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Insight, Knowledge and Vaccination Against COVID-19 Among Pregnant Women in Two Tertiary Hospitals Southeast Nigeria, Four Years After Onset of the Pandemic

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ABSTRACT

Background: *The study was conducted in two tertiary hospitals located in ababkaliki the capital city of Ebonyi State. These are referral centers that served the state and the neighboring states.*

Methods: *This was a prospective study in which pregnant women accessing antenatal care in the centers were consecutively recruited till the sample size was obtained. Information on sociodemographic characteristics like age, gravidity, occupation, Religion and educational level were obtained. Insight, awareness and vaccination of COVID-19 Disease also obtained were obtained. The aim of the study was clearly explained to the women and informed consent was signed prior to recruitment into the study. The exclusion criterion was those who did not sign consent.*

Results: *A total of 250 pregnant women who consented were recruited into the study. The mean age was 30.2 (SD 5.3) and ranged between 18yers to 44 years. The highest age group was 30 to 39years (55.2%) followed by those aged between 20 to 29 years (40%). The median gravidity of the respondents was 2.6 (SD 2.0) and ranged between 1 to 7. Majority were traders (34.4%) followed by civil servants (19.2%), thirdly students (16.0) and self-employed (13.2%). Most of them (98.3%) were Christians while 96.4% had tertiary education (62.8%). The awareness of COVID-19 was high but very poor knowledge of spread 18.8% and preventive measures 20.8%. Vaccine uptake was low 21.2% with major reason being fear of side effect (22.4) though 36% gave no reason while some believed vaccine is a scam.*

Conclusion: *There was high insight of COVID-19 disease among these pregnant women but very poor knowledge of its mode of spread and preventive measures as well as very low uptake of anti-COVID-19 vaccines 4 years on from the onset of the pandemic.*

Introduction

The outbreak of the pneumonia caused by coronavirus started in Wuham, China on December 8 2019 but the first report to the World Health Organization (WHO) was on 31st December 2019 [1]. The causative organism was later identified as "Severe Acute Respiratory Syndrome Coronavirus 2 (SARS Cov-2) and was called Coronavirus disease 2019 (COVID-19). The acronym COVID-19 was used to avoid stigmatization of the virus origin in terms of population, geography and animal origin [2]. From there (Wuham, China) the disease started spreading to other countries of the world. On January 30th 2020, the WHO declared the disease a public health emergency of international concern and described measures and actions and charged all countries to take necessary measures urgently to slow down the disease transmission [3]. The disease was declared a pandemic on March 1st 2020 and by June 7th the same year there were already 7 million cases globally [4]. As at 26th of April 2023, the WHO reported 764,474,387 confirmed

cases with 6,915,286 deaths [5].

The first case in Nigeria was reported by Nigerian Center for Disease Control (NCDC) on the 27th of February 2020 on an Italian traveler. The disease spread across the country and is mostly imported, affected people aged 31 – 50 years and males were more affected than female [6]. The available data on the country by NCDC as at April 27th 2023 are as follows.: confirmed cases 266,665, active cases 3,559, discharged cases 259,951 and number of deaths 3,155 [7].

The first case in Ebonyi State was announced by the State Governor on April 26th 2020. The disease was noted to have spread fast in the state after the index case and was mostly brought by returnees. This was as a result of undermining the interstate restriction of movement at the borders by security personnel collecting bribe and allowing free movement at night while others took alternative routes to enter the state [8]. As at 27th April, 2023 the state had recorded 2,064 confirmed cases, 28 cases on admission, 2,004 discharged and 32 deaths [7].

There is no widely acceptable cure for the disease hence precautionary measures were relied upon to prevent the spread. Measures such as hygienic practices like frequent hand wash with soap and water, use of hand sanitizers, social distancing and wearing of face mask were introduced. Quarantine of infected or suspected cases were also done. The antenatal care was adversely affected during this period. Many organizations issued multiple guidance, but in all, there was reduced face to face consultation. Digital technology became critical as there is less physical visit and shorter stay with health attendant during the visit [9]. The World Health Organization (WHO) proposed six in person visits and two virtual (3rd and 4th) consultations. This virtual method was difficult in our setting because most of our clients are not learned and poor hence either does not have or cannot use the digital appliances. Total or partial lockdown was later introduced in many countries and states including ours, boarder closure, travel as well as social gathering ban. This made matters worst for our client as it was extremely difficult for them to access antenatal care services during this period. A study prior to the pandemic in Nigeria reported that mobile health programs were relatively inexpensive and saved lives in Nigeria but these services are also not available for our clients [10]. Many of the pregnant women experienced increased anxiety and concern about their health during the period [11]. During this period our clients suffered untoward hardship as a result of increased pregnancy, labour and delivery complication. This resulted to increased morbidity and mortality as they patronized quacks and Traditional Birth attendants since they could not access skilled care.

In the midst of the confusion caused by the pandemic, vaccine was developed. Nigeria received a total of 3.94 million doses of vaccine in March 2021. Vaccination however faced the challenges of non-acceptance hence coverage remained low in the country. There was general hesitancy to and negative perception on vaccine uptake with some 'NO VACCINE' advocates believing that it is unwholesome and tool of the government to have control over the masses as well as perceived side effects [12-14]. Global vaccination reported by who as at 24th April 2023 was 13,325,228,015 and total vaccination for Nigeria was 116,606863 as at 19th March 2023 [5]. Ebonyi State government received a delivery of 46,088 of Moderna and 10,616 doses of AstraZeneca COVID-19 vaccines. On the 21st of December 2021 the state governor kicked off the mass immunization campaign in Ebonyi state and set a target of 1,500,000 people to get immunized. The same day the commissioner for health announced that 94,000 persons 18 years and above had been immunized. Presently the absolute number of immunized people are not available to us.

Most of the stringent measures against the transmission of this disease have been relaxed by most government irrespective of the fact that there is still sporadic diagnosis of this disease in many countries including Nigeria. This study is therefore set out to ascertain the perception and awareness of the existence of the disease, observance of safety precautions, availability, acceptability of vaccines and vaccination, 4 years after the onset of the pandemic among the pregnant women accessing antenatal care in two tertiary hospitals, Southeast Nigeria.

Materials and Method

This is a cross-sectional prospective study conducted in two tertiary hospitals in Abakaliki the capital city of Ebonyi state in June 2023. The purpose and methods of the study were explained to the participants in details and informed consent obtained prior to recruiting them into the study. The exclusion criteria were those that refuse consent. The study population comprised of consecutive recruitment of pregnant women in the antenatal clinic of the two hospitals till the sample size was reached. The questionnaire designed for the study was administered to them. Socio-demographic information including the age, occupation, educational status, gravidity, religion, marital status were obtained. The details of awareness, perception, precautionary practices and COVID-19 vaccination were recorded.

The research and ethics committee of Alex Ekwueme Federal University Teaching Hospital approved the study protocol. Informed consent was obtained from the participants and given the option to opt out at any time if they do not wish to continue. Those who do not practice precautionary measures were counseled adequately on the importance for containing and avoiding further spread of the virus and other infections prevalent in the state like Lassa Fever. A similar study reported knowledge of 82% [15].

The sample size was calculated using the following formula for cross-sectional study: [16,17]

$$n = z^2 P(1 – P)/d^2$$

where

n = The required minimum sample size,

z = A number relating to the degree of confidence = 1.96,

P = The proportion of awareness from a similar study = 82%,

d = The tolerable error for the study = 5%.

Thus, the estimated minimum sample size was 227. But considering attrition rate of 10% the sample size was increased to 252 participants.

The information obtained was recorded in the data collation sheet designed for the study. The coded data were fed into the computer using epi info program (2008) of CDC Atlanta USA 3.5.1 version and analysis done. A *P* value less than 0.05 was considered significant.

Results

A total of 250 pregnant women who consented were recruited into the study. The mean age of the respondents was 30.2 ± 5.3 and ranged between 18yers to 44 years. The highest age group in the study was 30 – 39years (55.2%) followed by those aged between 20 – 29 years (40%). The median gravidity of the respondents was 2.6 ± 2.0 and ranged between 1 – 7. Majority of the respondents were traders (34.4%) followed by civil servants (19.2%), thirdly students (16.0) and self-employed (13.2%). Most of the respondents (98.3%) were Christians while 96.4% and had tertiary education (62.8%) (Table 1).

Table 1: Socio-demographic characteristics of respondents.

Socio-demographic Variables	No of Respondents (n=250)	Percentage (%)
Age (years)		
<20	4	1.6
20-29	100	40
30-39	138	55.2
≥40	8	3.2
Mean ± SD (Range)	34.4 ± 10.6 (16–74)	
Gravidity		
1	69	27.6
1-4	159	63.6
≥5	22	8.8
Median ± SD (Range)	2.0 ± 2 (0–7)	
Marital status		
Unmarried	11	4.4
Married	239	95.6
Occupation		
Health workers	7	2.8
Farmers	5	2.0
Students	40	16.0
Teachers	28	11.2
Civil/ Public Servants	48	19.2
Traders	86	34.4
Self-employed	33	13.2
Housewives	3	1.2
Religion		
Christian	241	96.4
Muslim	9	3.6
Level of Education		
No formal Education	4	1.6
Primary Education	3	1.2
Secondary Education	86	34.4
Tertiary Education	157	62.8

Table 2: Awareness of COVID-19/Knowledge of spread.

COVID-19 Awareness	No of Respondents (n=250)	Percentage (%)
Do you know of the disease called COVID-19		
No	5	2
Yes	245	98
Do you think it still exist (n=414)		
No	64	25.6
Yes	186	74.4
Spread of COVID-19		
**How does it spread? ** **		
By air droplets	136	54.4
Close contact with infected person	129	51.6
Contact with corpse of a person killed by the disease	113	45.2
Contact with body fluid of infected person	151	60.4
Hand shake with the infected person	139	55.6
Level of knowledge of the spread of COVID-19		
Poor	203	81.2
Good	47	18.8

**Multiple responses allowed

Awareness of COVID-19 viral disease was very high (98%) in the group and 74.4% of the respondents believe the disease still exists while 25.6% believe the disease no longer exists. There was very poor knowledge (18.8%) of how the disease is spread among the respondents. Table 2. Majority of the respondents (96.4%) knew that the disease can be prevented but there was very poor knowledge of preventive measures among them (20.8%). The preventive measures mainly practiced now is frequent hand wash with soap and water/hand sanitizers (88.8%) and use of face mask (60.4%). About 11.2% of the respondents no longer practice any of the preventive measures (Table 3).

Table 3: Knowledge of prevention of COVID-19.

Prevention of COVID-19	No of Respondents (n=250)	Percentage (%)
Can it be prevented		
No	9	3.6
Yes	241	96.4
Preventive measures used initially(n=407)**		
Frequent hand was with soap and water and or use of hand sanitizer	200	80
Social distancing	153	61.2
No body contact including hand shake	119	47.6
Stoppage of social gathering	91	36.4
Use of face masks	171	68.4
Safe burial methods	88	35.2
Quarantine of diagnosed/suspected cases	114	45.6
Border closures/travel ban	83	33.2
Partial or total lockdown	94	37.6
Vaccination	129	51.6
knowledge of preventive measures of COVID-19		
Poor	198	79.2
Good	52	20.8

Preventive Measures Practiced now		
Which of the preventive measures do you still practice now **		
Frequent hand was with soap and water and or use of hand sanitizer	222	88.8
Social distancing	57	22.8
No body contact including hand shake	29	11.6
Use of face masks	151	60.4
Safe burial methods	27	10.8
Quarantine of diagnosed/suspected cases	18	7.2
Vaccination	44	17.6
None	28	11.2

**Multiple responses allowed

Table 4: Vaccination and COVID-19 infection among the respondents.

Vaccination	No of Respondents (n=250)	Percentage (%)
Are you aware of COVID-19 vaccine		
No	23	9.2
Yes	227	90.8
Have you been vaccinated		
No	197	78.8
Yes	53	21.2
How many doses did you receive? (n=53)		
Once	18	7.2
Twice	16	6.4
Thrice	19	7.6
Reasons given (n=227)		
Vaccine not available	7	2.8
Developed side effects	6	2.4
Afraid of side effects	56	22.4
Does not want vaccine	33	13.2
Vaccine is a scam by government	9	3.6
Completed	26	10.4
No reason	90	36.0
Where were you vaccinated? (n=53)		
Hospital	26	10.4
Health centre	27	10.8
Did you see anyone that developed side effect/ died after taking the vaccine?		
Yes	22	8.8
No	228	91.2
Have you seen pregnant woman that died of COVID-19?		
Yes	17	6.8
No	233	93.2
Were you infected with COVID-19?		
Yes	9	3.6
No	241	96.4
Where were you treated or managed? (n=9)		
Isolation/Treatment center	6	2.4
Hospital isolation area	3	1.6

Majority of the respondents (90.8%) were aware of the availability of vaccine but only 53 (21.2%) were vaccinated. A good number of those vaccinated, had only one dose giving development of side effects and unavailability of the vaccine as the reason for not continuing. The major reason for not getting vaccinated was fear of side effect (22.4%) though 36.0% of them did not give any reason. Some believed that vaccine was a scam by government (3.6%). Only 10.4% of the respondents completed the required number of doses. Nine (3.6%) of the respondents were infected

with COVID-19 disease, 6 were managed in the government isolation/treatment center while the remaining 3 were managed in the tertiary hospital isolation area (Table 4).

There is strong correlation between knowledge of spread and age ($x^2 = 41.489$, $Pv = 0.001$), Occupation ($x^2 = 18.401$, $Pv = 0.001$) and educational level ($x^2 = 1.458$, $Pv = 0.005$) (Table 5). Knowledge of prevention was also significantly related to age ($x^2 = 48,150$, $Pv = 0.002$), Occupation ($x^2 = 13.173$, $Pv = 0.001$) and educational level ($x^2 = 21.756$, $Pv = 0.001$) (Table 6).

Table 5: Relationship between the socio-demographic variables and the level of knowledge of spread of COVID-19.

Socio-demographic Variables	Level of Knowledge of Spread of COVID-19		χ^2	P-value
	Poor	Good		
Age group				
<20	4(100.0)	0 (0.0)	41.489*	0.001
20-29	86(86.0)	14(14.0)		
30-39	112(81.0)	26(19.0)		
≥40	5 (67.0)	3(33.0)		
Gravidity				
1	61 (89.0)	8 (11.0)	5.566*	0.591
1-4	137(86.0)	22(14.0)		
>4	18 (84.0)	4 (16.0)		
Marital status				
Unmarried	9 (82.0)	2 (18.0)	0.001*	0.620
Married	194(81.0)	45(19.0)		
Occupation				
Health workers	4(60.0)	3(40.0)	18.401	0.001
Farmers	4(80.0)	1(20.0)		
Students	36(90.0)	4 (10.0)		
Teachers	24(86.0)	2 (14.0)		
Civil/ Public servants	34(71.0)	14(29.0)		
Traders	75(87.0)	11(13.0)		
Self employed	31(94.0)	2 (6.0)		
Housewives	3(100.0)	0(0.0)		
Level of education				
No formal education	4(100.0)	0(0.0)		
Primary education	3 (100.0)	0(0.0)	13.458	0.005
Secondary education	78 (91.0)	8 (9.0)		
Tertiary education	121(77.0)	36(23.0)		

*Fisher's exact test used

Table 6: Relationship between the socio-demographic variables and the level of knowledge of prevention of COVID-19.

Socio-demographic Variables	Level of Knowledge of Prevention of COVID-19		χ^2	P-value
	Poor	Good		
Age group				
<20	4 (100.0)	0 (0.0)	48.150*	0.002
20-29	85 (85.0)	15 (15.0)		
30-39	110 (80.0)	28 (20.0)		
≥40	5 (62.5)	3 (37.5)		
Gravidity				
1	61 (88.4)	8 (11.6)	6.676*	0.463
1-4	135 (84.9)	26 (15.1)		
≥5	20 (91.0)	2 (9.0)		

Marital status				
Single	44 (72.1)	17 (27.9)	0.461*	0.243
Married	282 (79.9)	71 (20.1)		
Occupation				
Health workers	4 (57.0)	3 (43.0)	14.173	0.001
Farmers	4 (80.0)	1 (20)		
Students	35 (87.5)	5 (12.5)		
Teachers	23 (82.0)	(18.0)		
Civil/ Public servants	32 (66.7)	16 (33.3)		
Traders	77 (90.0)	9 (10.0)		
Self employed	29 (87.0)	4 (13.0)		
housewives	3 (100.0)	0 (0.0)		
Level of education				
No formal education	4 (100.0)	0 (0.0)		
Primary education	3 (100.0)	0 (0.0)	21.756	0.001
Secondary education	82 (95.0)	4 (5.0)		
Tertiary education	102 (65.0)	79 (35.0)		

* Fisher's exact test used

Discussion

There was high awareness of CVID 19 disease among the respondents (98%). This may be because of high level, sensitization of the public about the disease and its case fatality rate. There was a lot of public advocacy, health education and talks using the mass media, radio/television, the print media as well as the social media and visitation to the villages, churches schools by health personals. A previous study among pregnant women in the tertiary hospital also reported high awareness [22]. Some of the respondents (25.6%) believe the disease does not exist any longer. This may be due to reduced awareness creation, advocacy and other means of information to educate the people. Apart from that, most government had relaxed the strict measure like border closure and travel ban, Ban of social gathering and market closure. There is also marked reduction in screening/testing, contact tracing, diagnosis and quarantine of diagnosed or suspected cases. The government had also closed the isolation/treatment centers. The last confirmed case in the state was on 20th of September, 2022 while the last suspected case was on the 20th of April, 2023. (Information from The Virology Center, Alex Ekwueme Federal University teaching Hospital, Abakaliki, Ebonyi State). This may not mean that that the disease is no longer with us but shows that testing has drastically reduced as well as contact tracing. It is also possible that the variant may not be easily detected by the available kit. The development and use of vaccines may also have contributed to their opinion of none existent of the disease. However, (74.4%) still believe that the disease still exists.

Many of the respondents knew that the disease can be transmitted from one person to another but the knowledge of spread is very poor. (81.2%) has poor knowledge of spread. This may be because we used all or none principal where anyone that does not know one or more out of the modes of spread is classified as poor knowledge. Only 18.8% had good knowledge of spread of the disease. There was strong correlation between age, occupation and level of education with knowledge of spread. Marital status and parity do not have any significant correlation to knowledge of spread. This

may be due to the fact that those at the extreme of ages used in the study may be less likely to use the media both audio/visual print and social media for communication. Occupation played a role because the civil servants are more likely to leave and work in the city where there is easier access to information than the farmers in the villages and some health workers also participated in the study. The more educated ones are more likely to have access to information hence will know more about the spread of the disease.

Many of the respondents (96.4%) knew that the disease can be prevented but there was however poor knowledge of preventive measures (79.2%) had poor knowledge using the method of all or none as explained above. Most of the preventive measures still practiced by some include; frequent hand wash with soap and water/hand sanitizers (88.8%), followed by face mask (60.4%). About 11.2% of the respondents do not use any preventive measure any longer. There was strong correlation between age, occupation and level of education and knowledge of prevention. Marital status and gravidity had no significant correlation to knowledge of prevention. The reasons may be the same as outlined above about knowledge of spread.

Majority of the respondents knew the availability of anti-COVID-19 vaccine (90.8%) but vaccine uptake was low (21.2%) among the group. Among those vaccinated, some had only one jab. The reasons for this poor uptake of COVID-19 vaccine were; fear of side effects (22.4%), though about 36.0% did not give any reason. About 10.4% however completed the required number of doses while 3.6% claimed that vaccine is a scam by government. These challenges about the vaccines had been reported in previous studies [19-21]. Most of the reported side effects were fever, pain at injection site, headache, muscle ache, fatigue, nausea, diarrhea and chills. Nine (3.6%) of the respondents were COVID-19 disease patients that survived. Six of them were managed in the government isolation/treatment center and 3 were treated in the tertiary hospital isolation area.

Conclusion

There was high insight of COVID-19 disease among these pregnant women studied but very poor knowledge of its mode of spread and preventive measures as well as very low uptake of anti-COVID-19 vaccines 4 years on from the onset of the pandemic.

Acknowledgement

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