

Awareness, Willingness to Accept and Factors Influencing Covid-19 Vaccination Amongst Antenatal Attendees at a Nigerian Tertiary Hospital

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ABSTRACT

COVID-19 infection can become severe in pregnancy. When fear enshrouds antenatal use of the vaccine, pregnant women and their unborn babies become at risk and at the same time act as the disease's reservoirs. This study is aimed at determining the awareness, willingness to accept COVID-19 vaccination among antenatal attendees as well as factors influencing COVID-19 vaccination at the Niger-Delta University Teaching Hospital, Okolobiri. The study was a descriptive cross sectional study. Three hundred and fifty pregnant women were interviewed after informed consent. The data acquired included the awareness and source of information on COVID-19 vaccine, its acceptance, reasons for vaccine hesitancy and side effects. Three hundred and thirty-eight pregnant women (96.6%) indicated

awareness of the availability of the COVID-19 vaccine. Only 13 of the 350 pregnant women in this study had received the vaccine (3.7%). The television was the leading source of information about COVID-19 vaccines, (51.4%). The topmost reason for not been vaccinated was concern about the safety of the vaccines (39.2%). Age, religion, level of education and occupation were significantly associated with acceptance of COVID-19 vaccine. Eleven out of thirteen study subjects (84.6%) who have been vaccinated against COVID-19 had side effects. The commonest side effect of COVID-19 vaccination was malaise (84.6%). COVID-19 vaccine awareness in this study was optimal. However, its uptake in pregnancy was poor. Socio-demographic characteristics of antenatal attendees influences their use of COVID-19 vaccine. The COVID-19 vaccination side effects in pregnancy are mainly not life-threatening.

Keywords: COVID-19 vaccine, pregnancy, awareness, uptake, side effect

INTRODUCTION

The COVID-19 pandemic is one of the deadliest infectious diseases recorded. [1] The specific mechanism of its emergence in humans remain unknown, however a large body of virologic, epidemiologic, veterinary, and ecologic data establishes that the new virus, SARS-CoV-2, evolved directly or indirectly from a β -coronavirus in the Sarbecovirus (SARS-like virus) group that naturally infects bats and pangolins in Asia and Southeast Asia.[1] COVID-19 has emerged as the deadliest respiratory disease pandemic since 1918, when the “Spanish” influenza pandemic killed an estimated 50 million people. [2] Most recently, at least as early as late November 2019, SARS-CoV-2 was recognized and became the third fatal bat virus–associated human disease emergence and the fourth bat virus–associated mammalian emergence in 18 years. [1]

On December 31, 2019, mysterious cases of pneumonia were detected in the city of Wuhan in China's Hubei Province. On January 7, 2020, the causative agent was identified as a new coronavirus (2019-nCoV), and the disease was later named as COVID-19 by the World Health Organization (WHO). The virus spread extensively in the Wuhan region of China and has gained entry to over 210 countries and territories. [3]

Virtually, all countries in the world are affected, with over 5 million cases reported globally. [4] Africa reported its first case in Egypt on 14th February 2020 and Nigeria reported its index case of COVID-19 on 27th February 2020. [4] Globally, the count for confirmed COVID-19 cases was 186,821,815 with 4,038,342 deaths resulting in a case fatality rate of 2.2% as at the 27th week since onset of the pandemic. In the same period, Nigeria recorded over 167,000 cases and over 2000 deaths with a case fatality of 1.3%. [5]

The general measures to prevent COVID 19 include: washing hands frequently with soap or with alcohol- based (70% alcohol) solutions, use of hand sanitizers, using mask when going outdoors, especially when suffering from cold or cough, staying indoors, maintaining social distancing, sanitizing all inanimate objects in houses from time to time, etc. [6] However, a safe and effective vaccine against coronavirus disease 2019 (COVID-19) is the best way to control and ultimately end the pandemic. [7]

Vaccine development has moved at unprecedented speed, with more than 200 candidates, billions of dollars committed, and manufacturing often proceeding before even knowing

whether a given vaccine candidate will succeed. [7] At the same time, a growing movement of skeptics had raised doubt about future COVID-19 vaccines. [8] Mindful of prior vaccine safety crises, regulators are appropriately cautious about approving vaccines for widespread use. Even during a pandemic, when much of the population is at risk, vaccines, unlike therapeutics, are administered to very large number of healthy individuals, and so must be extremely safe. [7] As soon as feasible after vaccine safety is established in trials, studies should also involve pregnant women who risk exposure as healthcare workers and involve young children who are at risk of developing an infection-related multisystem inflammatory syndrome. [7] In addition, some vaccines against other coronaviruses have shown the potential to worsen the disease among vaccinated individuals who develop breakthrough infections. [9] Vaccine candidates against COVID-19 have diverse compositions, from traditional whole-pathogen vaccines to various new-generation vaccines. [10] Traditional whole-pathogen vaccines consist of live-attenuated vaccines (live pathogens with reduced virulence) and inactivated vaccines (thermally or chemically inactivated pathogens), both are relatively straightforward in their development processes.[10] The new-generation vaccines, including recombinant protein vaccines and vector-based vaccines, only incorporate a specific antigen or antigens from the pathogen, instead of the whole pathogen, giving a better safety profile.[11]

Pfizer-BioNTech (BNT162b2) and Moderna (mRNA-1273) COVID-19 vaccines are produced with encapsulated mRNA technology. [12] Oxford-AstraZeneca (ChAdOx1 nCoV-19), Johnson and Johnson (Ad26.COV2.S) and Gamaleya (Gam-COVID-Vac/Sputnik V) are all vector-based vaccines and their efficacies have been found to be 70%, 67% and 92%, respectively. [13,14]

Nigeria received 3.94 million doses of the Oxford AstraZeneca COVID-19 vaccine shipped by COVAX on 2nd March, 2021. [12] However, there is clearly a high perception among the Nigerian population that the COVID-19 vaccine is not safe, majorly because it is a novel virus, lack of adequate storage facilities and perhaps lack of trust in the government. [12]

In a study done on the perspective of residents of Bayelsa on hand washing in reducing COVID-19, respondents strongly agreed that hand washing is effective in reducing the spread of COVID-19 (65.32%). [15] However, in a study on predictors of acceptance of COVID-19 vaccine among patients at a tertiary hospital in South-South Nigeria, out of 1,000 participants, only 246 (24.6%) were willing to receive the COVID-19 vaccine. About 2 in every 5 participants were unwilling to take the vaccine due to trust issues. Lack of trust in the manufacturers and government were the reasons given by 43.4% and 41.8% of participants, respectively. [16]

The COVID-19 may alter the maternal symmetrical and local immune responses, and affect maternal and infant well-being. Pregnant women are more susceptible to respiratory pathogens; hence, they may be more susceptible to SARS-CoV-2 than the general population. [17] In pregnant women with COVID-19, there is no evidence for vertical transmission of the virus, but an increased prevalence of preterm deliveries has been noticed. [17] Hence pregnant women should be aware of COVID-19 vaccine and be willing to be vaccinated against COVID-19.

Following the emergency use authorization of the Pfizer-BioNTech mRNA vaccine and the Moderna mRNA-1273 vaccine, the Advisory Committee on Immunization Practices and the American College of Obstetricians and Gynecologists offer the recommendation that pregnant

persons should be offered the vaccine and should be encouraged to talk with their obstetric provider about their vaccination plan, although this is not a requirement for vaccination. [18] However in a study on “Coronavirus disease 2019: Knowledge, attitude, and practice of pregnant women in a tertiary hospital in Abakaliki, southeast Nigeria” one-fourth (25%) of respondents thought that infected individuals should be killed to prevent the spread of the virus. [19] This is worrisome and proper education must be given to the populace to avert these negative attitudes while promoting a positive preventive attitude. Justification for this study are: lacking data on the awareness and willingness of pregnant women in Nigeria to accept COVID-19 vaccine. Secondly, the Society of Obstetrician and Gynaecologist of Nigeria (SOGON), National Primary Health Care Development Agency and Federal Ministry of Health in Nigeria, have not given a position on vaccinating pregnant women against COVID-19. [20] Previously, certain group of women were thought should have COVID-19 vaccination. [21] Now all pregnant women should be vaccinated. [21] Thirdly, a significant number of pregnant women have been vaccinated against COVID-19 in the developed countries, the same can't be said of developing countries, such as Nigeria. This study is aimed at determining the awareness, willingness to accept COVID-19 vaccination as well as factors influencing COVID-19 vaccination among antenatal attendees at the Niger-Delta University Teaching Hospital Okolobiri, Bayelsa state, Nigeria.

METHODOLOGY

This was a descriptive cross-sectional study carried out at the Obstetrics and Gynaecology department of the Niger-Delta University Teaching Hospital (NDUTH), Okolobiri, Bayelsa state, Nigeria, between the 1st of July 2021 and the 31st of December 2021. NDUTH is a tertiary hospital, which serves as a referral hospital for primary, secondary and private health care facilities in the state and the neighboring states of Delta and Rivers, in Nigeria. An average of 70 to 80 pregnant women attend the antenatal clinic per month at the facility.

Utilizing the cross-sectional study sample size calculation formula, a sample size of 350 was obtained. An anonymous, well-structured, closed-ended questionnaire was given to each participant after informed consent was obtained. The data acquired were the sociodemographic characteristic of the participants, awareness and source of information on COVID-19 vaccine as well as awareness of administration of COVID-19 in pregnancy. Also included were awareness of which pregnant woman qualifies for COVID-19 vaccination, acceptance of COVID-19 vaccine, reasons for vaccine hesitancy and side effects amongst the acceptors of COVID-19 vaccine. Ethical approval was duly given by the ethical committee of the hospital

DATA ANALYSIS

The data were analyzed using SPSS version 20. Categorical variables were expressed in frequencies and percentages and presented using tables. Their relationship was assessed using the Chi-squared test. The level of significance was set at $p < 0.05$.

RESULTS

Socio-demographic characteristics of pregnant women in the study

There were 350 pregnant women recruited for the study, most of whom were aged 25 – 29 years (33.7%), 105 (30.0%) and 72 (20.6%) of them were aged 30 – 34 years and 35 – 39 years respectively (Table 1). Majority were married (324, 92.6%), Christians (344, 98.3%) with

tertiary education (217, 62.0%). About a third of the women were traders (32.9%), while 6.3% were unemployed (Table 1).

There was a history of chronic illness in 28 pregnant women (8.0%). Table 1 also shows that chronic illnesses included hypertension (2.9%), peptic ulcer disease (1.7%) and HIV (1.4%).

Table 1: Sociodemographic characteristics of pregnant women in the study

Characteristics	Frequency N = 350	Percent (%)
Age Group		
18 - 25 years	36	10.3
25 - 29 years	118	33.7
30 - 34 years	105	30.0
35 - 39 years	72	20.6
≥ 40 years	19	5.4
Marital Status		
Single	26	7.4
Married	324	92.6
Religion		
Christianity	344	98.3
Islam	6	1.7
Level of Education		
Primary	15	4.3
Secondary	101	28.9
Tertiary	217	62.0
Postgraduate	17	4.9
Occupation		
Civil servant	76	21.7
Health workers	39	11.1
Traders	115	32.9
Artisan	98	28.0
Unemployed	22	6.3
Presence of Chronic illness	28	8.0
Hypertension	10	2.9
Diabetes	3	0.9
Asthma	2	0.6
Obesity	4	1.1
Human immunodeficiency virus	5	1.4
Peptic ulcer diseases	6	1.7

Awareness, acceptance and sources of information about COVID-19 vaccine among pregnant women

Three hundred and thirty-eight pregnant women (96.6%) indicated awareness of the availability of the COVID-19 vaccine. (Figure 1). Figure 1 shows that despite the high level of

awareness of COVID-19 vaccine among pregnant women, only 13 of the 350 pregnant women in this study had received the vaccine, giving a vaccine acceptance rate of 3.7%.

Figure 2 displays the sources of information about the vaccine among pregnant women included television (51.4%), family and friends (33.1%) and radio (26.6%).

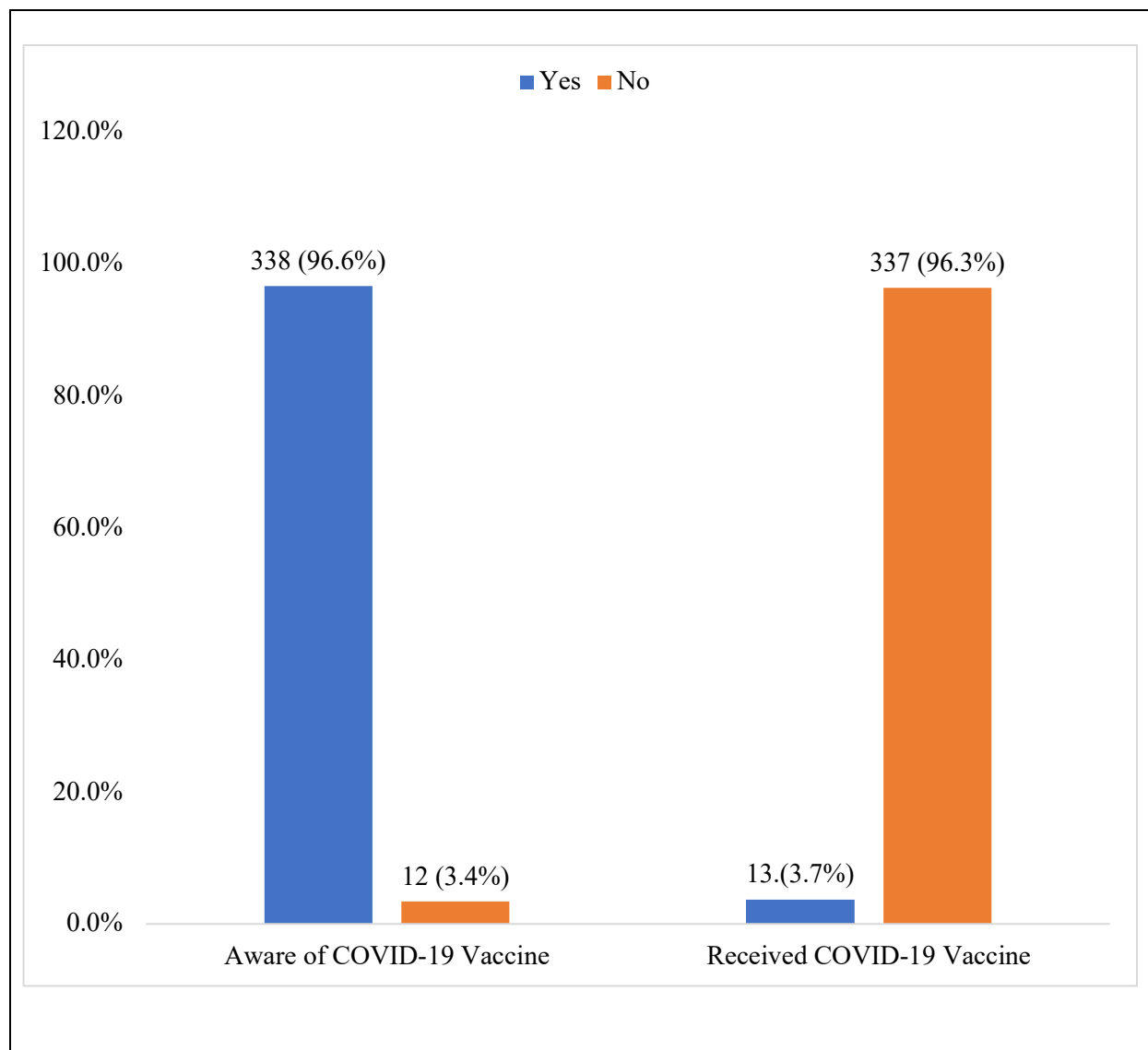


Figure 1: Awareness and Acceptance of COVID-19 vaccine among pregnant women at the NDUTH, Okolobiri

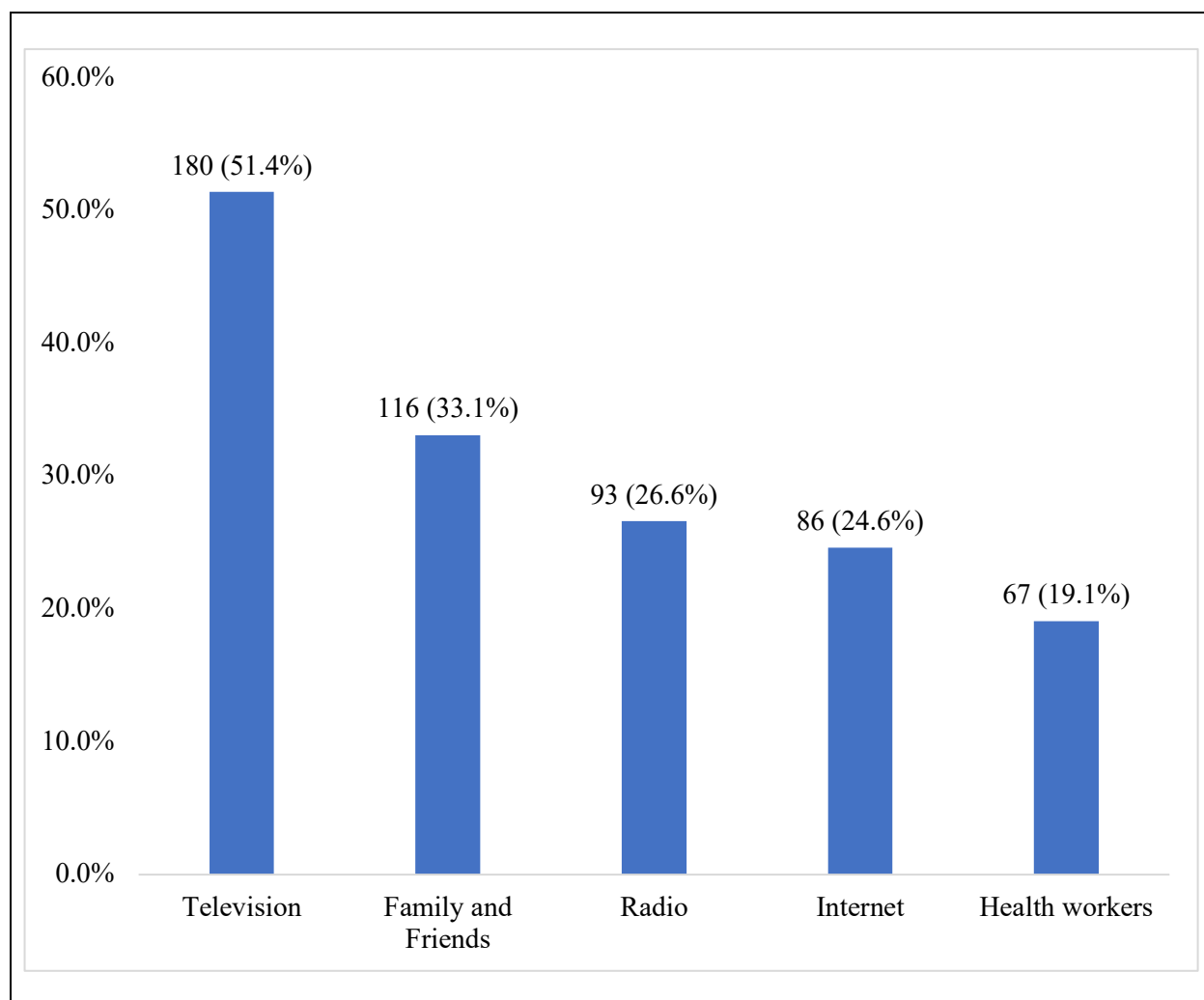


Figure 2: Source of information about COVID 19 vaccine among pregnant women at the NDUTH, Okolobiri

Suggested reasons for Vaccine hesitancy among pregnant women at the NDUTH

Table 2 depicts that three hundred and thirty – seven women (96.3%) had not received the vaccine despite its availability, the leading reason for this, was concern about the safety of the vaccines (39.2%). Others included the belief that the vaccines are not approved for pregnant women (22.0%) and lack of trust in government about the vaccine (21.4%).

Table 2: Reasons given for COVID-19 hesitancy among pregnant women at the NDUTH, Okolobiri

Reason for vaccine hesitancy	N = 337	Percent (%)
The vaccine may not be safe	132	39.2
The vaccine has not been approved for pregnant women	74	22.0
The government is not trustworthy	72	21.4
I need my doctor's approval	62	18.4
The vaccine may not have undergone much study	59	17.5
I will want to see what happens to those vaccinated before I take	47	13.9
The vaccine may have fearful side effects	39	11.6
I need approval of family and friends before I take it	26	7.7
The vaccine in Africa currently may be substandard	18	5.3
There are other forms of treatment for COVID-19	11	3.3
There is herd immunity	6	1.8
Vaccine is not safe in pregnancy	5	1.4
My religious belief disapproves	3	0.9
I have medical conditions that will not allow me	2	0.6

Factors associated with COVID-19 vaccine acceptance among pregnant women at the NDUTH

As presented in Table 3, age ($\chi^2 = 14.93$; $p = 0.005$); religion ($\chi^2 = 14.98$; $p = 0.001$), level of education ($\chi^2 = 8.67$; $p = 0.034$) and occupation ($\chi^2 = 16.17$; $p = 0.003$) of pregnant women were significantly associated with acceptance of COVID-19 vaccine. The proportion of pregnant women who received the vaccine increased with age. Three of the nineteen women (15.8%) aged 40 year and above accepted the vaccine, whereas only 2.5% and 6.7% of those aged 25-29 years and 30-34 years respectively accepted the vaccine. While 33.3% of Muslims received the vaccine, only 3.2% of Christian women received the vaccine. Only women with higher level of education had received the vaccine (tertiary – 5.1%; postgraduate – 11.8%). With respect to Occupation, health workers had the highest proportion of women (12.8%) who had received the vaccine.

Table 4 shows that there was also a significant association between those who got information about the vaccine from health workers ($\chi^2 = 57.03$; $p = 0.001$) and television ($\chi^2 = 4.65$; $p = 0.031$)

Table 3: Association between Sociodemographic characteristics and COVID-19 vaccine acceptance among pregnant women at the NDUTH, Okolobiri

CHARACTERISTICS	Total	Accepted COVID-19 Vaccine		Chi-square test (p-Value)
		Yes N = 13 (%)	No N = 337 (%)	
Age group				
<25 years	36	0 (0.0)	36 (100.0)	14.93 (0.005*)
25 – 29 years	118	3 (2.5)	115 (97.5)	
30 – 34 years	105	7 (6.7)	98 (93.3)	
35 – 39 years	72	0 (0.0)	72 (100.0)	
>40 years	19	3 (15.8)	16 (84.2)	
Marital Status				
Single	26	2 (7.7)	24 (92.3)	1.24 (0.265)
Married	324	11 (3.4)	313 (96.6)	
Religion				
Christian	344	11 (3.2)	333 (96.8)	14.98 (0.001*)
Islam	6	2 (33.3)	4 (66.7)	
Level of Education				
Primary	15	0 (0.0)	15 (100.0)	8.67 (0.034*)
Secondary	101	0 (0.0)	101 (100.0)	
Tertiary	217	11 (5.1)	206 (94.9)	
Postgraduate	17	2 (11.8)	15 (88.2)	
Occupation				
Civil Servant	76	2 (2.6)	74 (97.4)	16.17 (0.003*)
Health Workers	39	5 (12.8)	34 (87.2)	
Traders	115	0 (0.0)	115 (100.0)	
Artisan	98	6 (6.1)	92 (93.9)	
Unemployed	22	0 (0.0)	22 (100.0)	
Presence of Co-morbidity				
Yes	28	0 (0.0)	28 (100.0)	1.17 (0.279)
No	322	13 (4.0)	309 (96.0)	

Table 4: Association between the sources of information about the vaccine and COVID-19 vaccine acceptance among pregnant women at the NDUTH, Okolobiri

Characteristics	Total	Accepted COVID-19 Vaccine		Chi-square test (p-Value)
		Yes N = 13 (%)	No N = 337 (%)	
Health worker				
Yes	67	13 (19.4)	54 (80.6)	57.03 (0.001*)
No	283	0 (0.0)	283 (100.0)	
Radio				
Yes	93	2 (2.2)	91 (97.8)	0.87 (0.352)
No	257	11 (4.3)	246 (95.7)	
Television				
Yes	180	11 (6.1)	169 (93.9)	4.65 (0.031*)
No	170	2 (1.2)	168 (98.8)	
Internet				
Yes	86	2 (2.3)	84 (97.7)	0.62 (0.433)
No	264	11 (4.2)	253 (95.8)	
Family and friends				
Yes	116	2 (1.7)	114 (98.3)	1.92 (0.166)
No	234	11 (4.7)	223 (95.3)	

Awareness of the Categories of pregnant women who can take the COVID-19 vaccine

Table 5 displays that 24 (6.9%) of the pregnant women felt that certain categories of women should be vaccinated against COVID-19. At least 9 out of 10 women were not sure which specific category of pregnant women should be vaccinated.

Table 5: Awareness of the Categories of pregnant women who can take COVID 19 vaccine

Characteristics	Frequency N = 350	Percent (%)
Are you aware of COVID 19 vaccine		
Yes	338	96.6
No	12	3.4
Aware that certain categories of pregnant women should take COVID 19 Vaccine		
Yes	24	6.9
No	97	27.7
I don't know	229	65.4
Categories that can be vaccinated with COVID-19 Vaccine		
Pregnant below 18 years		
No	3	0.9
I don't know	347	99.1
Pregnant women greater than 45 years		
No	3	0.9
I don't know	347	99.1
Pregnant women morbidly obese		
Yes	4	1.1
No	6	1.7
I don't know	340	97.1
Pregnant women with medical condition		
Yes	7	2.0
No	3	0.9
I don't know	340	97.1
Pregnant women who are health workers		
Yes	2	0.6
No	3	0.9
I don't know	345	98.6
Pregnant women who are social workers		
Yes	2	0.6
No	3	0.9
I don't know	345	98.6

Side effects of COVID-19 vaccine among COVID-19 vaccinated pregnant women at the NDUTH

Eleven out of thirteen study subjects (84.6%) who have been vaccinated against COVID-19 had side effects. The commonest side effect of COVID-19 vaccine was malaise (84.6%) and all those vaccinated complained of this. Fever, chills and fatigue were the next complained of side effects of COVID-19 vaccination (61.5% each). (Table 6).

Table 6: Side effect of COVID-19 vaccine among COVID-19 vaccinated pregnant women at the NDUTH

Characteristics	Frequency N = 13	Percent (%)
Did you have any side effects of COVID 19 vaccination	11	84.6
Side effect		
Malaise	11	84.6
Pain at injection site	10	15.4
Fever	8	61.5
Chills	8	61.5
Fatigue	8	61.5
Joint and Body pain	2	15.4
When did the side effect of the COVID 19 vaccination start	N = 11	
Day 1	8	72.3
Day 2	3	27.7
Do you know any other person who had side effects	10	76.9

DISCUSSION

COVID-19 vaccine can be safely given in pregnancy. [22] Hence the recommendation by the American College of Obstetricians and Gynaecologists (ACOG) and the Centre for Disease Control and Prevention, that pregnant women should be vaccinated against COVID-19. [22] Although there are no long term data on the safety of antenatal COVID-19 vaccination, it is suggested that COVID-19 vaccination be given to pregnant women, as they are prone to higher and serious risk of COVID-19 disease in pregnancy. [22] Furthermore, the benefit of COVID-19 vaccination in pregnancy outweighs the risk. [22,23] Also, there are no exiting evidence to speculate that COVID-19 vaccination could cause harm in pregnancy. [23] In fact, COVID-19 infection acquired during pregnancy increases the risk of delivering preterm or stillbirth infants. It is imperative for the following persons to take the vaccine; pregnant women who are healthcare professionals, obese women, and those having co-morbid medical conditions. [24]

On the whole, COVID-19 vaccination during pregnancy stimulates the acquired immunity of pregnant women to develop antibodies against COVID-19. [24] These developed antibodies transverses the placenta and enter the fetal circulation. Consequently, the fetus is protected against COVID-19 infection. [24] Studies have shown that the antibodies against COVID-19 following its vaccination have been found in the umbilical cord of babies born to mothers vaccinated. [25] These antibodies have been found to last at least six months in the infant's blood after birth. [25]

There has been unfounded anxiety about COVID-19 vaccination even among non-pregnant women. Studies done have shown that COVID-19 vaccination in pregnancy was not associated with increased risk of miscarriage, fetal anomaly, preterm birth and intrauterine fetal death, how much more in the non-pregnant woman. [26,27,28].

Formerly, the Royal College of Obstetrician and Gynaecologists (RCOG) stated that certain classes of women should be vaccinated, now all women should be vaccinated against the

disease. [21]. These categories of pregnant women were women who were health workers, social workers, women aged less than 18 years or more than 45 years, had chronic medical conditions, or were morbidly obese. [21] All pregnant women are considered a vulnerable group within the COVID-19 vaccination programme by the Joint Committee on Vaccination and Immunization since the 16th of December, 2017. Thus the RCOG strongly recommends COVID-19 vaccination in pregnancy. [21]

The prevalence of vaccination in pregnancy is high in developed countries unlike in developing ones. [29] Over 23,779 pregnant women as at 2nd of May, 2022 have been vaccinated. [29]

In this study, about 95.7% of pregnant women had secondary of education. This is slightly above that gotten in a study by Iliyasu *et al* in Amino Kano Teaching Hospital in Kano, Nigeria (89.2%). [30] The least educational developed areas in Nigeria are considered to be the Northern part of Nigeria and this may explain for this difference. [31]

Six out of ten of the study participants (67.1%) were self-employed. This was a testament to the resilience of the women in the area this study was conducted, to be self-reliant, despite paucity of white collar jobs.

The awareness about COVID-19 vaccine in this study is encouraging. Knowing about the existence of a potentially potent preventive measure, such as the vaccine for COVID-19, is key to reducing the scourge of the disease. [32]

In this study, healthcare worker constituted the lowest source of information on the availability of COVID-19 vaccine (19.1%). This is not surprising as healthcare workers generally have a fear of the 'side effects of the vaccine [32] and may not want to advise their patients to be vaccinated. From our observation, the healthcare worker is closest to the pregnant woman on a personal level. Thus every health care contact is an important avenue to inform these gravid women and the other patients of the importance of this vaccination.

Pregnant women fear of the safety of COVID-19 vaccines, particularly of its the effect on their unborn babies as seen in our study findings. Surprisingly, only 1.4% of pregnant women in our study felt that the vaccine was not safe in pregnancy. This was in contrast to a study by Iliyasu *et al* [30], where 74.2% were worried that their unborn babies risk harm from COVID-19 vaccination.

Astonishingly, 18.4% of our respondents required their doctors' approval to be vaccinated against COVID-19, however, 50.1% of respondents in the Iliyasu *et al* a study done in Northern Nigeria said same. From our experience again, we noticed that in Northern Nigeria, the healthcare worker, especially the medical doctor, is more revered by the hospital attendees and therefore would readily follow the 'wise' counsel of the healthcare worker than the hospital attendees in the Southern parts of Nigeria.

Age, education, and occupation seem to be pivotal in accepting COVID-19 vaccination, even among the pregnant population. From our study, increasing age and educational level has proven to be important players in been vaccinated against this disease, as seen in other studies. [33, 34] Forty years was a landmark age for COVID-19 vaccine acceptance (15.8%) in our study

findings and the lowest age was 25-29 years (2.5%). This was similar to a study by Razzaghi *et al* [34], where women aged 35-49 years had the highest COVID-19 vaccine acceptance rate (22.7%) and the lowest were those aged 18-24 years (5.5%). Educational attainment positively influenced the uptake of COVID-19 vaccine pregnant women. Higher level education allows for more enlightened and increases one's ability to actively seek out authentic information from a wide range of sources about a drug or vaccine and COVID-19 vaccine is no exception. Educated persons have been found to likely be 'COVID-19 vaccinated' than the uneducated or those with lower educational status. [35,36] This finding was in contrast to findings in studies done by Alemayehu *et al* in Ethiopia [37] and Al-Marshoudi *et al* in Oman [38], where those with less education or no formal education were more likely to receive COVID-19 vaccination. A possible explanation for this observation may be that the more educated individuals are more aware of the short time taken to develop the various COVID-19 vaccines as well as their side effect, and may hesitate to be vaccinated.

Healthcare workers amongst other occupation in our study were the highest to have received COVID-19 vaccination. This is an expected finding because healthcare is an occupation with a high risk of exposure to COVID-19 infection acquisition by default. This position is supported by findings from Reifferscheid *et al*'s research. [39]

Of those respondents vaccinated in this research, 13 (3.7%) nearly all of them had side effects, 11(84.6%). This finding was in contrast to another similar study by Chekol *et al* [40], where the majority, 59 (64.8%) out of 91 pregnant women did not experience post vaccination symptoms. This study finding's departure from ours may be due to the fact that a smaller number pregnant women received COVID-19 vaccine in our facility unlike in the Chekol's study.

In terms of which untoward effect of COVID-19 vaccination, fever and fatigue were amongst the commonest experienced by our respondents and occurred a few days after administration. These findings were congruous with that of the Chekol's study.

CONCLUSION

COVID-19 vaccine awareness was good amongst the antenatal attendees where the research was done but its antenatal uptake is abysmal. The socio-demographic characteristics of the antenatal attendees influenced their use of COVID-19 vaccine. The COVID-19 vaccination side effects in pregnancy are mainly not life-threatening.

RECOMMENDATIONS

The healthcare worker especially the Obstetricians in our locale has to be enlighten more on COVID-19 vaccine so that its uptake in pregnancy will improve. The mass media should be used to disseminate the information that antenatal COVID-19 vaccine is safe.

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