)	13(59.1%)	16(30.2%)	8(53.3%)	156(60.9%)
7-12 months	23(87.1%)	8(95.4%)	22(71.6%)	5(86.7%)	58(83.6%)
>12 months	21(100%)	1(100%)	15(100%)	2(100%)	39(98.8%)
Overall Acceptance	163(100%)	22(100%)	53(100%)	15(100%)	253(98.8%)

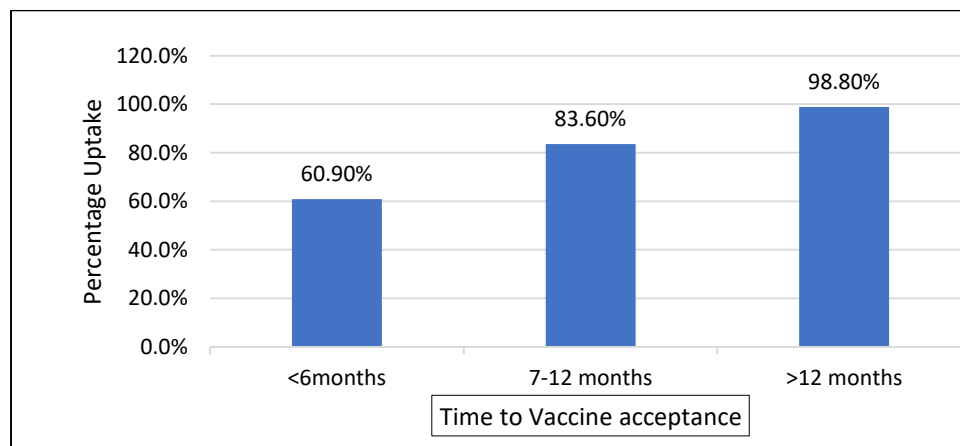


Figure 2:
Time to vaccine acceptance



Discussion

This study showed that 98.8% of HCWs accepted the vaccine, this is contrary to a study by Martin Ackah *et al* 2022 on COVID-19 acceptance among HCWs in Africa where the pooled estimated COVID-19 acceptance rate was 37% for North Africa, 28% for Central Africa, 48% West Africa, 49% East Africa and 90% in Southern Africa (5). Our study shows that over sixty percent, 163 (64.4%) of the HCWs accepted the AstraZeneca vaccine similar to a study by Shah *et al.*, 2022 that showed more than half (61.9%) reported getting the AstraZeneca vaccine; the first vaccine available in Kenya. A most recent study done in Kenya by Shah *et al.*, 2022 involving an online survey given to the general adult population in six different healthcare facilities between November 2021 and January 2022 reported that 72.2% of those vaccinated had received full vaccination (14). The possible reasons for the sharp contrast to previous findings could be due to the increased supply of vaccines, accelerated roll-out and increased priority given to the healthcare workers within the period. Another possible reason is that the focus was on two cadres of HCWs (Nurses and clinical officers) who directly handled COVID-19 patients.

Gender was significantly associated with vaccine hesitancy ($p < 0.043$). More female healthcare workers received vaccines compared to male healthcare workers. This finding is similar to a study on COVID-19 vaccine uptake roll-out in the first month in Saudi Arabia carried out by Mazin Barry *et al.*, 2020 where 66.5% of females were vaccinated and 59.2% were nurses (15) However, in the age category, Cadre, education level, religion, marital status, and facility level were not significantly associated with vaccine hesitancy. Our study further shows that 1.2% of the respondents were hesitant to take the vaccine, 72.5% felt COVID-19 is very risky if not vaccinated and 97.3% felt the vaccines are very effective. This study stratified the

respondents in terms of time to vaccine acceptance, 39.1% of HCWs were vaccine-hesitant within the first six months of rollout while 16.4% were vaccine-hesitant within the first year of vaccine rollout and only 1.2% were hesitant after more than one year (18 months) after rollout. The study findings show a much lower rate of vaccine hesitancy in sharp contrast to previous findings. As of 25th November 2021, a preliminary analysis by the World Health Organization (WHO) showed that only 27% of health workers in Africa had been fully vaccinated against Covid-19 (OKA, 2021). A study by Agyekum *et al* (2021) (16) involving a self-administered online survey between 16 January to 15 February 2021 also showed a different finding compared to this study. It showed that only 39.3% of HCWs intended to receive the vaccine. However, this study was conducted back when vaccines were first introduced into the market, in contrast to our current study.

While this study population generally showed good uptake of the Covid-19 vaccine the minority that showed hesitancy and those who failed to comply by not taking all required doses had their reasons for non-compliance. The HCWs stated vaccine side effects, safety concerns, and low risk of getting COVID-19 as reasons for the lack of vaccination. Those who did not take the second dose mentioned adverse side effects and some preferred a single-dose vaccine. However, the group that took a single-dose vaccine complied. It could be true that fear of side effects could have prevented complete compliance to vaccination or abstaining from vaccination. This is well reflected in a Finland study which showed complacency and worry about side effects were the main reasons against vaccination while concern about severe disease was a strong motive for vaccination (Hammer, 2021). A study by Shah *et al* found that 40.5% of respondents reported being hesitant to be vaccinated primarily due to side effects. (14) Similarly, an Indian study



showed that a significant proportion of eligible candidates had not turned up for their second dose of vaccine despite immense efforts made to develop a safe and effective vaccine (17)

Limitations of the study

The study only focused on clinical officers and nurses and therefore another study focusing on a wider scope of healthcare workers is advised on time to vaccine acceptance. Also, this study is done in a single county therefore finding is not representative of other counties to inform national strategies.

Conclusion

The study shows that the time to acceptance of the vaccine by the HCW remains a public health concern. Our findings agree with other studies consequently, there is a need to explore strategies that can help to improve the time to acceptance of the vaccine given the frequent pandemics. We recommend studies on time to acceptance to other interventions too so that the strategies may be cost-effective.

References

1. **World Health Organization.** Geneva: World Health Organization. 2022. WHO Health Emergency Dashboard WHO (COVID-19) Homepage.
2. **Chong PY, Yin H.** System dynamics simulation on spread of COVID-19 by traffic and transportation. *Jiaotong Yunshu Gongcheng Xuebao* *Journal Traffic Transp Eng.* 2020;
3. **Kannan S, Shaik Syed Ali P, Sheeza A, Hemalatha K.** COVID-19 (Novel Coronavirus 2019) - recent trends. *Eur Rev Med Pharmacol Sci.* 2020;
4. **Centers for Disease Control and Prevention.** Symptoms of Coronavirus (COVID-19). *Cdc.* 2020;
5. **Ackah M, Ameyaw L, Salifu MG, Asubonteng DPA, Yeboah CO, Annor EN, et al.** COVID-19 vaccine acceptance among health care workers in Africa: A systematic review and meta-analysis. *PLoS ONE.* 2022;17(5 May):1–15.
6. **Duchmann R.** COVID-19. *Endo-Prax.* 2020;

7. **Kumari A, Ranjan P, Chopra S, Kaur D, Kaur T, Upadhyay AD, et al.** Knowledge, barriers and facilitators regarding COVID-19 vaccine and vaccination programme among the general population: A cross-sectional survey from one thousand two hundred and forty-nine participants. *Diabetes Metab Syndr Clin Res Rev.* 2021 May 1;15(3):987–92.
8. **Aemro A, Fentie B, Wassie M.** Adherence to Covid-19 mitigation measures and its associated factors among health care workers at referral hospitals in Amhara regional state of Ethiopia. *PLoS ONE.* 2022;17(8 August):1–13.
9. **Sohrabi C, Alsafi Z, O'Neill N, Khan M, Kerwan A, Al-Jabir A, et al.** World Health Organization declares global emergency: A review of the 2019 novel coronavirus (COVID-19). *International Journal of Surgery.* 2020.
10. **Ministry of Health R of K.** Ministry of Health – Republic of Kenya. *MOH Kenya Website.* 2021.
11. **Lucia VC, Kelekar A, Afonso NM.** COVID-19 vaccine hesitancy among medical students. *J Public Health.* 2020;
12. **Wang MW, Wen W, Wang N, Zhou MY, Wang CY, Ni J, et al.** COVID-19 Vaccination Acceptance Among Healthcare Workers and Non-healthcare Workers in China: A Survey. *Front Public Health.* 2021;9(August):1–8.
13. **Abdulle HM, Masika MM, Oyugi JO.** COVID-19: knowledge, perception of risk, preparedness and vaccine acceptability among healthcare workers in Kenya. *Pan Afr Med J.* 2022;41.
14. **Shah J, Abeid A, Sharma K, Manji S, Nambafu J, Korom R, et al.** Perceptions and Knowledge towards COVID-19 Vaccine Hesitancy among a Subpopulation of Adults in Kenya: An English Survey at Six Healthcare Facilities. *Vaccines.* 2022;10(5):1–15.
15. **Barry M, Temsah MH, Aljamaan F, Saddik B, Al-Eyadhy A, Alenezi S, et al.** COVID-19 vaccine uptake among healthcare workers in the fourth country to authorize BNT162b2 during the first month of rollout. Vol. 39, *Vaccine.* 2021. p. 5762–8.
16. **Agyekum MW, Frempong Afrifa-Anane G, Kyei-Arthur F, Addo B, Author C.** Acceptability of COVID-19 vaccination among health care workers in Ghana. *medRxiv.* 2021;
17. **Harrison EA, Wu JW.** Vaccine confidence in the time of COVID-19. *Eur J Epidemiol.* 2020;35(4).