Original Research Article

Willingness to accept COVID-19 vaccine and its determinants among selected security personnel in Benin City

Andrew Ifeanyichukwu Obi[1-2]
Janet Ogbonna[1]
Major Usman Ogaba[1]
Ekaete Tobin[3]
Patrick Okundia[4]
Pius Ononigwe[5]
Faith Ireye[6]
Alphonsus Rukevwe Isara[1-2]
Regina Uwaoma Obi[7]

[1]Department of Public Health and Community Medicine, University of Benin, Benin City, Edo State, Nigeria.

[2]Centre of Excellence for Reproductive Health Innovation (CERHI), University of Benin, Benin City, Edo State,

[3]Institute of Lassa Fever Research and Control, Irrua Specialist Teaching Hospital, Irrua, Nigeria.

[4]State Ministry of Health, Edo State, Nigeria.

[5]Africa Centers for Disease Control and Prevention, Addis Ababa, Ethiopia.

[6]World Health Organization, Nigeria.

[7]Department of Sociology and Anthropology, University of Benin, Benin City, PMB 1154, Edo State, Nigeria

*For correspondence:

Tel: +2348023447122.
Email: andrew.obi@cerhi.uniben.edu

Abstract

Introduction: Perception towards health intervention such as COVID-19 vaccination to a large extent can influence willingness for vaccine acceptance and uptake. This study assessed determinants of willingness towards COVID-19 vaccine uptake among security personnel in Benin City Edo State, to help improve vaccine uptake among target population.

Methods: A descriptive cross-sectional study involving 482 security personnel from selected security agencies in Benin City was conducted between 1st February 2021 and 31st May 2021. Data collected were analysed using SPSS version 25.0 statistical software with statistical significance set at p<0.050 and 95% Confidence Interval.

Results: All respondents studied have heard of the term COVID-19, with mass media 330 (68.5%) and health workers 274 (56.8%) identified as the main source of information. One hundred and ninety-four (40.0%) and 344 (71.4%) of respondents had good knowledge and positive attitude towards COVID-19 preventive measures while 374 (77.6%) respondents were willing to take a COVID-19 vaccine. Small household size (OR=0.609; 95% CI =0.374-0.993; p =0.047), low educational status (OR=0.070; 95% CI =0.008-0.577; p =0.014) low rank care of security personnel (OR=0.319; 95% CI= 0.142-0.718; p =0.006) and category of security agency (OR=8.235; 95% CI =2.791-24.297; p <0.001) significantly influenced willingness for COVID-19 vaccination among security personnel.

Conclusion: Willingness for COVID-19 vaccination was high among security officers studied. Sustained strategic stakeholder engagement and sensitization of security personnel through routine health training and retraining on COVID-19 preventive measures is required to corresponding actual vaccination among target populations.

Keywords: COVID-19, COVID-19 Vaccine, Vaccination, willingness for vaccine uptake, Security Personnel, Benin City

Introduction

The COVID-19 pandemic has adversely impacted various aspects of our societies especially the way we live and work, including the health systems, socio-economic growth and development including individual, family, community life and wellbeing.[1-4] Global efforts is being intensified for a possible treatment for COVID-19 [4] However, implementation of effective preventive measures such as non-pharmaceutical interventions and vaccination remains a cost effective means of containing COVID-19 to assure global health and safety.[5-8]

Vaccination is considered as one of the most successful public health measures in combating infectious diseases as 2 to 3 million of lives are saved

each year through vaccination.[2] However for decades, vaccination has been perceived as unsafe and unnecessary by a growing number of individuals around the world and this mindset can bring about vaccine hesitancy, negatively impacting on willingness for vaccine uptake and acceptance.[9] There are currently four vaccines available and recommended against COVID-19 which include the COVID-19 vaccines manufactured by: Pfizer-BioNTech, Moderna, Johnson and Johnson/Janssen and AstraZeneca. As at February 2021,clinical trials were started on a vaccine called Novavax vaccine.[10] The vaccine currently available for distribution in Nigeria are the Oxford/AstraZeneca vaccine and the Moderna vaccine.[11] Nigeria received 4,024,000 doses of Oxford/AstraZeneca vaccine from the COVAX facility (a partnership between CEPI, Gavi, UNICEF and WHO) in March 2021[1] and successfully vaccinated 3,966,005, eligible persons across 36 States and FCT, representing 98.6% utilization of the vaccines during the first Phase of the vaccination rollout across the country. This comprised 2,549,599 people who were vaccinated for first dose, and 1,416,406 who have received their second dose of the AstraZeneca vaccine. Furthermore, the United States Government donated 4,000,080 doses of Moderna COVID-19 vaccine received in-country on August 1st, 2021. This was followed by 177,600 doses of the Johnson and Johnson vaccine which is the first tranche of the 29,850,000 doses the Federal Government has procured from the Africa-Export-Import (AFREXIM) Bank through the African Union.[1,9] However, the success of vaccination against COVID-19 is largely dependent on the willingness of the general populace to accept and receive the vaccine and the subsequent development of herd immunity.[11]Misinformation about the actual existence of COVID-19 and the fast-tracked discovery of the vaccine have remained in most health discuss and conversations in recent time. If these are not well handle through appropriate risk communication activities to dispel rumors and myths, they could mitigate against vaccine acceptance.[12]

Low uptake of vaccines is a widely recognized rate-limiting factor to achieving successful global vaccination against infectious diseases.[13] In Africa, the issue of vaccine hesitancy, defined as "delay in acceptance or refusal of vaccines despite the availability of vaccination services", has been reported.[14,15] It is influenced by factors such as complacency, convenience and confidence.[16] In recent times, there has been a growing anti-vaccine movement that include the various negative fake publicity through social media like WhatsApp and Facebook [13] The perception of the benefits and risks of vaccines plays a role in the development of vaccine hesitancy. Indeed, several studies show that individuals who perceive vaccines as less necessary and safe, more often reject scheduled vaccinations for themselves and significant others especially dependents.[17] Vaccine acceptance and uptake have been reported to be influence by level of education,

ethnicity, socio-cultural factors, religious factors, personal risk perception, access to social media, fear of side effects, accessibility to healthcare facility, sources of information and level of trust in the healthcare system.[13-17]

It is therefore imperative to assess possible determinants of willingness for COVID-19 vaccine uptake and by extension, its hesitancy in order to commence necessary mitigation measures to enhance adequate vaccine uptake. This study assessed the determinants of willingness towards COVID-19 vaccine uptake among security personnel in Benin City Edo State, to help improve vaccine uptake among target population

Methods

This descriptive cross sectional study was carried out in Benin City, Edo State among personnel of selected security agencies (Police, Edo State Traffic Maintenance Agency, Road Safety and Immigration) .[17] Benin City has 3 local government areas; Egor, Oredo and Ikpoba-Okha but is however expanding to include Ovia North East and Uhumnwonde.[18] Benin City has a number of security agencies such as the Nigerian Army, Airforce, Nigerian correctional service, Nigeria security and civil defence corps, Nigerian immigration service, federal road safety commission, Edo state traffic management agency and the Nigerian police force.[19,20,21,22]

A sample size of 482 security personnel was utilized for this study, calculated using Cochran formula[23] based on willingness to accept (50.2%)[24] a COVID-19 vaccine from a previous study. Self-administered questionnaire adapted from previous studies was utilized for the study. Pre-test was conducted among military personnel at Supply and Training barracks, at Egor LGA, Benin City, Edo State. Data collected was assessed for completeness, coded, subsequently entered and analyzed using IBM SPSS version 25.0 statistical software. The ranks of respondents were cadre into high, mid and low ranks.

Furthermore, attitude towards COVID-19 preventive measures was assessed with 18 questions using the Likert scale with a reliability (Cronbach alpha) score of 0.721. Responses were scored as appropriate or inappropriate responses, each appropriate response was scored as 1 while inappropriate responses scored as 0, given a maximum point score of 18. Scores were then converted to percentages, percentage score of ≥ 50% were graded as positive attitude and scores < 50% as negative attitude. Willingness to accept a COVID-19 vaccine was graded as "willing to accept" or "not willing to accept" vaccination based on a single question.

Ethical approval (ADM/E 22/A/VOL. VII/14831047) was obtained from the Health Research Ethics Committee of the University of Benin Teaching

Hospital, Benin City, Edo State before commencement of the study. Institutional approval at the various security agencies were also applied for and gotten before questionnaire administration.

Verbal informed consent was obtained from the respondents with full assurance of confidentiality of information." Health education session was administered to respondents on COVID-19 preventive measures following questionnaire administration. In relation to study limitation, timeline was used to reduce recall bias in the course of data collection and data was also subject to self-reporting.

Results

The mean age of respondents studied was 41.5±7.2) years. Slightly above average 255 (52.9%) had tertiary level of education, majority 431 (89.4%) were Christians while 393 (81.5%) have been married. Two hundred and twenty (45.6%) respondents were mid rank security personnel 220 (Table 1).

All respondents 482 (100%) were aware of covid-19 with mass media 330 (68.5%) and health workers 274 (56.8%) identified as main source of information (Table 2).

In relation to COVID-19 and its preventive measures, 427 (88.6%) of the respondents correctly identified it as viral disease, 451 (93.6%) correctly identified the route of transmission as airborne, 413(85.6%) of respondents correctly identified the typical symptoms of COVID 19. Furthermore, 449 (93.2%) correctly identified the non-pharmacological interventions, 262 (58.5%) correctly identified vaccination as a preventive measure against COVID-19. Finally, 215 (44.6%) respondents studied correctly identified that no specific treatment is available currently (Table 3).

Furthermore, in relation to knowledge of COVID-19 preventive measures, more than a third 194(40.2%) of security agents had a good knowledge of COVID 19 and its preventive measures while two third 288 (59.8%) had poor knowledge. In relation to willingness to accept COVID-19 vaccination, 374(77.6%) of security personnel studied were willing to accept vaccination against COVID 19 while 108 (22.4%) were not willing.

In relation to the determinants of willingness to accept vaccination against COVID 19 (Table 4), the odds of being willing to accept COVID-19 vaccine was significant among respondents with small household size (OR=0.609; 95% CI =0.374-0.993; p =0.047), low educational status (OR=0.070; 95% CI =0.008-0.577; p =0.014) low rank cadre of security personnel (OR=0.319; 95% CI= 0.142-0.718; p =0.006) and category of security agency (OR=8.235; 95% CI =2.791- 24.297; p <0.001).

Table 1: Sociodemographic characteristics of security agents

Variable	Frequency (n=482)	Percent
Age group(years)		
21-30	31	7.1
31-40	141	29.3
41-50	246	51
51-60	61	12.6
Sex		
Male	332	58.9
Female	150	31.1
Level of education		
None	0	0
Primary	5	1
Secondary	222	46.1
Tertiary	255	52.9
Ethnic group		
Benin	229	47.5
Esan	90	18.7
Etsako	74	15.4
Igbo	45	9.3
Yoruba	20	4.1
Urhobo	24	5.0
Religion		
Christianity	431	89.4
Islam	51	10.6
Marital status		
Never married	89	18.5
Ever married	393	81.5
Family type		
Nuclear	419	85.9
Extended	63	13.1
Family structure		
Monogamous	407	84.4
Polygamous	75	15.6
Household size		
1-5	228	47.3
>5	254	52.7
Security Agency		
Police	122	25.3
Immigration	120	24.9
FRSC	120	24.9
EDTSMA	120	24.9
Cadre		
High ranking	115	23.9
Middle rank	220	45.6
Low rank	147	30.5

Table 2: Source of information on COVID-19 among security agents

Variables*	Frequency (n=482)	Percent
Mass media	330	68.5
Health workers	274	56.8
Social media	258	53.5
Friends	175	36.3
Billboards	112	23.2
Family	1	0.2

*multiple response

Table 3: Knowledge of COVID-19 and its preventive measures among security agents

Variable	Correct responses (%)	Incorrect responses (%)
Causes		
Viral	427(88.6)	55(11.4)
Non-viral	55(11.4)	427(88.6)
Transmission*		
Air-borne	451(93.6)	31(6.4)
Non-airborne	421(21.8)	61(78.2)
Symptoms*		
Typical**	413(85.6)	69(14.4)
Non typical	395(82.1)	87(17.9)
Preventive measures*		
NPIs***	449(93.2)	33(6.8)
Vaccination	262(58.5)	220(41.5)
Others	432(89.7)	50(10.3)
Specific Treatment*		
No treatment	215(44.6)	267(55.4)
Other treatment modality	415(86.0)	67(14.0)

*Asterisk (*) indicates multiple response questions, ** indicates fever 459(96.9%), cough 463 (96.1%), difficulty in breathing 437(90.7%), loss of smell 360 (74.7%) and loss of taste 345 (71.6%); *** indicates use of face masks 480 (71.6%), sanitizer 479(99.4%), handwashing 476(98.8%), social 463 (96.1%) and physical distancing 348 (72.2%)*

Discussion

This study identified that a higher proportion of respondents studied were young and of the male gender. This is expected as security agencies are usually comprised of younger age group and men for better enforcement. This is similar to study done in Pune among the police force[18] which showed more men and younger persons as officers.

About half of the respondents studied were Benin, majority practiced Christianity as religion with the prevalent family type being nuclear, this observation is in keeping with the socio-demographics of study area[9,20]. Majority of the respondents had household size of greater than 5, this may be because of the high fertility rate of 5.8 in Nigeria and is keeping with data gotten from the Nigerian demographic and health survery.[19] Despite very high awareness of the term COVID-19 less than two third of respondents studied had poor knowledge of COVID-19 and its preventive measures. This was majorly due to inability of respondents to identify the mode of transmission and symptoms of the disease. This may be as a result of misconception about COVID-19 and possible gullible wrong information about COVID-19 on the social

Table 4: Logistic regression model for determinants of willingness to accept COVID-19 vaccine among respondents

Predictors	B (regression co-efficient)	Odds Ratio	95% CI for OR		p-value
			Lower	Upper	
Age					
21-30	21.456	2081569510	0.000		>0.999
31-40	22.235	4536118308	0.000		>0.999
41-50	23.494	2584567545	0.000		>0.999
51-60		1			
Sex					
Male	0.040	1.040	0.601	1.800	0.887
Female		1			
Marital status					
Never married	0.224	1.252	0.581	2.695	0.566
Ever married		1			
Household size					
1-5	-0.496	0.609	0.374	0.993	0.047*
>5		1			
Level of education					
Primary	-2.661	0.070	0.008	0.577	0.014*
Secondary	-0.122	0.885	0.438	1.790	0.734
Tertiary		1			
Security agency					
Police	2.108	8.235	2.791	24.297	<0.001*
Immigration	-0.556	0.573	0.291	1.129	0.108
FRSC	-0.978	0.376	0.195	0.725	0.004*
EDSTMA		1			
Cadre					
High Rank	-0.828	0.437	0.136	1.405	0.165
Middle Rank	-1.143	0.319	0.142	0.718	0.006*
Low Rank		1			
Knowledge of COVID-19 Prevention					
Good		1			
Poor	-0.273	0.761	0.437	1.325	0.334
Constant	-20.253				

R^2 = 6.1% - 9.0%, CI = Confidence interval, OR = Odds Ratio *Statistically significant (p<0.05)

media[21] at the onset of the pandemic, the disease was accorded 'disease of the rich and mighty' as most affected persons belonged to the high socioeconomic cadre or were politicians.[22] Also, a lot of false information was spread via social media as to the cause and mode of transmission.[21] This is in contrast to an online study done in Ogun state to measure the level of COVID-19 knowledge, attitudes, and practices of the Nigerian public[23] which identified majority of respondents with good knowledge.

This poor knowledge is a very concerning finding from this unique target population who are not only front line but expect to enforce COVID-19 preventive measures. It is therefore important to target security agencies and personnel for routine and regular training on COVID-19 preventive measures through campaigns to help address wrong information on COVID-19 and also help drive better behavioral change necessary to take up health interventions such as COVID-19 vaccination to help decrease incidence of COVID-19 and break the chain of transmission.

Massive health education campaigns across target groups on COVID-19 prevention and identifications of risks of COVID-19 have been identified in literature to influence behavior change towards health intervention.[24-26] Majority of respondents studied had positive attitude towards COVID-19 preventive measures, this finding is in contrast to an online study done in Nigeria which showed a negative attitude to COVID-19 preventive measures.[26]

This study identified a high willingness to accept COVID-19 vaccination among security agencies This is commendable and may be due to the massive public health campaigns on COVID-19 within the study area and also that the security personnel are frontline and were captured in the phase 1 vaccine rollout plan in Nigeria, hence the high willingness to be vaccinated. This is similar to a study done in Nigeria which showed increased willingness to accept vaccination.[27] It is therefore important for more and more public health education campaigns to target and special population so as to improve uptake of preventive measures.

This study revealed that willingness to be vaccinated was higher among younger persons. This may be as a result of fear of the disease and fear of transmitting the disease to their elderly parents who are more vulnerable. It may also be due to massive public health campaigns to COVID-19 as health education influences perception, attitude[24] which may in turn influence intention to be vaccinated. This is in contrast with an online study done in Nigeria which revealed more older persons willing to take the vaccine.[28] There is therefore a need to intensify public health campaign targeted at older age groups about the disease and vaccination so as to improve overall outcome of the disease.

This study also revealed that willingness to be vaccinated was higher among males compared to females. This is similar to a study done in south-south Nigeria where willingness to be vaccinated was higher in males.[29] It is therefore important that campaigns targeted at debunking myths about the vaccination be carried out so as to improve willingness and hence influence uptake of vaccination.

In addition, respondents with higher level of education were more willing to be vaccinated. This could be because they have more access to more information about the disease as well as their increased ability to make informed decisions. This is similar to a study done in Osun state Nigeria which showed more respondents with higher level of education having increased willingness to be vaccinated.[27] It is therefore imperative that public health campaigns be more inclusive including the use of jingles, plays and even vernacular English in disseminating information regarding COVID-19 vaccination.

Furthermore, findings from this study revealed more persons from smaller households as having decreased willingness to be vaccinated. This may be because of perceived higher risk of spread of COVID-19 in larger congregate settings and so the higher uptake will improve health outcome, ensure food security and good physical and mental well-being. There is no current available data on household as a predictor of willingness to receive vaccine. It is therefore important for increased public health campaigns directed at these groups to increase willingness and hence overall uptake so as to achieve herd immunity.

Respondents from the police and mid-ranking officers showed an increased willingness to receive vaccination. It may also be due to massive public health campaigns to COVID-19 as health education especially among the Police at it was predicted that they were at great risk at the onset of the second wave of COVID-19 within the study area. This may have influenced perception which may in turn influence intention to be vaccinated. It is therefore important that more and more health sensitization campaigns be done concerning vaccination as well as programs/ seminars debunking myths and misconceptions surrounding vaccination.

Conclusion

Although, knowledge of COVID-19 preventive measures was not a significant predictor for willingness for COVID-19 uptake the odds of being willing to take COVID-19 vaccine was higher among respondents with better knowledge of COVID-19 preventive measures. As such, the importance of education concerning health intervention in COVID-19 cannot be over emphasized in driving health intention and subsequent uptake. It is therefore important for stakeholder involvement as well as education of target

populations such as security agencies aimed at debunking myths surrounding COVID-19 vaccine are intensified to help increase willingness and improve overall uptake of vaccination among target populations.

List of abbreviations

FRSC, Federal Road Safety Corp, Nigeria; EDTSMA, Edo State Transport Management Agency; CI , Confidence interval; OR, Odds ratio

Declarations

Ethical approval (ADM/E 22/A/VOL. VII/14831047) was obtained from the Health Research Ethics Committee of the University of Benin Teaching Hospital, Benin City, Edo State before commencement of the study. Consent to participate in the Study and for publication were also duly obtained for the study and publication.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

No conflict of interest associated with this work.

Funding

No funding was received for this work

Contribution of Authors

We declare that this work was done by the authors named in this article and all liabilities pertaining to claims relating to the content of this article will be borne by the authors.

Acknowledgements

Appreciation to the Heads of the Security Agencies and the personnel that participated in the study.

Open Access

References

1. Africa Centre for Disease Control. Coronavirus in Africa. Available at https://www.africacdc.org/covid-19/ (Accessed 11 June 2020).
2. World Health Organization. Coronavirus disease (COVID-19). Situation Report-130. 2020,2021 May [cited May 30, 2020]. In: World Health Organization [Internet]. Available from: https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200529-covid-19-sitrep-130.pdf?sfvrsn=bf7e7f0c_4
3. "Coronavirus: Nigeria 'strengthens' surveillance at five international airports" https://www.premiumtimesng.com/news/top-news/374865-coronavirus-nigeria-strengthens-surveillance-at-five-international -airports.html. Premium Times. 29 January 2020. (Retrieved 10 March 2020).
4. Yongshi Y, Peng F, Wang R, Guan K, Jiang T, Xu G, Sun J, Chang C. The deadly coronaviruses: The 2003 SARS pandemic and the 2020 novel coronavirus epidemic in China. Elsevier Public Health Emergency Collection. 2020:1:3-5
5. Hui DS, Azhar E, Madani TA, Ntoumi F, Kock R, Dar O, Ippolito G, Mchugh TD, Memish ZA, Drosten C, Zumla A and Petersen E. The continuing 2019-nCoV epidemic threat of novel coronaviruses to global health— The latest 2019 novel coronavirus outbreak in Wuhan, China. International Journal of Infectious Diseases 2020, 91:264–266.
6. Chakraborty C, Sharma AR, Sharma G, Bhattacharya M, Saha RP, Lee SS. Extensive Partnership, Collaboration, and Teamwork is Required to Stop the COVID-19 Outbreak. *Arch Med Res.* 2020;51(7):728-730. doi:10.1016/j.arcmed.2020.05.021
7. Saha RP, Sharma AR, Singh MK, Samanta S, Bhakta S, Mandal S, Bhattacharya M, Lee SS, Chakraborty C. Repurposing Drugs, Ongoing Vaccine, and New Therapeutic Development Initiatives Against COVID-19. Front Pharmacol. 2020 Aug 19;11:1258. doi: 10.3389/fphar.2020.01258. PMID: 32973505; PMCID: PMC7466451.
8. Rodriguesn C & Plotkin S. Impact of vaccines, health, Economic and social perspectives. Frontiers in Microbiology. 2020:10-12
9. Speech by Dr Faisal Shuaib Executive Director of National Pprimary Health Care Development Agency at the national flag-off of phase 2 COVID-19 vaccination in Nigeria held on Monday 16th August 2021. Available from https://nphcda.gov.ng/ / (Accessed 13th September, 2021)
10. Centre for Disease Control and Prevention. Type of COVID vaccine. Available at https://cdc.gov/coronavirus/2019-nCoV/vaccines/different-vaccines.html (Accessed 9th June, 2021)
11. SSRN.Fact sheet: Hesitancy towards a COVID-19 vaccine and prospects for herd immunity, 2020. Available at:https://ssrn.com/abstract=3593098. (Accessed 11th February 2021.
12. Nigerian Centre for Disease Control. Vaccines in Nigeria. Available at https://covid19.ncdc.gov.ng/faq/#:~:text=The%20Government%20of%20Nigeria%20through,be%20provided%20by%20NPHCDA (Accessed at 9th June, 2021)
13. Piltch-Loeb R, DiClemente R. The vaccine uptake continuum: applying social science theory to shift vaccine hesitancy. Vaccines (Basel). 2020;8(1):76
14. Eskola J, Duclos P, Schuster M, MacDonald NE; SAGE Working Group on Vaccine Hesitancy. How to deal with vaccine hesitancy? Vaccine. 2015 Aug 14;33(34):4215-7. doi: 10.1016/j.vaccine.2015.04.043. Epub 2015 Apr 18. PMID: 25896378
15. Dubé E, Gagnon D, Nickels E, Jeram S, Schuster M. Mapping vaccine hesitancy--country-specific characteristics of a global phenomenon. Vaccine. 2014 Nov 20;32(49):6649-54. doi: 10.1016/j.vaccine.2014.09.039. PMID: 25280436; PMCID: PMC5355208.
16. Tavolacci MP, Dechelotte P, Ladner J. COVID-19 Vaccine Acceptance, Hesitancy, and Resistancy among University

Students in France. *Vaccines.* 2021; 9(6):654. https://doi.org/10.3390/vaccines9060654

17. Jacobson M, Sauver L, Griffin M, Maclaughlin L, Rutten J. How health care providers should address vaccine hesitancy in the clinical setting: Evidence for presumptive language in making a strong recommendation. BMC Pub Health. 2020:60-78

18. Kulkarni R., Kinikar A., Sonkawade N., Valvi C., Uday C, Dawre R, Pawar S., Jadhav T.,Chandanwale A., Tambe M., Venkatesham K., Suryavanshi N., 2020. Knowledge, Attitude and Practices of Pune Police force during COVID-19 pandemic: An Online cross-sectional survey

19. National Population Commission (NPC) [Nigeria] and ICF. 2019. Nigeria Demographic and Health Survey 2018 Key Indicators Report. Abuja, Nigeria, and Rockville, Maryland, USA: NPC and ICF

20. Edo State; Edo State government. About Edo State. 2020. Available at www..edostate.gov.ng/about-edo-state/ (Accessed 7th March, 2021)

21. Aluh DO, Onu JU. 2020. The need for psychosocial support amid COVID-19 crises in Nigeria. Epub ahead of print 22 June 2020. Psychological Trauma: Theory, Research, Practice, and Policy DOI 10.1037/tra0000704.

22. Nwaubani AT. 2020. Coronavirus: why some Nigerians are gloating about Covid-19—BBC news. Available at https://www.bbc.com/news/world-africa-52372737 (Accessed 11 August 2020).

23. Adesegun O., Binuyo T., Adeyemi O., Ehioghae O., Rabor D., Amusan O., Akinboboye O., Duke O., Olafimihan A., Ajose O., Idowu A., Abiodun O., The COVID-19 Crisis in Sub-Saharan Africa: Knowledge, Attitude and Practices of the Nigerian Public. American Journal of Tropical medicine and hygiene. doi:10.4269/ajtmh.20-0461 p5.

24. Ekaete Alice Tobin, Martha Okonofua, Azuka Adeke, Andrew Obi, Willingness to Accept a COVID-19 Vaccine in Nigeria: A Population-based Cross-sectional Study, Central African Journal of Public Health. Vol. 7, No. 2, 2021, pp. 53-60. doi: 10.11648/j.cajph.20210702.12

25. Remuzzi A, Remuzzi G. COVID-19 and Italy; what next? Lancet 2020 Apr; 395 (10231): 1225-1228.

26. Adenubi O, Adebowale O, Adetokunbo A, Bankole N, Adesokan H, Oladotun E, Ayo-Ajayi P, Koyuum A. Level Of Knowledge, Attitude And Perception About COVID-19 Pandemic And Infection Control: A Cross-Sectional Study Among Veterinarians In Nigeria. Veterinary Journal of medicine. 2020:1-24. doi:10.20944/preprints202007.0337.v1i:10944/preprints202007.0337.v1

27. Akinyemi P, Fajobi O, Owoade I, Elugbaju O, Wuraola F. Community perception and determinants of willingness to uptake COVID-19 vaccines among residents of Osun State, South-West Nigeria. International Journal of Community Medicine and Public Health.2021Apr;8(4):1551-1557.

28. Eniade O, Olarinmoye A, O tovwe A,Akintunde F, Okedare O, Aniyeloye A.Willingness to Accept COVID-19 Vaccine and Its Determinants among Nigeria Citizens: A Web based Cross-sectional study.Journal of Advances in Medicine and Medical Research. 2021;33(8): 13-22

29. Allagoa D, Oriji P, Tekenah E,Obagah L, Njoku C, Afolabi A, Atemie G. Predictors of acceptance of COVID-19 vaccine among patients at a tertiary hospital in South-South Nigeria.International Journal of Community Medicine and Public 2021;8(5):2165-2172.