VOLUME 39, NUMBER 4
April 2022

ISSN 0189 - 160X

WAJM

WEST AFRICAN JOURNAL OF MEDICINE

ORIGINALITY AND EXCELLENCE IN MEDICINE AND SURGERY

OFFICIAL PUBLICATION OF
THE WEST AFRICAN COLLEGE OF PHYSICIANS *AND*
WEST AFRICAN COLLEGE OF SURGEONS

www.wajmed.org

WEST AFRICAN JOURNAL OF MEDICINE

WEST AFRICAN JOURNAL OF MEDICINE

ORIGINAL ARTICLE

Assessment of Knowledge, Attitude and Factors Influencing Uptake of COVID-19 Vaccine among Traders at Edaiken Market, Uselu, Benin City, Edo State, Nigeria

Évaluation des Connaissances, de L'attitude et des Facteurs Influençant L'adoption du Vaccin Contre la COVID-19 chez les Commerçants du Marché d'Edaiken, Uselu, Benin City, État d'Edo, Nigéria

[1,2,3]*O. E. Obarisiagbon, [1,2,3]N. Mokogwu

ABSTRACT

BACKGROUND AND OBJECTIVES: Vaccination is a critical tool in the battle against COVID-19, and a public health necessity in combating the pandemic. Challenges in getting the public to accept the vaccine may be due to vaccine hesitancy which may be caused by poor knowledge, poor attitude, ethical issues and safety concerns. The study aimed at assessing the knowledge, attitude and factors affecting the acceptability of COVID-19 vaccine among traders at Edaiken market, Uselu, Benin City, Edo State

METHODS: This was a descriptive cross-sectional study conducted among 400 traders using multistage sampling technique in Benin City, Edo State. A forty-one-item questionnaire was utilized to collect data. Data were analyzed with IBM SPSS version 25.0 and quantitative variables were expressed as frequencies, proportions, means and standard deviation. Level of statistical significance was set at $p<0.05$.

RESULTS: A higher proportion (35.2%) of respondents were aged between 20 – 29 years of age and almost three-quarters (74.0%) were females, while 48.7% were married. Almost one-third, 30% of the respondents had good knowledge of COVID-19 and 375 (93.8%) had poor knowledge regarding COVID-19 vaccine. One-fifth (20.8%) of respondents had a positive attitude towards COVID-19 vaccine and 90 (22.5%) respondents did not know where to get the vaccine.

CONCLUSION: Knowledge of COVID-19 vaccines was poor among the respondents, with most of them displaying a negative attitude to the vaccine. Knowledge of locations for obtaining vaccines was reported as a factor that would influence vaccine uptake. We recommend campaigns by public health authorities aimed at sensitizing the public about availability and importance of COVID-19 vaccine. **WAJM 2022; 39(4): 327–335.**

Keywords/MeSH Terms: Vaccine uptake, vaccine acceptability, COVID-19 vaccines, knowledge, attitude, factors influencing vaccine uptake.

RÉSUMÉ

CONTEXTE ET OBJECTIFS: Les vaccins sont un outil essentiel dans la lutte contre le COVID-19 et une nécessité de santé publique dans la lutte contre la pandémie. Les difficultés à faire accepter le vaccin au public peuvent être dues à une hésitation à l'égard du vaccin et cela peut être causé par une mauvaise connaissance, une mauvaise attitude et des problèmes éthiques de sécurité. L'étude visait à évaluer les connaissances, l'attitude et les facteurs affectant l'acceptabilité du vaccin COVID-19 parmi les commerçants du marché d'Edaiken, Uselu, Benin City, Edo State

METHODES: Il s'agissait d'une étude transversale descriptive menée auprès de 400 commerçants à l'aide d'une technique d'échantillonnage à plusieurs degrés à Benin City, dans l'État d'Edo. Un questionnaire de quarante et un éléments a été utilisé pour collecter les données. Les données ont été analysées avec IBM SPSS version 25.0 et les variables quantitatives ont été exprimées en fréquence, pourcentages, moyenne et écart type.

RESULTATS: Une proportion plus élevée (35.2 %) des répondants étaient âgés de 20 à 29 ans et près des trois quarts (74.0 %) étaient des femmes tandis que 48.7 % étaient mariés. Près d'un tiers, 30% des répondants avaient une bonne connaissance du COVID-19 et 375 (93.8 %) avaient une mauvaise connaissance du vaccin COVID-19. Un cinquième (20.8%) des répondants avaient une attitude positive envers le vaccin COVID-19 et 90 (22.5 %) des répondants ne savaient pas où se procurer le vaccin.

CONCLUSION: La connaissance des vaccins COVID-19 était faible parmi les répondants, la plupart des répondants affichant une attitude négative à l'égard du vaccin. La connaissance des lieux d'obtention des vaccins a été signalée comme un facteur susceptible d'influencer l'adoption des vaccins. Nous recommandons des campagnes par les autorités de santé publique visant à sensibiliser le public à la disponibilité et à l'importance du vaccin COVID-19. **WAJM 2022; 39(4): 327–335.**

Mots-clés: Adoption du vaccin, acceptabilité du vaccin, vaccins contre la COVID-19, connaissances, attitude, facteurs influençant l'adoption du vaccin.

[1]**Department of Public Health and Community Medicine, University of Benin, Benin City, Edo State, Nigeria.**
[2]**Department of Public Health and Community Medicine, University of Benin Teaching Hospital, Benin City, Edo State, Nigeria.**
[3]**Centre of Excellence for Reproductive Health Innovation (CERHI), University of Benin, Benin City, Edo State, Nigeria.**
***Correspondence:* Dr. O. E. Obarisiagbon,** Department of Public Health and Community Medicine, University of Benin Teaching Hospital, Benin City, PMB1111, Edo State, Nigeria. Telephone: +2348033700722. Email: otaniyenuwa.obarisiagbon@uniben.edu

Abbreviations: COVID, Coronavirus disease of 2019; **MERS,** Middle Eastern Respiratory Syndrome; **SPSS,** Statistical Package for Social Sciences; **WHO,** World Health Organisation

INTRODUCTION

Coronaviruses are a large family of viruses that are known to cause illness ranging from the common cold to more severe diseases such as Middle East respiratory syndrome (MERS) and severe acute respiratory syndrome (SARS). The novel coronavirus (SARS-CoV-2) is a new strain, with the first case being detected in the Hubei province of China at the end of December 2019.[1] According to current evidence, Coronavirus is primarily transmitted between people through respiratory droplets and contact route with coughing and sneezing being the most contagious routes.[2]

Since the onset in 2019, both pharmacological and non-pharmacological measures have been put in place to reduce COVID-19 transmission, some of the non-pharmacological measures include hand washing, social distancing and practicing cough etiquettes.[3] The pharmacological measures include the use of COVID-19 vaccines. Vaccines are critical tools in the battle against COVID-19. By January 7, 2021, two vaccines Pfizer and Moderna had been approved by the Food and Drug Administration (FDA) and their administration had already commenced.[4,5] Getting infected with COVID-19 may offer some sort of natural protection known as immunity. However, experts do not know for sure how long this protection lasts, and the risk of severe illness and death from COVID-19 far outweighs any benefit that would be obtained by natural immunity. COVID-19 vaccination protects by creating an antibody response without having to experience sickness.[1]

It is believed that ending the COVID-19 pandemic relies heavily on the vast majority of people getting vaccinated to safely reach herd immunity and limit the ability of the corona virus to spread, yet vaccine hesitancy remains a huge challenge. According to a recent University of Michigan report of the sponsored national poll on healthy aging, an estimated slightly above half of adults aged 50–80 when asked in the fall of 2020 said they would get vaccinated against COVID-19 when it was their turn.[6] Vaccine hesitancy has been identified as a growing trend in global health in the United States, Canada and especially in Africa which can result from a wrong perception.

Research conducted to assess people's perception on whether they would be willing to receive a vaccination against the virus, showed that the proportion of respondents willing to be vaccinated decreased over time from 79% to 60%.[7] Studying the knowledge and perceptions among key community groups such as market women especially in a developing setting like Nigeria may help public health authorities gain insight about factors that may hinder or promote vaccine uptake especially with the COVID-19 vaccine.

In a typical Nigerian setting, traders are exposed to conditions like overcrowding at the markets with open stalls and have interactions with diverse persons from different backgrounds. Therefore, assessing their knowledge and perceptions to the COVID-19 vaccine programme would provide useful information that would help drive risk communication messages.

An understanding of traders' willingness to take the vaccine and the factors influencing it will contribute to the development and implementation of effective strategies towards reducing the burden of this disease.

The aim of this study was to assess the knowledge, attitude, and factors influencing uptake of COVID-19 vaccine among traders at Edaiken Market in Benin City, Edo State.

SUBJECTS, MATERIALS AND METHODS

Study Area

This study was carried out in Edaiken Market Uselu in Benin City, Edo State Nigeria. Edo State is one of the 36 States in Nigeria and it is located at Latitude 6.34° North, Longitude 5.63° East, and 80 metres elevation above sea level with a landmass of approximately 1,217km.[8]

Benin City is the capital of Edo State and the City is made up of three Local Government Areas (LGAs), namely Egor, Oredo, and Ikpoba-Okha. Benin City had a population of 1,778,938 in 2021.[9] The City is cosmopolitan and the inhabitants are mainly civil servants, artisans, and traders. Edaiken Market also called Uselu market is located in Egor Local Government Area. There are five main markets in Egor LGA namely Edaiken, Oliha, Evbuotubu, Siluko, and Ogida.[10]

Edaiken market is one of the biggest and oldest markets in Egor as well as in Benin City. It is located along Latitude 6.4091N and Longitude 5.6143E. It is bounded by Uselu-Lagos Road to the south, Mela Motel Road to the East, Egor Local Government Secretariat to the north, and Mount Gilead Hospital to the west. People from different tribes such as Benin, Esan, Urhobo, Hausa, Igbo, Yoruba, and the neighbouring States like Delta, and Kogi have shops/stores, stalls and stands in the market. Edaiken market is strategically located along Uselu–Lagos. In 2020, the market was renovated by the Edo State Government with improved infrastructure like lock-up shops, electricity and water supply. Currently, there are over 1,500 lock-up shops and 1,000 stands/stalls in the market. They are arranged in rows and columns. Each row deals with different items. For example, there are rows for perishable goods, sundries, household accessories, etc.[10]

This was a descriptive cross-sectional study conducted among traders at Ediaken market in Benin City, Edo State which focused on the knowledge of COVID-19 and its vaccination amongst the traders at the market. It also assessed the attitude of the traders towards the vaccine and their level of acceptability of COVID-19 vaccination.

The sample size was determined using the Cochrane formula for simple proportions[11]

$n = z^2pq/d^2$

Where, n= minimum sample size

z = standard normal deviate at 95% confidence level (1.96)

p = prevalence rate of a particular characteristics

d = level of accuracy

q =1.0-p

For this study p was taken as 0.63 which corresponds to 63% respondents willing to take the COVID-19 vaccine among South Africans.[12]

$$n = \frac{1.96^2 \times 0.63 \times 0.37}{0.05^2}$$

$n = 358.19$

Calculating using 10% non-response rate $n_f = 393$

However, for the purpose of this study a sample size of 400 was used.

Sampling Technique

The respondents were chosen using a multi stage sampling technique.

Stage 1: Selection of Local Government Area.
Edo State has 18 Local Government Areas (LGA). Egor LGA was selected using simple random sampling (balloting).

Stage 2: Selection of market.
There are 5 major markets in Egor LGA. Edaiken market was selected by simple random sampling (balloting).

Stage 3: Selection of stalls
This was done using systematic sampling. Edaiken market has 1207 stalls.

Sample size = 400

Sampling interval =study population/ sample size

$1207/400 = 3.017 \approx 3$

The first stall was selected by simple random sampling, thereafter every 3rd stall was selected and respondents interviewed until sample size was completed.

Tools and Methods of Data Collection

The data was obtained using a structured interviewer-administered questionnaire adapted from a study on perception, acceptance and uptake of human papilloma vaccine among female adolescents in selected secondary schools in Ibadan, Nigeria and a second study on the Assessment of knowledge, perception and readiness of Nigerians to participate in the COVID-19 vaccine trial.[13,14]

The questionnaire addressed the knowledge of COVID-19 and COVID-19 vaccine among traders in Edaiken Market, their attitude towards COVID-19 vaccine and the factors influencing uptake of COVID-19 vaccine among the traders.

An interviewer asked the respondents questions in stalls at their comfort and convenience to guarantee optimum response. Explanation of the purpose of the study ensured maximum participation by the study participants. Questionnaires took approximately 5 minutes to administer.

Scoring of Variables

Knowledge of COVID-19

A total of 5 questions were used to assess knowledge of COVID-19 under 5 domains: (Awareness of COVID-19, knowledge of definition of COVID-19, knowledge of the symptoms of COVID-19, knowledge of the modes of transmission and the preventive measures of COVID-19) Knowledge of COVID-19 was assessed with 5 questions. WHO defines COVID-19 as an infectious disease caused by a newly discovered coronavirus.[15] The correct symptoms of COVID-19 according to WHO are cough, loss of smell, fever, difficulty in breathing, loss of taste.[16] The modes of transmission of COVID-19 are person to person (shaking of hands), hugging and touching of contaminated surfaces.[15] The preventive measures of COVID-19 are wearing of face masks, social distancing, washing of hands and using hand sanitizers.[17] Questions under these domains were scored. A score of 1 was given to questions answered correctly and 0 for wrong answers in each domain, each domain was scored then scores were added together to get an aggregate score. The minimum score attainable was 0 and the maximum score was 5. The total score was then converted to percentages. A percentage of less than 70 was scored as poor knowledge while 70 and above was scored as good knowledge.

Knowledge of COVID-19 Vaccine

A total of 6 questions was used to assess the knowledge of COVID-19 under the following domains (Awareness of COVID-19 vaccine, understanding of COVID-19 vaccine, types of COVID-19 vaccine, doses of COVID-19 vaccine, availability in Nigeria and safety of the COVID-19 vaccine).

The types of COVID-19 are Astrazeneca, Moderna and Pfizer.[18,19] It is a two-dose series separated by a minimum of 21 days and is currently available in Edo State and other states in Nigeria.[20,21]

The knowledge variables were recorded to binary levels such that respondents with the correct options in the knowledge of COVID-19 variables were coded 1 while the wrong options were coded zero. The minimum score attainable was 0 and the maximum score was 6. Respondents' score was then computed and converted to percentages. A score of greater than 70% was termed good knowledge and less than 70% was termed poor knowledge.

Attitude towards COVID-19 Vaccine

The attitude of respondents towards COVID-19 vaccine was assessed using 10 questions. This was scored using the three-point Likert scale: "Agree", "Undecided", "Disagree". 'Agree' was given a score of 2 for correct answers; 'undecided' was given a score of 1, and disagree' was given a score of 0 for attitude questions that required an affirmative response. Whereas, for attitude questions which required a negating response, 'agree' was given a score of 0, 'undecided' was given a score of 1 and 'disagree' was given a score of 2. The minimum score attainable was 0 while the maximum score was 20. Respondents' scores were computed to percentages, and a score of 70% and above was termed positive attitude while a score of less than 70% was termed negative attitude.

Statistical Analysis

The questionnaires were screened for completeness. Data coding and cleaning was done. Data was entered and analyzed with IBM SPSS version 25.0 software. Categorical data such as age group, sex, and education etc., were presented as frequencies and proportions while continuous data that were normally distributed like age were presented as mean and standard deviation. Knowledge and attitude to COVID-19 vaccination were represented in proportions.

Bivariate analysis was done to determine association of socio-demographic characteristics with knowledge and attitude, and towards the COVID-19 vaccine using Chi-square test. The Fisher's exact test was used in instances where more than 20% of the cells had an expected count less than 5'. Multivariate analysis was done using

logistic regression to identify predictors of uptake of the COVID-19 vaccine among the respondents. The level of significance was set as $p<0.05$.

Ethical Consideration

Ethical approval to conduct the study was sought from the Research Ethics Committee, University of Benin, Ugbowo, Benin City. REC Approval Number: (CMS/REC/2021/195).

The respondents were informed that participation in the study was voluntary and that information provided in the survey would be anonymous and confidential. Verbal consent was then obtained before participation.

RESULTS

A total of 400 respondents participated in the research. More than a third of the respondents 141 (35.3%) were in the age group 20–29; 128 (32.0%) were in the age group 30–39, a smaller proportion 67(16.8%) were in the age group 40–49. A higher proportion was female (74.0%) and 195 (48.0%) of the respondents were married. Christianity was the predominant religion with Pentecostal having the highest frequency with 246 (61.5%); Anglican respondents were 41 (10.3%), Jehovah witnesses 13 (3.3%) and African traditional religion 29 (7.1%). The highest proportion 210 (52.5%) of the respondents had a secondary level of education, 36 (9.0%) had no formal level of education while less than half 92 (23.0%) had tertiary level of education (Table 1).

Table 1: Socio-demographic Characteristics of Study Participants

Variable	Frequency (n=400)	Percent (%)
Age group (years)		
20 – 29	147	35.2
30 – 39	128	32.0
40 – 49	67	16.8
50 – 59	50	12.5
60 and above	14	3.5
Mean ± SD (years)	35.8 ± 11.5	
Sex		
Female	298	74.0
Male	104	26.0
Marital status		
Married	195	48.7
Single	170	42.5
Divorced	16	4.0
Widowed	19	4.8
Religion		
Pentecost	246	61.5
Catholic	49	12.3
Anglican	41	10.3
African Traditional Religion	29	7.1
Muslim	22	5.5
Jehovah's Witness	13	3.3
Level of Education		
No formal	36	9.0
Primary	62	15.5
Secondary	210	52.5
Tertiary	92	23.0

Most 319 (79.8%) of the respondents knew the correct answer to the meaning of COVID-19, which was coronavirus disease-19 while 81 (20.2%) chose incorrect answers which were bacterial infection, fungi infection and I don't know. Most respondents 360 (90.0%) also knew the correct answers to symptoms of COVID-19.

A majority, 280 (70.0%) of the respondents, had poor knowledge of COVID-19, while 120 (30.0%) had good knowledge of COVID-19.

A higher proportion 246 (61.5%) of respondents had incorrect understanding of COVID-19 while most 374 (93.5%) respondents did not know the types of COVID-19 vaccine. Most respondents, 394 (98.5%) did not know the number of doses needed. More than half, 234 (58.5%) of respondents interviewed knew the COVID-19 vaccine was available in Nigeria. Most respondents 15.8 (84.2%) said the vaccine was not safe (Table 2).

Majority, 375 (93.8%) of respondents had poor knowledge of COVID-19 vaccine while 25 (6.2%) had good knowledge of COVID-19 vaccine (Table 2).

Most 319 (79.8%) of the respondents knew the correct answer to the meaning of COVID-19, which was coronavirus disease-19 while 81 (20.2%) chose incorrect answers which were bacterial infection, fungi infection and I don't know. Most respondents 360 (90.0%) also knew the correct answers to symptoms of COVID-19.

A majority, 280 (70.0%) of the respondents, had poor knowledge of COVID-19, while 120 (30.0%) had good knowledge of COVID-19.

A higher proportion 246 (61.5%) of respondents had incorrect understanding of COVID-19 while most 374 (93.5%) respondents did not know the types of COVID-19 vaccine. Most respondents, 394 (98.5%) did not know the number of doses needed. More than half, 234 (58.5%) of respondents interviewed knew the COVID-19 vaccine was available in Nigeria. Most respondents 15.8 (84.2%) said the vaccine was not safe (Table 2).

Majority, 375 (93.8%) of respondents had poor knowledge of COVID-19 vaccine while 25 (6.2%) had good knowledge of COVID-19 vaccine (Table 2).

Regarding attitude of respondents displayed towards COVID-19 vaccination, more than half, 230 (57.5%) of respondents disagreed that the COVID-19 vaccine would keep them safe; 223 (55.8%) reported that they would not give their child permission to take the vaccine; 237 (59.3%) didn't think the

Table 2: Knowledge of COVID-19 and COVID-19 Vaccine of Study Participants

Variable	Frequency (n=400)	Percent (%)
Meaning of COVID-19		
Correct	319	79.8
Incorrect	81	20.2
Symptoms of COVID-19		
Correct	360	90.0
Incorrect	40	10.0
Knowledge of COVID-19		
Good	280	70.0
Poor	120	30.0
Understanding of COVID-19 vaccination		
Correct	154	38.5
Incorrect	246	61.5
Types of COVID-19 vaccine		
Correct	26	6.5
Incorrect	374	93.5
Doses needed		
Correct	6	1.5
Incorrect	394	98.5
Availability in Nigeria		
Correct	234	58.5
Incorrect	166	41.5
Safety of COVID-19 vaccine		
Correct	63	15.8
Incorrect	337	84.2
Knowledge of COVID-19 vaccine		
Good	25	6.2
Poor	375	93.8

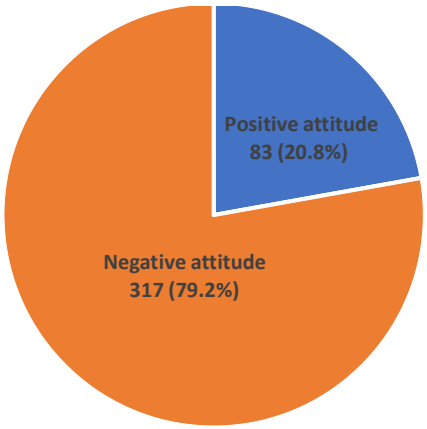

Fig. 1: Attitude of Respondents to COVID-19 Vaccination

vaccine would keep them safe; 263 (65.8%) were discouraged by the unknown safety profile and 237 (59.3%) would not use the vaccine even if it was safe.

Almost two-thirds, 252 (63.0%) of respondents didn't know much about the vaccine so they would not take it. More than half, 259 (57.3) of respondents would not encourage their friends and family to take the vaccine; 119 (29.8%) think taking the COVID-19 vaccine is really important and almost half, 194 (48.5%) of respondents disagreed that the speed of developing the vaccine meant it would be safe (Table 4).

Only one-fifth, 83 (20.8%) of respondents displayed a positive attitude to the COVID-19 vaccine while 317 (79.2%) had negative attitude towards the COVID-19 vaccine (Figure 1).

A higher proportion (29.9%) of the respondents with positive attitude to COVID-19 vaccine belonged to age group 40–49 years. A higher proportion (26.9%) of respondents with positive attitude to the vaccine were males and had a primary level of education (28.3%). However, this association was not statistically significant (p = 0.090 and p=0.071 respectively). Majority (64.0%) of respondents with good knowledge about COVID-19 vaccine had a positive attitude to COVID-19 vaccine (p<0.001) (Table 5).

More than half (55.8%) of all respondents interviewed reported that religious beliefs did not encourage COVID-19 vaccination; 31 (7.8%) reported

Table 3: Socio-demographic Characteristics and Knowledge of COVID-19 Vaccine

Variables	Knowledge of Vaccine		Chi-square Test	p value
	Good n = 25 Freq (%)	Poor n = 375 Freq (%)		
Age Group (years)				
20 – 29	11 (7.8)	130 (92.2)	5.661	0.318
30 – 39	6 (4.7)	122 (95.3)		
40 – 49	5 (7.5)	62 (92.5)		
50 – 59	1 (2.0)	49 (98.0)		
≥60	2 (14.3)	12 (85.7)		
Sex				
Male	6 (5.8)	98 (94.2)	0.055	0.814
Female	19 (6.4)	277 (93.6)		
Level of education				
No Formal Education	1 (2.8)	35 (97.2)	16.881	<0.001
Primary	3 (4.8)	59 (95.2)		
Secondary	6 (2.9)	204 (97.1)		
Tertiary	15 (16.3)	77 (83.7)		
Marital status				
Married	11 (5.6)	184 (94.4)	1.973	0.585
Single	12 (7.1)	158 (92.9)		
Divorced	0 (0.0)	16 (100)		
Widowed	2 (10.5)	17 (89.5)		

Table 4: Attitude of Respondents towards COVID-19 Vaccine

Variables	Attitude n=400		
	Agree Freq (%)	Undecided Freq (%)	Disagree Freq (%)
I feel at risk of getting COVID-19			
I will take the vaccine	112(28)	58 (14.5)	230 (57.5)
I will give permission to child to have the vaccine	115 (28.8)	62 (15.5)	223 (55.8)
I think taking the vaccine will keep me safe	114 (28.5)	49 (12.3)	237 (59.3)
The unknown safety profile discourages me from taking the COVID-19 vaccine	263 (65.8)	49 (12.3)	88 (22.0)
I will use the COVID-19 vaccine if it is free	106 (26.5)	57 (14.3)	237 (59.3)
Little knowledge of vaccine so I won't take it	252 (63.0)	45 (11.3)	103 (25.8)
I will encourage my family and friend to take the vaccine	113 (28.3)	58 (14.5)	259 (57.3)
Taking a COVID-19 vaccination is really important	119 (29.8)	53 (13.3)	228 (57.0)
If we were required by the government I will take it	127 (31.8)	80 (20.0)	193 (48.3)
The speed of developing the vaccine means it will be really safe	83 (20.8)	123 (30.8)	194 (48.5)

Table 5: Association between Socio-demographic Characteristics and Attitude of Respondents towards COVID-19 Vaccines

Variables	Attitude		Chi-Square Test	p-value
	Positive (n=83) Freq (%)	Negative (n=317) Freq (%)		
Age				
20 – 29	25 (17.7)	116 (82.3)	4.855	0.302
30 – 39	27 (21.1)	101 (78.6)		
40 – 49	20 (29.9)	47 (70.1)		
50 – 59	8 (16.0)	42 (84.0)		
≥60	3 (21.4)	11 (78.6)		
Sex				
Male	28 (26.9)	76 (73.1)	3.257	0.071
Female	55 (18.6)	241 (81.4)		
Level of Education				
No formal education	9 (25.0)	27 (75)	11.474	0.090
Primary	18 (29.0)	44 (77)		
Secondary	30 (14.30	180 (85.7)		
Tertiary	26 (28.3)	66 (71.7)		
Knowledge of COVID-19 Vaccine				
Good knowledge	16 (64.0)	9 (36.0)	30.334	<0.001
Poor knowledge	67 (17.9)	308 (82.1)		

that receiving the vaccine was against their cultural beliefs; 104 (26.0%) reported that support from family encourages COVID-19 vaccination and 90 (22.5%) respondents did not know where to get the vaccine (Table 6).

In relation to predictors of COVID-19 uptake among respondents, secondary level of education (OR= 0.193, 95% CI 0.047 – 0.801, p=0.024), family support (OR= 0.204, 95% CI = 0.053–0.787, p=0.021), knowledge of location of vaccination site (OR= 0.315, 95%CI= 0.064–0.736, p=0.014) willingness to accept vaccine (OR=0.216, 95% CI= 0.064–0.736, p=0.014) were significant determinants of COVID-19 uptake among respondents.

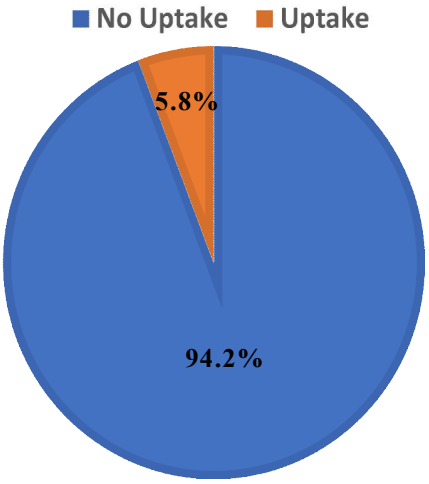

Fig. 2: Uptake of COVID-19 Vaccine among Respondents
COVID-19 Vaccine Uptake among the Respondents was 5.8%.

DISCUSSION

The result of this study showed that a greater proportion of the respondents had poor knowledge of the meaning, symptoms, cause, mode of transmission and preventive measures of COVID-19. Similar findings were gotten from a cross-sectional study carried out in Iran [22] but in contrast to findings from a study carried out in Venezuela.[23] Poor knowledge of COVID-19 may be due to the myths and misinformation from the internet and social media at the onset of the pandemic which may have made it more difficult to follow the necessary prevention protocols of COVID-19. This can also predispose them to developing a negative attitude towards COVID-19 vaccination which can result in vaccine hesitancy. Respondents with no formal education had very poor knowledge of COVID-19. This may be as a result of their inability to understand the message about COVID-19 passed across by the media.[24] Individuals with no formal education are less likely to adhere to the non-pharmacological method put in place by the government.

A greater proportion of the respondents had poor knowledge of COVID-19 vaccine types, doses and its

Table 6: Respondents Perceived Factors Influencing COVID-19 Vaccine Uptake

Variables	COVID-19 vaccine uptake (n=400)		
	Yes Freq (%)	No Freq (%)	I don't know Freq (%)
My religious belief encourages COVID-19 vaccination	115 (28.8)	223 (55.8)	62 (15.5)
Receiving the COVID-19 vaccination is against my cultural beliefs	31 (7.8)	305 (76.3)	64 (16.0)
Getting support from family members encourages COVID-19 vaccination	104 (26.0)	207 (51.8)	89 (22.3)
No knowledge of where to get the vaccine	90 (22.5)	196 (49.0)	114 (28.5)

Table 7: Predictors of Uptake of COVID-19 Vaccine among Respondents

Variables	B (Regression Coefficient)	p value	Odds Ratio	95% C.I. for Odds Ratio	
				Lower	Upper
Age (in years)	0.057	0.049	1.059	1.000	1.121
Sex					
Male*			1		
Female	0.527	0.427	1.694	0.461	6.222
Marital Status					
Married*			1		
Single	0.479	0.563	1.614	0.318	8.185
Divorced	–0.879	0.486	0.415	0.035	4.934
Widowed	–0.608	0.503	0.545	0.092	3.218
Level of Education					
No Formal*			1		
Primary	–1.607	0.050	0.200	0.040	0.999
Secondary	–1.644	0.024	0.193	0.047	0.801
Tertiary	–2.387	0.007	0.092	0.016	0.525
Religious Beliefs					
Yes*			1		
No	0.356	0.571	1.428	0.416	4.899
Cultural Beliefs					
Yes*			1		
No	–1.779		0.008	0.169	0.045
0.626					
Family Support					
Yes*			1		
No	–1.589	0.021	0.204	0.053	0.787
Knowledge of Location of Vaccination Site					
Yes*			1		
No	–1.155	0.040	0.315	0.105	0.949
Willingness to Accept Vaccine					
Yes*			1		
No	–1.531	0.014	0.216	0.064	0.736

**Reference category, R^2 (coefficient of determination) = 14.8%–41.4%*

availability. This finding was in tandem with a study carried out in a web-based survey in Malaysia where knowledge was inadequate but paradoxically, they were willing to get vaccinated.[25] This poor knowledge of the vaccine may be as a result of the existing poor knowledge of COVID-19 and their pattern of work may not require them to know the types and dosage of COVID-19 vaccines. The poor knowledge may thus contribute significantly to vaccine hesitancy. Respondents within the age group 50–59 years, those without formal education and males had poor knowledge of COVID-19 vaccine. Although respondents' level of education was significantly associated with knowledge of COVID-19 vaccination; age, gender and marital status were however not significantly associated with knowledge of COVID-19 vaccine. Good knowledge of COVID-19 vaccines has been found to be significantly associated vaccine acceptance from previous studies.[26]

This study showed that the overall attitude towards COVID-19 vaccination was not satisfactory as majority of the respondents had a negative attitude towards the vaccine and was therefore in contrast to an earlier conducted cross-sectional community survey in Bangladesh where attitudes were largely positive towards the vaccine.[27] This negative attitude can be attributed to poor knowledge of the respondents towards COVID-19 vaccine. In addition, the distrust in factors such as safety of the vaccine, response of government to previous disease outbreaks, misinformation, corruption, conspiracy theories etc. could have influenced them. Negative attitude towards COVID-19 vaccine may lead to vaccine hesitancy and poor uptake of the vaccine with a stalling of the national and global strategies for curtailing the pandemic.

There was no significant difference between the attitudes of males and females, regarding their attitude to the vaccines as both genders had negative attitudes towards the vaccine. This could be due to the fact that irrespective of gender, most of the respondents generally had poor knowledge of COVID-19 and COVID-19 vaccine. Having negative attitudes towards the COVID-19 vaccine may reduce the willingness of the respondents to accept the vaccine which can be further reinforced even at home, work or school.

Overall, the religions of most of the respondents did not encourage COVID-19 vaccination. This finding was similar to the findings from a comparative study carried out in Israel and Japan to assess the relationship between religious faith and intention to undergo COVID-19 vaccination.[28] This may be due to the conspiracy theories about the vaccine and distrust in science by some religious leaders as well as their members. A principle of health education is learning

from leaders and public figures so high profiled religious leaders should be enlisted by the government to take this vaccine publicly and subsequently preach on its importance as this would positively affect the attitude of individuals positively.

Furthermore, a high proportion of the respondents did not know the location to get the COVID-19 vaccine. This was a significant predictor of COVID-19 vaccine uptake among the respondents. This may be as a result of inadequate information and publicity of the vaccine and the various centres to get the COVID-19 vaccine. And may impact negatively on the attitude of respondents and subsequently their willingness to accept the vaccine. Other determinants of uptake of COVID-19 vaccination among respondents included; age, level of education, family support and willingness to accept vaccine. This was in agreement with previous studies where males and persons with no formal education or low educational level were less likely to be willing to get vaccinated.[23,25] In markets where majority of the traders, artisans and shoppers may have no formal education or low educational status, this can be quite worrisome as it is a fertile niche for the rapid spread of the virus and where there is vaccine hesitancy or refusal, can mean that the end of the pandemic may not be yet in sight.

In conclusion, three-quarters of the respondents had poor knowledge of COVID-19 vaccine. A negative attitude towards COVID-19 vaccination was reported among a higher proportion of the respondents. Religion, cultural belief and support from family members were identified as factors influencing respondent's acceptability towards COVID-19 vaccine. Significant predictors of uptake of COVID-19 vaccine were secondary level of education, family support, knowledge of location of vaccination site and willingness to accept vaccine.

We suggest that government and public health authorities increase campaigns aimed at sensitizing the public about availability and importance of COVID-19 vaccine. These campaigns should enlist the support of religious leaders and opinion holders and should contain correct, simple and clear messages that can be translated into local language for people to understand.

ACKNOWLEDGEMENTS

The authors wish to appreciate the Chairman of Egor LGA and the management of the Edaiken market.

Conflicts of Interest/Financial Support

None

REFERENCES

1. World Health Organisation WHO, (2019). [Online] COVID-19 vaccines. Available from: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/covid-19-vaccines [Accessed 8 Mar 2021]
2. World Health Organisation WHO, (2020). Modes of transmission of virus causing COVID19: Implication for IPC precaution recommendations. Available from :http://www.who.int/news-room/commentaries/details/modes-of-transmission-of-virus-causing-covid-19-implications-for-ipc-precaution-recommendations [Accessed 8 Mar 2021].
3. Nigerian Centre for Disease Control (2020). [Online]. First Coronavirus disease confirmed in Nigeria [online] Available from: https://ncdc.gov.ng/news/227//first-case-corona-virus-disease-confirmed-in-nigeria [Accessed 8 Mar 2021].
4. Scarabel L, Guardascione M, Dal Bo M, Toffoli G. Pharmacological strategies to prevent SARS-CoV-2 infection and to treat the early phases of COVID-19 disease. *Int J Infect Dis.* 2021.
5. World Health Organisation WHO, (2019). [Online]. COVID-19 Vaccines. Available from: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/covid-19-vaccines [Accessed 8 Mar 2021].
6. Malcom K, (2021) Overcoming COVID-19 Vaccine Hesitancy . [online] Available https://www.healthblog.uofmhealth.org/org/wellness-prevention/overcoming-covid-19 vaccine-hesitancy [Accessed 8 Mar 2021].
7. International Labour Organisation ILO and World Health Organisation WHO, (2020). [Online] Impact of COVID-19 on peoples livelihoods, their health and our food systems. Available from: https://www.who.int/news/item/13-10-2020-impact-of-covid-19-on-people's-livelihoods-their-health-and-our-foods-systems-the-economic-and-social-disruption-end-of-the-year [Accessed 8 Mar 2021].
8. Latlong.net, (2021). [Online]. Where is Benin City, Nigeria on Map Lat Long Coordinates. Available at: https://www.latlong.net/place/benin-city-nigeria-18128.html [Accessed 10 Mar 2021].
9. World Bank, United Nations, Census, Geonames, (2021). [Online]. Benin city, Nigeria Population (2021)- Population Stat. Available at: https://www.populationstat.com/Nigeria/benin-city [Accessed 11 June,2021]
10. Okunola PO, Nwaneri DU. A study on childhood epilepsy among traders in Benin City Nigeria. Nigerian Medical Journal. *Niger Med J.* 2019. **60:** 175.
11. Cochran WG. Sampling Techniques. Third Edition. New York: John Wiley 1977: 149–154.
12. Hoque AM, Buckus S, Hoque M, Hoque ME, Van Hal G. COVID-19 vaccine acceptability among pregnant women at a primary health care facility in Durban, South Africa. *Eur J Med Health Sci.* 2020: 2(5).
13. Ndikom CM, Oboh PI. Perception, acceptance and uptake of Human papillomavirus vaccine among female adolescents in selected secondary schools in Ibadan, Nigeria. *Afr Jl of Biomed Res.* 2017; **20:** 237–244.
14. Enitan SS, Oyekale AO, Akele RY, Olawuyi KA, Olabisi EO, Nwankiti AJ. Assessment of Knowledge, Perception and Readiness of Nigerians to participate in the COVID-19 Vaccine Trial. Int. J vaccines and immune. 2020; **4:** 1–3.
15. Cennimo JD. (2019). [Online]. Coronavirus Disease 2019 (COVID-19): Practice Essentials Background, Route of Transmission. Available at: https://www.emedicine.medscape.com/article/2500114-overview [Accessed 11 Jun 2021].
16. World Health Organisation WHO, (2021). [Online] Coronavirus. Available at: https://www.who.int/health-topics/coronavirus [Accessed 10 Jun 2021].
17. World Health Organisation WHO, (2021). [Online]. Transmission of SARS-Cov-2: Implication for Infection prevention precautions. [online] Available at: https://www.who.int/news-room/commentaries/detail/transmission-of-sars-cov-2-implications-for-infection-prevention-precautions [Accessed 10 Jun 2021].
18. World Health Organisation WHO,

(2021). [Online]. COVID-19 vaccines / WHO/ Regional office for Africa. Available at https://www.afro.who.int/health-topics/coronavirus-covid-19/vaccine [Accessed 10 Jun 2021].
19. World Health Organisation, (2021). [Online]. COVID-19 vaccines shipped by COVAX arrive in Nigeria/ WHO/ Regional office for Africa. Available at https://www.afro.who.int/news/covid-19-vaccines-shipped-covax-arrive-nigeria [Accessed 10 Jun 2021].
20. Al-Mohaithef M, Padhi BK. Determinants of COVID-19 vaccine acceptance in Saudi Arabia: a web-based national survey. *Journal of Multi-disciplinary Healthcare*. 2020; **13:** 1657.
21. Centre for Disease Control and Prevention, (2021). Administration Overview for Pfizer-BioNtech COVID-19 vaccine / CDC. Available at: https://www.cdc.gov/vaccines/covid-19/info/info-by-product/pfizer/index.html [Accessed 11 Jun 2021].
22. Erfani A, Shahriarirad R, Ranjbar K, Mirahmadizadeh A, Moghadami M. Knowledge, Attitude and Practice toward the Novel Coronavirus (COVID-19) Outbreak: A Population-Based Survey in Iran. [Preprint]. Bull World Health Organ. E-pub:30 March 2020. Available at: http://dx.doi.org/10.2471/BLT.20.256651 [Accessed 27 Jan 2022].
23. Bates BBR, Tami A, Carvajal A, Grialva MJ. Knowledge, attitudes, and practices towards COVID-19 among Venezuelans during the 2020 epidemic: An online cross-sectional survey. PLoS ONE. 2021; **16:** e0249022. Available at: https://doi.org/10.1371/ournal.pone.0249022 [Accessed 27 Jan 2022].
24. Adesegun OA, Binuyo T, Adeyemi O, Ehioghae O, Rabor DF, *et al*. The COVID-19 crisis in Sub-Saharan Africa: Knowledge, attitudes, and practices of the Nigerian public. *Am J Trop Med Hyg*. 2020; **103:** 1997–2004.
25. Mohamed NA, Solehan HM, Mohd Rani MD, Ithnin M, Che Isahak CI. Knowledge, acceptance and perception on COVID-19 vaccine among Malaysians: A web-based survey. PLoS ONE. 2021; **16:** e0256110. Available at: https://doi.org/10.1371/journal.pone.0256110 [Accessed 27 Jan 2022].
26. Hong J, Xu X, Yang J, Zheng J, Dai S, Zhou J, *et al.* Knowledge about, attitude and acceptance towards, and predictors of intention to receive the COVID-19 vaccine among cancer patients in Eastern China: A cross-sectional survey. Journal of Integrative Medicine; 2021. https://doi.org/10.1016/j.joim.2021.10.004.
27. Islam MS, Siddique AB, Akter R, Tasnim R, Sujan MSH, *et al*. Knowledge, attitudes and perceptions towards COVID-19 vaccinations: a cross-sectional community survey in Bangladesh. *BMC Public Health*. 2021; **21:** 1851.
28. Lahav E. Shahrabani S, Rosenboim M, Tsutsui Y. Is stronger religious faith associated with a greater willingness to take the COVID-19 vaccine? Evidence from Israel and Japan. *Eur J Health Econ*. 2021; **22:** 1–17.