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Awareness, Perception and Acceptability of the Covid-19 Vaccine in Two Contrasting Settings in Imo State

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Abstract

A vaccine provides the best hope for a permanent solution to controlling the pandemic. Several coronavirus disease (COVID-19) vaccines are still under scrutiny. However, to be effective, a vaccine must be accepted and used by a large majority of the population, who has the right perception and awareness. This study investigated the awareness and acceptability of COVID-19 vaccine in addition to the perception towards coronavirus vaccine among the public. This study carried out a cross sectional survey during the period of June-September 2021, data was collected from 400 individuals aged 18 years and above in the Rural and Urban Areas of Imo State. Results revealed that the awareness level of respondents in the urban area was high (63.5) and was low in the rural Area (27%). The perception level of the rural and urban settlers was relatively low, where the rural had more negative perception (76%), but the both settings had positive perceptions of (31.2%). In consideration to the 4-point Likert scale used, the mean score point of their perception is highest in the urban area (3.5 out of 4). Acceptability rate was low in the two contrasting settings; with only 117 (29.3%) accepting the vaccine in the study area. The rate of acceptability of the vaccine is much lower among the rural respondents. Public health interventions should take the form of reviving the trust in national health authorities and structured awareness campaigns that offer transparent information about the safety and efficacy of the vaccines.

1. Introduction

Vaccines are key resolution to the demise of the COVID-19 pandemic, by April 8, 2020, there were more than 100 COVID-19 vaccine candidates being developed (Pogue *et al.*, 2020) [20]. COVID-19 vaccine development was stepped up at a fast pace; prior to March 30, 2020, two vaccine candidates had entered Phase 1 clinical trials (Lurie *et al.*, 2020) [15], while on the 9th of April, five vaccine candidates were in Phase 1 clinical trials (Thanh *et al.,* 2020) [22]. Characterizing vaccine acceptance is important, given the large population and because of high vaccine hesitancy for existing vaccines and relatively low vaccination coverage (Doremalen *et al.*, 2020 [8]; Harapan *et al.,* 2019). Vaccine efficacy could also impact vaccine acceptance, given that actual or perceived vaccine efficacy could be relatively low.

The high usage of news media is concerning given the potential for alarming, sensationalist portrayals of the pandemic (Klemm *et al.,* 2016) [12]. In addition, myths, rumors and misinformation can quickly spread online, particularly via social media (Vosoughi *et al.*, 2018) [23]. Social media may have contributed to numerous suspicions around COVID-19, for example, about whether people have natural immunity and whether specific home remedies (garlic, vitamins, exposure to sunlight and rinsing noses with saline) help protect against coronavirus.

It may also explain some uncertainty around whether the virus was human-made and deliberately released. Uncertainty and rapidly changing information may have contributed to increased worry about the virus (Han *et al.*, 2006) [10]. These findings speak to the importance of distributing accurate health information about COVID-19 through a variety of sources (news, social media, and government websites) to reach the general population and correct misinformation. The effect of media exposure may be related to the provision of important health information about the pandemic. Although media exposure early in the outbreak appears to have facilitated health protective behaviors, media fatigue where people become desensitized to ongoing messaging may reduce this effect as the pandemic continues (Collinson *et al.,* 2015) [5]. Repeated media exposure may also lead to heightened stress and anxiety, which can have longer term health effects, as well as contributing to excessive or misplaced health protective behaviors such as presenting for diagnostic testing when actual risk of exposure is low (Garfin *et al.*, 2020) [9].

Emerging evidence from groups with widespread testing for the Sars-Cov-2 virus indicates that between 2 and 8 out of every 10 infections may be asymptomatic (Mizumoto *et al.,* 2020; Nishiura *et al.,* 2020) [18, 16]. Despite being asymptomatic, those infected are still able to transmit the virus to others (Bai *et al.,* 2020; Zou *et al.,* 2020) [3, 17]. In addition, people appear to be infectious and asymptomatic during the incubation period (Lauer *et al.,* 2020) [13]. People commonly rely on symptoms to indicate illness and assume that the absence of symptoms means they are well (Diefenbach & Leventhal, 1996) [7]. Such assumptions in the COVID-19 pandemic could have serious consequences, in terms of both community transmission and reduced health-protective behaviors. Therefore, public health communication campaigns about COVID-19 need to address these misconceptions. There is an evident uncertainty clouding the COVID-19 vaccines. Firstly, the new mRNA-based vaccines as a novel technology could be received with some skepticism since no prior experience or successes with such approach have been reported in the past. Also, the speed of vaccine development and registration in less than a year may have played a role in reducing the acceptance level.

Another global phenomenon that negatively contributed to such a low level is the numerous campaigns launched by anti-vaccinationists fueled by new technology and short span of vaccine development. Such campaigns on social media with fabricated, false, and sometimes misleading translations feed the conspiracy beliefs of some people. Some factors that are specific to the country and the region could also play a role in this. For example, there is a sector of the public who had their trust shaken in local authorities and disapprove of the overall handling of the pandemic. Some people express their frustration as many decisions could be unwelcomed, disproportional with the pandemic status, not justified or backed with science (Han *et al.*, 2006) [10].

COVID-19 pandemic as with other previous pandemics is associated with feelings of fears, anxiety, and worries (Blakey and Abramowitz 2017; Wheaton *et al.,* 2012) [4, 24]. However, it is unique because people are not only worried about getting infected or transmitting the disease to others (Blakey and Abramowitz 2017) [4], but they have also suffered societal and economic concerns due to the measures that were undertaken by the government to confine the pandemic and stop the human-human transmission of the disease (Nicola *et al.,* 2020) [19]. These measures include enforcement of curfews and lockdowns (the largest throughout history), social distancing and self-isolation, schools and universities closures, borders' shutdowns, travel restrictions, and quarantine (Mannan and Farhana 2020; Nicola *et al.,* 2020) [16, 19]. This study aimed to ascertain the awareness, perception and acceptability of the Covid-19 vaccine in two selected contrasting settings in Imo State; that is the urban and rural parts of the State.

2. Materials and methods
A community based cross-sectional survey was adopted to assess the awareness, perception and acceptability of covid-19 vaccine in the urban (Owerri Municipal) and rural area (Owerri West) of Imo State, Nigeria. A structured questionnaire was used for data collection after being validated and its reliability tested. The questionnaire was divided into four major sections for ease of administration. Section A comprised of questions on the socio-demographic characteristics of the study participants. Section B comprised of questions on the awareness of Covid-19 and Covid-19 vaccines, each text had an option of Yes or No. Section C consisted of questions on their perception of Covid-19 and Covid-19 vaccines with a 4-point Likert scale (strongly agree, agree, disagree, strongly agree). Section D consisted of questions regarding their acceptability rate of Covid-19 vaccine. It was administered after explaining the purpose of the study to the respondents. Specific oral information on the purposes of the study was given to the participants, and their oral consents obtained before inclusion in the study. Confidentiality of information was maintained throughout the study. Inclusion criteria were adults above 18 years residing in the urban and rural area of Imo State, while exclusion criteria were individuals below 18 years. Chi-square was used to compare the relationship between the level of awareness and perception about covid-19 vaccine, and the level of awareness and acceptability of the covid-19 vaccine, and the level of perception and the acceptability of covid-19 vaccine in the urban and rural areas of Imo State. Analysis was performed at 5% significant level, probability value was used for the determination of the level of association, such that values less than 0.05 was considered as significant.

3. Result
Socio-demographic characteristics of the study participants was such that 110 (27.5%) were between 30 -40 years and those who were between 41 -50 or above 50 were 96 (24.0%) in each case. Only 23 (5.8%) in all were between 18 to 20 years and none in that age group were from the urban area. The age groups that contained the largest number of participants in the urban area were the over 50s (69: 34.5) and 41-50 (63: 31.5%) while the largest number of the participants from rural area were within 31 -40 years (60: 30%), followed by the 21 – 30 years old (57: 28.5%) (Table 1). More males were included in the study that females in each area which also reflected at the overall (male = 56.8%, female = 42.8%).

Many of the study participants had tertiary education (33.5%) especially in the urban area where more than half (52%) had tertiary education. More than half were married among the urban participants (115: 57.5%) and rural participants (112: 56%) studied. As large as 124 (31%) were unemployed and the most affected were the rural residents in the study at 99 (49.5%). In a contrast, 126 (31.5%) were employed in the government sector of which 90 (45%) were among the rural participants. All the urban participants were Christians but a few were Muslims (9: 4.5%), or traditional religion (1: 0.5%) in the rural area.

Only about 3.8% in all (urban = 6%, rural = 1.5%) earn above 100,000 naira while 34.8% earn less than 20,000 naira monthly, with more than half of the rural participants being affected (urban = 16.5%, rural = 53%).

Table 1: Socio-Demographic Characteristics of the Study Participants

Socio-Demographics	Urban		Rural		Total	
	n	%	n	%	n	%
Age Group in years						
18 -20	0	0	23	11.5	23	5.8
21-30	18	9	57	28.5	75	18.8
31-40	50	25	60	30	110	27.5
41-50	63	31.5	33	16.5	96	24.0
51 and above	69	34.5	27	13.5	96	24.0
Gender						
Male	121	60.5	106	53	227	56.8
Female	79	39.5	92	46	171	42.8
Educational Level						
Primary level only	24	12	48	24	72	18.0
Secondary	44	22	83	41.5	127	31.8
Tertiary	104	52	30	15	134	33.5
Postgraduate degree	25	12.5	2	1	27	6.8
Non-Formal Education	3	1.5	37	18.5	40	10.0
Marital Status						
Married	115	57.5	112	56	227	56.8
Single	38	19	63	31.5	101	25.3
Widowed	44	22	23	11.5	67	16.8
Divorced	3	1.5	0	0	3	0.8
Employment Status						
Unemployed	25	12.5	99	49.5	124	31.0
Employed (Govt sector)	90	45	36	18	126	31.5
Self employed	40	20	16	8	56	14.0
Employed (Artisan)	44	22	7	3.5	51	12.8
Student	5	2.5	42	21	47	11.8
Religion						
Christianity= 200	200	100	190	95	390	97.5
Islam	0	0	9	4.5	9	2.3
Others (Traditional, etc.)	0	0	1	0.5	1	0.3
Monthly Income Level						
Less than 20,000	33	16.5	106	53	139	34.8
30,000 – 50,000	42	21	64	32	106	26.5
50,000 – 80,000	71	35.5	21	10.5	92	23.0
80,000 – 100,000	42	21	6	3	48	12.0
100,000 and above	12	6	3	1.5	15	3.8

Awareness about COVID - 19 and COVID - 19 Vaccines

All the participants have heard about Covid-19 and the most common sources were the social media (50.5%), television (22%) and family and friends (17.5%) in the urban areas while the sources remain family and friends (58%), television (20.5%) and radio news (9.5%). On the other hand, up to 231(57.8%) know about covid-19 of which only 55 (27.5%) among rural participants know about it.

The overall knowledge indicates that 181 (45.3%) showed good knowledge of Covid-19 and Covid-19 vaccines while 219 (54.7%) showed poor knowledge. The knowledge level seems to vary between the urban and rural participants. The knowledge level was quite high to a reasonable extent (63.5%) among urban participants, it remained very low (27%) among their rural counterparts.

Table 2: Awareness about COVID- 19 and COVID- 19 Vaccines

Awareness Items	Urban		Rural		Total	
	N	%	n	%	n	%
Have you heard about COVID-19						
Yes	200	100	200	100	400	100
No	0	0	0	0	0	0
Information Source						
Television	44	22	41	20.5	85	21.25
Radio news	12	6	19	9.5	31	7.75
Newspaper	1	0.5	6	3	7	1.75
Internet/social media	101	50.5	18	9	119	29.75
Health workers = 7	7	3.5	0	0	7	1.75
Family and friends	35	17.5	116	58	151	37.75
Have you seen anybody infected by Covid-19						
Yes	18	9	1	0.5	19	4.75
No	182	91	199	99.5	381	95.25
Have you heard about COVID-19 vaccine						
Yes	7	3.5	8	4	15	3.75

	Urban	%	Rural	%	Total	%
No	193	96.5	192	96	385	96.25
The simplest signs of COVID-19 are not being able to smell or get the taste of anything with fever and tiredness.						
Yes	135	67.5	95	47.5	230	57.5
No	65	32.5	105	52.5	170	42.5
The health effects of COVID-19 appear to be more severe for people who already have serious medical condition						
Yes	151	75.5	35	17.5	186	46.5
No	49	24.5	165	82.5	214	53.5
Do you know about COVID-19 vaccine?						
Yes	176	88	55	27.5	231	57.8
No	24	12	145	72.5	169	42.3
How did you hear about COVID-19 vaccine?						
Television	103	51.5	19	9.5	122	30.5
Radio news	3	1.5	12	6	15	3.75
Newspaper	1	0.5	1	0.5	2	0.5
Internet/social media	65	32.5	1	0.5	66	16.5
Health workers	4	2	0	0	4	1
Family and friends	24	12	22	11	46	11.5
Do you think COVID-19 vaccine is effective in the prevention and control of COVID-19?						
Yes	93	46.5	68	34	161	40.3
No	107	53.5	132	66	239	59.8
What do you think the vaccine will do to anybody who takes it?						
Create a response against the virus	45	22.5	10	5	55	13.8
Boost immune system	107	53.5	46	23	153	38.3
Kills the virus	36	18	112	56	148	37
No idea	12	6	32	16	44	11
What are other preventive measures to reduce the spread of COVID-19 infection?						
Staying at home	116	58	38	19	154	38.5
Avoiding crowded places	163	81.5	50	25	213	53.3
Washing of hand with soap and water	188	94	21	10.5	209	52.3
Practicing social distancing	115	57.5	63	31.5	178	44.5
Wearing of face mask	192	96	109	54.5	301	75.3
Use of hand sanitizer	104	52	32	16	136	34
Use of vaccine	96	48	47	23.5	143	35.8
Overall awareness Summary						
Good awareness	127	63.5	54	27	181	45.3
Poor awareness	73	36.5	146	73	219	54.7
Total	200	50%	200	50%	400	100

Perception about covid-19 vaccines in urban and rural areas

There negative perception was more (68.8%) compared to positive perception (31.2%). The perception was much more negative in the rural area (76%). While many believed that COVID-19 is real (79.8%), only 27.5% (urban = 48.5%, rural = 6.5%) are ready to pay to be vaccinated with the COVID-19 vaccine.

As large as 83% (urban = 82%, rural = 91.5%) would rather prefer taking herbs or antibiotics to cure Covid-19 to taking COVID-19 vaccine.

In consideration to the 4-point likert scale used, the mean score point is highest was found to be highest at the urban area (3.5 out of 4), ant it was recorded on the perception that COVID-19 vaccine will stop mortality due to corona-virus (Table 3). It was followed by 3.3 mean point score on "COVID-19 vaccination is an effective way to prevent and control the spread of corona-virus", also in the urban area. None of the mean scores in the rural area is up to 2.5.

Statistical test for significant difference using non parametric method based on Mann-Whitney U test, indicate that that perception for Covid-19 slightly differ significantly in the two area (Mann-Whitney U = 8,5, p = 0.040).

Table 3: Perception about covid-19 vaccines in urban and rural areas

Perception Items	Urban	%	Rural	%	Total	%
Do you believe COVID-19 is real?						
Yes	177	88.5	142	71	319	79.8
No	23	11.5	58	29	81	20.3
Will you pay to be vaccinated with the COVID-19 vaccine?						
Yes	97	48.5	13	6.5	110	27.5
No	103	51.5	187	93.5	290	72.5
Would you rather take herbs or antibiotics to cure Covid-19 than the COVID-19 vaccine?						
Yes	164	82	183	91.5	347	86.75
No	36	18	17	8.5	53	13.25
Is COVID-19 vaccine price a determinant of COVID-19 vaccination?						
Yes	117	58.5	183	91.5	300	75
No	83	41.5	17	8.5	100	25
What is your concern about the COVID-19 vaccine?						
Safety	109	54.5	143	71.5	252	63
Effectiveness	22	11	41	20.5	63	15.75

Speed of vaccine development	53	26.5	16	8	69	17.25
None	16	8	0	0	16	4
Taking vitamin C or other vitamins will protect you from the COVID-19?						
Yes	141	70.5	117	58.5	258	64.5
No	59	29.5	83	41.5	142	35.5
Exposure to sunlight is a preventive measure for COVID-19?						
Yes	41	20.5	139	69.5	180	45
No	159	79.5	61	30.5	220	55
Overall Summary for Perception						
Negative Perception	123	61.5	152	76.0	275	68.8
Positive Perception	77	38.5	48	24.0	125	31.2
Total	200	50%	200	50%	400	100

Items	SA=4	A =3	D =2	S D=1	Mean	Std. dev
	Freq (%)	Freq (%)	Freq (%)	Freq (%)		
Urban						
COVID-19 vaccination is an effective way to prevent and control the spread of corona-virus	100 (50)	62 (31)	38 (19)	0 (0)	3.3	0.87
Everyone should receive the COVID-19 vaccine?	64 (32)	23 (11.5)	90 (45)	23 (11.5)	2.6	0.53
Taking the COVID-19 vaccine is against my religious belief?	16 (8)	30 (15)	98 (49)	56 (28)	2.0	0.32
Taking the COVID-19 vaccine is against my cultural belief?	0(0)	5 (2.5)	175 (87.5)	20 (10)	1.9	0.85
COVID-19 vaccine will stop mortality due to corona-virus?	129 (64.5)	40 (20)	26 (13)	5(2.5)	3.5	1.17
There is need to adhere to preventive measures after being vaccinated?	75 (37.5)	39 (19.5)	58(29)	28(14)	2.8	0.57
COVID-19 vaccine does not alter human genetic information (DNA)?	43(21.5)	12(6)	127(63.5)	18(9)	2.4	0.56
Rural						
COVID-19 vaccination is an effective way to prevent and control the spread of corona-virus?	21(10.5)	35 `(17.5)	50(25)	94(47)	1.9	0.05
Everyone should receive the COVID-19 vaccine?	16 (8)	44 (22)	98 (49)	42(21)	2.2	0.35
Taking the COVID-19 vaccine is against my religious belief?	50(25)	12(6)	98(49)	40 (20)	2.4	0.46
Taking the COVID-19 vaccine is against my cultural belief?	12(6)	3(1.5)	89(44.5)	96(48)	1.7	0.36
COVID-19 vaccine will stop mortality due to corona-virus?	23(11.5)	27(13.5)	109(54.5)	41 (20.5)	2.2	0.38
There is need to adhere to preventive measures after being vaccinated?	13(6.5)	18(9)	107(53.5)	52 (26)	1.9	0.40
COVID-19 vaccine does not alter human genetic information (DNA)?	43(21.5)	12(6)	127(63.5)	18 (9)	2.4	0.56

Mean Rank (Urban = 9.97, rural =5.21), Mann-Whitney U = 8, 5, p = 0.040

Acceptability of the COVID-19 Vaccines in the Area Studied

The overall summary of acceptability for Covid-19 vaccines in the study area clearly shows that the acceptability is low with only 117 (29.3%) accepting the vaccine in the study area. The rate of acceptability of the vaccine is much lower among rural participants (12.5%).

While many 65% accepted the idea of a COVID-19 vaccine (urban = 71.5%, rural = 58.5%), only 38.5% comprising of 62% in the urban and 15% in the rural will accept to be vaccinated. Only 33% (urban = 55.5%, rural = 10.5%), indicated that they will complete the full dose if ever vaccinated, while just 26.5% (urban = 43.5%, rural = 9.5%), will encourage their household members to be vaccinated with the COVID-19 vaccine.

Significant difference was found in acceptability for Covid-19 vaccines between the urban and rural areas studied (p < 0.0001, $\chi^2 = 54.23$.

Table 4: Acceptability of the COVID-19 Vaccines in the Area Studied

Acceptability of the COVID-19 vaccine	Urban	%	Rural	%	Total	%	χ^2	P
Do you accept the idea of a COVID-19 vaccine?								
Yes	143	71.5	117	58.5	260	65.0		
No	57	28.5	83	41.5	40	35.0		
Will you accept to be vaccinated with COVID-19 vaccine?								
Yes	124	62	30	15	154	38.5		
No	76	38	170	85	246	61.5		
Will you complete the full dosage of the COVID-19 vaccine if ever vaccinated?								
Yes	111	55.5	21	10.5	132	33		
No	89	44.5	182	91	271	67.75		
Will you encourage your household to be vaccinated with the COVID-19 vaccine?								
Yes	87	43.5	19	9.5	106	26.5		
No	103	51.5	181	90.5	294	73.5		
Would you rather wait for others to receive the vaccine before getting yours?								
Yes	182	91	191	95.5	373	93.3		
No	18	9	9	4.5	27	6.75		
Would you encourage other people to receive the COVID-19 vaccine?								
Yes	70	35	28	14	98	24.5		
No	130	65	172	86	302	75.5		
Overall Summary for acceptability								
Accepted	92	46.0	25	12.5	117	29.3		
Yet to accept	108	54.0	175	87.5	283	70.7		
Total	200	100	200	100	400	100	54.23	0.0001

4. Conclusion

The present study is primarily aimed at investigating and comparing the awareness, perception and acceptability of COVID-19 among the urban and rural dwellers in Imo State. To date, there is no study published study about the level of awareness, perception and acceptability of COVID-19 vaccine in the urban in comparison with a rural area.

Inadequate awareness regarding vaccination can be low due to poor education background, poor socio-economic status or obtaining information from their peer layman (Abdullah and Rosliza, 2018) [1]. This study found that almost all the urban dwellers were aware of COVID-19 vaccine. Knowledge about Covid-19 vaccine remained very poor in the rural area of Imo State. Higher Education level and higher income earning individuals were significantly associated with higher awareness score.

A previous study done in Nigeria showed an increase in the perception of susceptibility to infection as the COVID-19 pandemic progressed (Wong and Alias, 2020) [14]. Effective preventive behaviors such as personal hygiene and social distancing to control COVID-19 transmission largely depend on the perceived susceptibility to infection (Commodari, LaRosa and Coniglio, 2020) [6]. Perception of disease susceptibility also correlates with better health seeking behavior (Ahadzadeh and Sharif, 2017) [2].

The urban and rural respondents had a significantly close perception of COVID-19 vaccine, perception of COVID-19 vaccine was poor in the rural and urban area (31.2%), the rural area had the most negative perceptions (76%). More than half of the rural respondents perceived that COVID-19 is real, same as the urban respondents but were less likely to pay for it this maybe because of their income and educational level. Most of the rural and urban respondents insisted that they would rather take herbs and antibiotics to cure COVID-19. The urban respondents and rural respondents had perceived that the vaccine was unsafe due to its adverse effects, rapid vaccine development and scary information about vaccines in social media is also a contributing factor. Majority of the respondents in the contrasting settings perceived that price was a determinant for the COVID-19 vaccination. This is consistent with other findings from other countries (Lin *et al.,* 2020) [14]. Moreover a higher number of respondents in the rural area, way higher than the urban respondents believed that the exposure to sunlight would prevent COVID-19.

In this study Acceptability of COVID-19 vaccine was relatively low in the urban area with only (29.3%) but much lower among their rural counterpart (12.5). this finding differed with other studies done in other parts of the world. A study done in France in March, 2020 showed that only 26% of respondents refused vaccination, more prevalent among low-income people, young women and people older than 75 years old (Sherman *et al.,* 2020). Another study done in the USA among the general population found that only 21% of respondents were not willing to be vaccinated. Reasons for vaccine refusal were not limited to safety, effectiveness, price and speed of vaccine development.

Christians in the urban and rural area were less likely than Moslems to accept a vaccine probably because of the widespread conspiracy theory that has been promoted by social media and reputable church leaders. Religious leaders therefore should not only be actively engaged in the planning and implementation phase of any COVID-19 vaccine intervention in the country but be encouraged to support positive messaging and role modeling.

Self-employed respondents in the rural area were found to have significantly lower vaccine acceptance. This may be connected to the lack of health insurance for the self-employed and therefore high -out of pocket expenditure on health, and the concern that the vaccine may not be without a cost. Further studies are required on the barriers, self-employed persons may face in accepting a vaccine. Public health authorities can act on this information by developing intentional messaging to the public. Accessibility and affordability were identified as significant predictors of willingness to accept a vaccine and should be considered when planning to introduce the vaccine into the country. This finding can help the Ministry of Health plan for future efforts to increase vaccine uptake that may eventually lead to herd immunity against SARS-CoV-2. The efforts should focus on those with insufficient knowledge and low acceptance, particularly those with Poor education background and less financially fortunate people.

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