

COVID-19 Vaccine Acceptability Among Pregnant Women in Northern Nigeria

Increasing vaccine uptake among pregnant women is a critical part of combating the coronavirus disease 2019 (COVID-19) pandemic.¹ The prevalence and correlates of vaccine acceptance among pregnant women in Nigeria are unknown. We assessed acceptability and correlates of COVID-19 vaccines among pregnant women attending an antenatal clinic in Nigeria.

The study was conducted at Aminu Kano Teaching Hospital in Nigeria, a 750-bed referral facility serving ~13 million people. Systematic sampling was used to recruit consenting pregnant women upon arrival for antenatal care ($n = 420$). Quantitative data were collected using an adapted, interviewer-administered, structured questionnaire.^{2,3} A variable representing vaccine acceptability was created based on a 5-point Likert scale (very keen = 1 to against it = 5). Vaccine acceptability was defined as “yes” if a respondent answered “very keen” or “pretty positive” and “no” for any other response. Multivariable logistic regression was employed to assess factors independently associated with vaccine acceptability. Adjusted odds ratios and 95% confidence intervals were computed. Hosmer-Lemeshow statistic and omnibus tests were used to determine model fitness.

Among the 420 pregnant women invited to participate, 399 (95.0%) completed the survey-based interview. The median gestational age of respondents was 32 weeks (interquartile range: 24–36). Among respondents, 359 (90.0%) were of Hausa-Fulani ethnicity, 373 (93.5%) were Muslim, 280 (70.2%) had two or more children, and 356 (89.2%) had completed at least secondary education. Most (312 [78.2%]) had received at least one dose of tetanus toxoid during the current pregnancy.

Overall, 283 respondents (70.9%) thought that pregnant women affected by COVID-19 could become very sick. Similarly, 296 respondents (74.2%) were worried about the effects of COVID-19 on their unborn babies. However, only 74 respondents (18.6%) considered themselves

to be at high risk for COVID-19 infection. In terms of protection, 236 respondents (59.1%) thought that COVID-19 vaccination could reduce their risk of contracting COVID-19, and 222 (55.6%) believed that the vaccine would reduce risk for the unborn baby.

Most respondents were worried about vaccine side effects, efficacy, and safety. For example, 339 (85.0%) and 360 (90.2%) were worried about safety and side effects, respectively. Additionally, 149 (37.3%) were concerned about infertility-related rumors. Half of the respondents (200 [50.1%]) reported that they would consider vaccination if recommended by their doctor. However, only 135 respondents (33.8%) would accept the COVID-19 vaccine during pregnancy. One-quarter (106 [26.6%]) reported that they would only take it after delivery, and 93 (23.3%) would delay vaccination until after weaning the baby off breast milk.

The respondent's religion, number of living children, education, income, gestational age at booking, self-assessed health status, risk perception, and vaccine safety concerns were independently associated with COVID-19 vaccine acceptability (Table, Appendix). For example, non-Muslim respondents had a four-fold increased likelihood of accepting the vaccine during pregnancy. Similarly, respondents with primary education were 6 times more likely to accept the vaccine. Furthermore, primigravida women and those who booked early (≤ 12 weeks gestational age) for antenatal care had 3-fold increased odds of accepting COVID-19 vaccination during pregnancy. Women who received tetanus toxoid in the current pregnancy and those who self-assessed their health status as “good” or “very good” had at least a 4-fold increased likelihood of accepting the COVID-19 vaccine. Finally, pregnant women who were not concerned about COVID-19 vaccine safety were 8 times more likely to accept the vaccine.

In conclusion, we found low COVID-19 vaccine acceptance among pregnant women seeking antenatal care in Nigeria. Vaccine acceptability was associated with several sociodemographic and health-related factors. Our findings present an opportunity for public health action to reduce misconceptions about the COVID-19 vaccine. Our results will inform the design of interventions to build trust and

boost COVID-19 vaccine confidence among pregnant women in similar settings.

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Supplemental Table. Logistic regression model for predictors of acceptability of COVID-19 vaccination among pregnant women attending AKTH, Kano, Nigeria (n = 399)

Characteristics	Adjusted OR (95% CI)	P value
Religion		
Islam	Referent	
Christianity	4.08 (1.53–10.91)	0.007 ^a
Education		
Less than primary	Referent	
Completed primary	6.21 (1.08–35.69)	0.011 ^a
Completed secondary or more	1.46 (0.33–6.39)	0.69
Monthly income (Naira)		
<30 000	Referent	
≥30 000	1.76 (1.14–3.26)	0.034 ^a
Number of living children		
0	2.88 (1.13–7.34)	0.018 ^a
1	1.19 (0.58–2.42)	0.74
2–4	1.24 (0.54–2.84)	0.97
≥5	Referent	
Gestational age at booking, wk		
≤12	3.00 (1.71–5.27)	0.002 ^a
23–28	Referent	
Current gestational age, wk		
13–28	1.46 (0.82–2.63)	0.20
29–40	Referent	
Tetanus toxoid immunization in current pregnancy		
Yes	6.90 (2.70–17.63)	<0.001 ^a
No	Referent	
Self-assessed health status		
Very good	5.15 (1.65–16.07)	<0.001 ^a
Good	4.04 (2.34–7.01)	0.007 ^a
Fair	Referent	
COVID-19 risk perception		
High	1.24 (1.07–2.74)	0.037 ^a
Low	Referent	
Concerned about COVID-19 vaccine safety		
Yes	Referent	
No	8.30 (4.41–15.62)	0.007 ^a
Concerned about COVID-19 vaccine efficacy		
Yes	Referent	
No	1.41 (0.41–4.87)	0.59
Concerned about side effects of COVID-19 vaccine		
Yes	Referent	
No	1.70 (0.43–6.77)	0.45

Hosmer-Lemeshow chi-square = 5.63; *P* = 0.73. Models adjusted for age.

^aSignificant at *P* < 0.05

AKTH: Aminu Kano Teaching Hospital; COVID-19: coronavirus disease 2019; OR: odds ratio.