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Research Article

# Assessment of Knowledge, Attitude and Acceptance of COVID-19 Vaccination Among Students of Taraba State College of Nursing and Midwifery, Jalingo, Nigeria

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## Abstract

Background: It has been reported several times that medical personnel with a negative attitude, dislike, or unwillingness towards vaccines transfer these attitudes to patients. As a result of theories passed across both social and traditional media platforms about the inefficacy of COVID-19 vaccination, combined with the previous history of abstaining from vaccination, adequate knowledge and awareness are vital to making appropriate conclusions concerning COVID-19 vaccines. Unwillingness to receive a vaccine, usually observed in the general population, has been associated with the level of unwillingness to receive a vaccine among healthcare professionals. Objectives: This study assessed the knowledge, attitude, and acceptance of COVID-19 vaccination among Taraba State College of Nursing and Midwifery students. Methods: A descriptive cross-sectional study was conducted using convenience sampling. A self-administered questionnaire collected data from 336 students. Responses were analyzed using descriptive statistics and cross-tabulations to examine associations. Results: Respondents were predominantly female (77.08%), single (88.99%), and aged between 15-20 years (65.77%). Year One students made up 56.25% of the sample. Overall, knowledge and attitudes toward COVID-19 vaccines were positive, with 64.29% having already received the vaccine. Key factors influencing vaccine uptake included prior adverse vaccine experiences, concerns about side effects, negative media coverage, and doubts regarding vaccine safety. Conclusion: The study found that higher knowledge and more positive attitudes were associated with greater vaccine acceptance. This can be achieved by addressing concerns about the effects of the vaccine and providing appropriate information about the vaccine's effectiveness and safety.

## Keywords

COVID-19 Vaccine, Knowledge, Attitude, Vaccine Acceptance, Vaccine Hesitancy, Nursing and Midwifery Students

## 1. Introduction

The COVID-19 pandemic remains one of the most significant global health emergencies in recent history, profoundly affecting health systems, economies, and societal norms. Since its emergence in late 2019, COVID-19 has caused widespread morbidity and mortality, making it one of the deadliest pandemics since World War II. As of April 13, 2024, more than 7million deaths have been reported globally, with Nigeria recording 267,173 confirmed cases and 3,155 deaths [1].

Vaccination is widely recognized as one of the most effective public health interventions for controlling infectious diseases [2,

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3]. However, the success of any vaccination program relies heavily on the knowledge, attitude, and acceptance of the target population. In the context of COVID-19, the rapid development and deployment of vaccines were met with both optimism and skepticism, particularly due to misinformation spread via social and traditional media platforms [4]. This has significantly influenced vaccine hesitancy, which the World Health Organization (WHO) has identified as one of the top ten threats to global health [1].

Healthcare workers—including nurses and midwives—are expected to play a central role in disseminating accurate information about vaccines and influencing positive health behavior. Evidence suggests that healthcare workers with negative attitudes or limited knowledge about vaccines are less likely to recommend them to patients and may inadvertently promote vaccine hesitancy. Moreover, studies show a strong association between vaccine hesitancy among healthcare professionals and that of the general population [5, 6].

Nursing and midwifery students, as future healthcare professionals, occupy a strategic position in the healthcare system. Their willingness to receive COVID-19 vaccination and advocate for it is strongly influenced by their level of knowledge and perception of vaccine safety and efficacy. Training institutions have a critical role to play in ensuring students are well-prepared to respond confidently and competently to patients' inquiries and concerns about vaccination [7-10]. Despite the availability of four major WHO-approved vaccines in Nigeria—Pfizer BioNTech, Moderna, AstraZeneca, and Johnson & Johnson—acceptance remains suboptimal.

The first batch of approximately four million AstraZeneca vaccine doses arrived in Nigeria through the COVID-19 Vaccine Global Access (COVAX) facility in March 2021 [11]. As of April 2025, Nigeria has administered approximately 133 million COVID-19 vaccine doses, with around 81.3 million individuals fully vaccinated, representing a national coverage rate of approximately 53.36% [12]. This figure still falls short of the WHO's recommended 70% population coverage threshold required to achieve herd immunity. Although government-led efforts—including public awareness campaigns and mobile vaccination teams—have contributed to gradual improvements, vaccine hesitancy driven by misinformation, cultural beliefs, and risk perception remains a critical barrier to optimal uptake [11-14].

Sustained vaccination efforts are particularly important among healthcare trainees such as nursing and midwifery students, who serve not only as future caregivers but also as vital channels of health information to the public. Their knowledge, attitudes, and acceptance of COVID-19 vaccination are therefore essential to improving public confidence in vaccines and reducing transmission. Evidence suggests that vaccine hesitancy among healthcare professionals closely mirrors patterns in the general population, and early education targeting these professionals can significantly improve uptake and patient compliance [15-18].

The need to investigate and address factors influencing vaccine hesitancy among health science students in Nigeria cannot be overstated. Despite extensive research on COVID-19 vaccine hesitancy, there remains limited understanding of how knowledge, attitudes, and acceptance interrelate among future healthcare providers in North Eastern Nigeria, particularly regarding the persistence of misinformation despite medical training and the weak predictive relationship between vaccine knowledge and acceptance behaviors [19-21]. Previous studies have identified a range of barriers including limited access to accurate information, mistrust in pharmaceutical companies or government agencies, fear of side effects, religious beliefs, and peer influence. Furthermore, students in nursing and midwifery programs are not exempt from these influences, despite their training in health sciences [22-24].

This study, therefore, aims to assess the knowledge, attitude, and acceptance of COVID-19 vaccination among students of the Taraba State College of Nursing and Midwifery (TSCNM), Jalingo. Understanding these dimensions is crucial for informing targeted interventions, improving vaccine literacy among future health professionals, and ultimately strengthening Nigeria's pandemic preparedness and response strategies.

## 2. Materials and Methods

### 2.1. Study Design and Population

This was a descriptive cross-sectional study conducted at the TSCNM, Jalingo, Taraba State, Nigeria. The study assessed knowledge, attitudes, and acceptance of COVID-19 vaccination among student nurses and midwives enrolled during the 2023/2024 academic session.

### 2.2. Student Population, Eligibility and Sampling

The study population comprised all registered students in the nursing and midwifery programs. Students who were enrolled at the time of data collection and consented to participate were included; those on leave of absence or who declined consent were excluded.

A convenience sampling approach was used due to logistical constraints and to maximize participation. A total of 336 students completed the questionnaire and were included in the analysis.

Data were collected using a structured, self-administered questionnaire developed from previously published studies assessing COVID-19 vaccine knowledge, attitudes and acceptance among healthcare students. Face and content validity were established through expert review by three public health and nursing education specialists who assessed the questionnaire for relevance, clarity and comprehensiveness. Minor modifications were made following their recommendations before administration.

Ethical approval was obtained from the Ethics Committee of the University of Nigeria Teaching Hospital (NHREC/05/01/2008B-FWA00002458-1RB00002323). Permission to conduct the study was also obtained from the management of TSCNM, Jalingo. The research was conducted in accordance with the Declaration of Helsinki (1964). Participation was voluntary; informed consent was obtained from all respondents, and anonymity and confidentiality were maintained throughout data collection, analysis, and reporting.

### 2.3. Data Collection and Analysis

Data collection took place between May and June 2024 using a structured, self-administered questionnaire. The questionnaire was designed based on a review of relevant literature and comprised sections on socio-demographic data, knowledge of the COVID-19 vaccine, attitudes toward vaccination, and willingness to accept the vaccine.

To assess the depth of respondents' knowledge and identify misinformation, the questionnaire intentionally included two fictitious vaccine options ("K-BCG" and "K-Anthrax") as distractor items. Selection of these options indicated misconceptions regarding approved COVID-19 vaccines rather than awareness of actual vaccines.

Collected data were analyzed using descriptive statistics, including frequencies and percentages, to describe participant characteristics and summarize their responses. The findings offered insight into students' levels of knowledge and attitudes, as well as the rate of acceptance or hesitancy toward COVID-19 vaccination. Pearson's correlation analysis was used to examine relationships between knowledge, attitude, and vaccine acceptance, with significance set at $p < 0.05$ (two-tailed).

## 3. Results

### 3.1. Socio-demographic Information

A total of 336 responses were obtained from students of TSCNM, Jalingo (Table 1). The demographic characteristics of the respondents showed that most of the respondents were single (88.99%), females (77.08%) and Year One students (56.25%).

***Table 1.*** *Demographic information of students of TSCNM, Jalingo, Nigeria (N = 336).*

| | N | Percentage (%) |
|---|---|---|
| Gender | | |
| Male | 77 | 22.92 |
| Female | 259 | 77.08 |
| Level | | |
| Year one | 189 | 56.25 |
| Year two | 108 | 32.14 |
| Year three | 39 | 11.61 |
| Marital Status | | |
| Single | 299 | 88.99 |
| Married | 34 | 10.12 |
| Divorced/widowed | 3 | 0.89 |
| Total | 336 | 100 |

### 3.2. Knowledge of COVID-19 Vaccination

In assessing the respondents' knowledge of the COVID-19 vaccine (Table 2), Social media was the predominant information source (73.21%). About 53.27% believed the vaccine is recommended for children. Awareness of approved vaccines was relatively high: Moderna (61.01%), AstraZeneca (59.23%), Pfizer-BioNTech (55.95%), and Johnson & Johnson (56.85%). However, 44.64% and 48.51% incorrectly identified the intentionally fictitious "K-BCG" and "K-Anthrax" vaccine options as approved COVID-19 vaccines, indicating persistent misconceptions and gaps in vaccine knowledge. Most respondents cor-

rectly acknowledged that vaccines do not alter De-oxy Ribonucleic Acid (DNA) (60.71%) or cause illness (62.80%), and that they offer protection against COVID-19 (79.46%). Nonetheless, 41.96% incorrectly believed that prior infection removes the need for vaccination.

*Table 2. Knowledge of COVID-19 Vaccination among Students of TSCNM, Jalingo, Nigeria (N=336).*

| S/N | Knowledge of COVID-19 vaccine | Yes (%) | No (%) |
|---|---|---|---|
| | Major Source of information regarding COVID-19 Vaccine | | |
| | Social Media | 246 (73.21) | 90 (26.79) |
| | Newspaper | 58 (17.26) | 278 (82.74) |
| 1. | Friends and Colleague | 62 (18.45) | 274 (81.55) |
| | Medical Faculty | 42 (12.50) | 294 (87.50) |
| | Scientific Websites | 72 (21.43) | 264 (78.57) |
| | Family members | 48 (14.29) | 288 (85.71) |
| 2. | Current vaccines is recommended for children | 179 (53.27) | 157 (46.73) |
| | Approved COVID-19 vaccines | | |
| | AstraZeneca-Oxford COVID-19 vaccine | 199 (59.23) | 137 (40.77) |
| | Pfizer-BioNTech COVID-19 vaccine | 188 (55.95) | 134 (39.88) |
| 3. | Johnson & Johnson's Janssen COVID-19 vaccine | 191 (56.85) | 145 (43.15) |
| | ModernaCOVID-19 vaccine | 205 (61.01) | 131 (38.99) |
| | K-BCG COVID-19 vaccine* | 150 (44.64) | 186 (55.36) |
| | K-Anthrax COVID-19 vaccine* | 163 (48.51) | 173 (51.49) |
| 4. | COVID-19 vaccine can alter my DNA? | 132 (39.29) | 204 (60.71) |
| 5. | COVID-19 vaccination can protect me from getting sick with COVID-19 | 267 (79.46) | 69 (20.54) |
| 6. | I do not need to get vaccinated if I already had COVID-19 | 141 (41.96) | 195 (58.04) |
| 7. | After getting a COVID-19 vaccine, I can still test positive for COVID-19 on a viral test | 192 (57.14) | 144 (42.86) |
| 8. | COVID-19 vaccine can make me sick with COVID-19? | 125 (37.20) | 211 (62.80) |

* Used as distractor to assess misinformation and identify gaps in knowledge

## 3.3. Attitude towards COVID-19

Assessment of respondents' attitude towards COVID-19 vaccinations using a 4-point Likert scale showed moderate agreement with the effectiveness and safety (Table 3) vaccines (mean = 3.22). While most agreed that vaccination could reduce complications (mean = 2.89) and infection rates (mean = 2.78), the belief that vaccines prevent infection was less strong (mean = 2.65). Attitudes also revealed concerns about vaccine profiteering (mean = 2.66), long-term effects (mean = 2.92), and general mistrust of vaccine benefits (mean = 2.91). The overall mean scores suggest a cautiously positive attitude with some underlying skepticism.

*Table 3. Attitude towards COVID-19 among students of TSCNM, Jalingo, Nigeria (N=336).*

| S/N | Item | SD | D | A | SA | Mean | Std. D |
|---|---|---|---|---|---|---|---|
| 1. | General mistrust of vaccine benefit | 51 (15.18) | 62 (18.45) | 91 (27.08) | 132 (39.29) | 2.91 | 1.087 |

| S/N | Item | SD | D | A | SA | Mean | Std. D |
|---|---|---|---|---|---|---|---|
| 2. | Worries about unforeseen effect | 23 (6.85) | 83 (24.70) | 130 (38.69) | 100 (29.76) | 2.92 | 0.902 |
| 3. | Concern about commercial profiteering | 51 (15.18) | 97 (28.87) | 102 (30.36) | 86 (25.59) | 2.66 | 1.022 |
| 4. | Preference for natural immunity | 33 (9.82) | 87 (25.89) | 107 (31.85) | 109 (32.44) | 2.87 | 0.983 |
| 5. | The vaccines are safe and effective? | 23 (6.85) | 44 (13.09) | 106 (31.55) | 163 (48.51) | 3.22 | 0.920 |
| 6. | COVID-19 vaccine can prevent infection? | 45 (13.39) | 114 (33.93) | 91 (27.08) | 86 (25.60) | 2.65 | 1.003 |
| 7. | Rate of infection will decrease after vaccination | 44 (13.09) | 88 (26.19) | 102 (30.36) | 102 (30.36) | 2.78 | 1.023 |
| 8. | Complications of COVID-19 infection will decrease after vaccination | 35 (10.42) | 63 (18.75) | 141 (41.96) | 97 (28.87) | 2.89 | 0.942 |
| 9. | Herd immunity achieved through vaccination is the -key to stop the pandemic | 46 (13.69) | 88 (26.19) | 72 (21.43) | 130 (38.69) | 2.85 | 1.086 |

Note: SD = Strongly Disagree, D = Disagree, A = Agree SA= Strongly Agree

## 3.4. Acceptance of COVID-19 vaccines

The results also showed that 64.29% of respondents had received an approved COVID-19 vaccine (Table 4). Among those yet to be vaccinated, 51.67% expressed intent to get vaccinated, indicating a moderate level of acceptance among the unvaccinated subgroup.

***Table 4.*** *Acceptance of COVID-19 Vaccination among students of College of Nursing and Midwifery Jalingo, Nigeria (N= 336).*

| S/N | COVID-19 vaccination acceptance | Yes (%) | No (%) |
|---|---|---|---|
| 1. | Have you received a COVID-19 vaccine? | 216 (64.29) | 120 (35.71) |
| 2. | If not, are you willing to get vaccinated? | 62 (51.67) | 58 (48.33) |

## 3.5. Relationship Between Knowledge, Attitude and Acceptance of COVID-19 Vaccine

The relationships between knowledge, attitude, and vaccine acceptance (Table 5) showed that there is a weak but statistically significant positive correlation between attitude and vaccine acceptance ($r = 0.135$, $p = 0.004$) and between knowledge and vaccine acceptance ($r = 0.117$, $p = 0.006$). However, the correlation between knowledge and attitude was not statistically significant ($r = 0.152$, $p = 0.08$). These results suggest that while knowledge may influence vaccine acceptance directly, it was not significantly associated with attitude and may require further investigation.

***Table 5.*** *Relationship between knowledge, attitude and acceptance of COVID-19 vaccine among students of TSCNM, Jalingo, Nigeria (N=336).*

| | r-value | Knowledge | Attitude | Vaccine Acceptance |
|---|---|---|---|---|
| Knowledge | Pearson Correlation | 1 | 0.152 | 0.117 |
| | Sig. (Two tailed) | - | 0.08 | 0.006 |
| | N | 336 | 336 | 336 |
| Attitude | Pearson Correlation | 0.152 | 1 | 0.135 |
| | Sig. (Two tailed) | 0.08 | - | 0.004 |

| | r-value | Knowledge | Attitude | Vaccine Acceptance |
|---|---|---|---|---|
| Vaccine acceptance | N | 336 | 336 | 336 |
| | Pearson Correlation | 0.117 | 0.135 | 1 |
| | Sig. (Two tailed) | 0.006 | 0.004 | - |
| | N | 336 | 336 | 336 |

## 4. Discussion

This study assessed knowledge, attitudes, and acceptance of COVID-19 vaccination among students of the TSCNM, Jalingo. Overall, respondents demonstrated moderate-to-high knowledge and acceptance, with generally positive but cautious attitudes and persistent pockets of hesitancy and misinformation, echoing patterns in other health-training settings in Nigeria and beyond [22, 25].

A large proportion of students correctly identified approved vaccine types and their protective benefits, consistent with studies among Nigerian university and health-science students that report relatively high formal knowledge but uneven depth of understanding [26]. Similar findings among health-care students in India and other settings suggest that healthcare curricula and clinical exposure enhance awareness but do not eliminate misconceptions or hesitancy [27].

The persistence of misinformation in this cohort—including incorrect beliefs about non-existent or unapproved vaccines—is consistent with previous evidence from Ethiopia and Ghana where social media is a dominant information source and strongly associated with misconceptions and hesitancy [4, 28, 29]. This reinforces the double-edged role of social media: a highly accessible channel for both credible information and harmful "infodemic" content.

Attitudes were broadly favorable toward vaccine safety and efficacy, yet notable skepticism persisted about long-term side effects, pharmaceutical or governmental motives, and a preference for "natural" immunity. Similar concerns—rapid development, potential long-term harms, and mistrust of institutions—have been widely documented among students and the general public in multiple countries [30, 31]. Among Nigerian health-science students, distrust of authorities and concerns about safety similarly reduce Covid-19 vaccine acceptance despite high awareness [22, 32].

The acceptance level of 64.29% in this study is higher than in several Nigerian and regional student samples, where acceptance among health-science or general students has ranged from roughly 20%-40% [22, 26, 32]. This comparatively higher uptake among nursing and midwifery students may reflect their perceived occupational risk and proximity to clinical environments, as suggested by evidence that health-training backgrounds and exposure to patients can increase willingness to vaccinate [27, 33]. Nonetheless, the finding that nearly half of unvaccinated students remained hesitant indicates unresolved doubts and likely low or contested risk perception, in line with work showing that knowledge alone does not guarantee uptake when perceived personal risk is low or ambivalent [34, 35].

Consistent with previous Nigerian student data, this study found weak but statistically significant correlations between knowledge and acceptance, and between attitude and acceptance [25, 26]. Broader evidence supports this pattern: knowledge, attitudes, and behavior each contribute to acceptance but explain only part of the variance, and perceived risk and trust are critical additional drivers [35-37]. The non-significant correlation between knowledge and attitude in the present work is thus plausible and suggests that cognitive awareness does not automatically translate into positive affect or trust, particularly in contexts marked by historical or contemporary distrust.

Taken together, the findings from Taraba State contribute to the growing evidence that nursing and midwifery students, despite their health-science training, remain vulnerable to the same socio-political narratives, emotional responses, and digital misinformation that shape vaccine hesitancy in the general population [4, 30, 32]. This underscores a need to expand vaccine literacy programs beyond factual content to deliberately address trust, perceived risk, emotional concerns, and social influences. Interventions should leverage trusted academic and clinical channels, strategically engage social media to counter misinformation, and directly tackle recurring worries about long-term safety and commercial motives, which have been repeatedly shown to erode confidence and uptake.

From a policy and institutional perspective, the findings highlight the need to strengthen vaccine literacy and communication competencies among future healthcare professionals. The Nigeria Vaccine Policy [38] identifies vaccine advocacy and public enlightenment as important responsibilities of governments at all levels, including efforts to address vaccine hesitancy and resistance. The policy also encourages state-level adaptation and dissemination, providing a framework for translating national vaccine priorities into context-specific interventions. In Taraba State, the findings could inform collaboration between the State Ministry of Health, the Taraba State Primary Health Care Development Agency, and nursing and midwifery training institutions to strengthen public education and responses to vaccine misinformation. At the institutional level, nursing and midwifery curricula should incorporate

structured vaccine communication training, including evidence-based vaccine counselling, risk communication, identification of misinformation, and effective responses to vaccine-related misconceptions. These competencies would better prepare nursing students to serve as credible sources of vaccine information and contribute to improved public confidence in vaccination.

## 5. Conclusions

The findings of this revealed that while a majority of respondents possessed a moderate to good level of knowledge about COVID-19 vaccines—particularly regarding approved vaccine types and their protective benefits—misconceptions and misinformation persisted, particularly regarding unapproved vaccines and immunity post-infection.

Attitudes toward the vaccine were generally positive but marked by caution, with notable concerns about safety, long-term effects, and commercial motives. Despite this, a significant proportion of students (64.29%) had already received at least one dose of an approved vaccine, and over half of the unvaccinated students expressed willingness to be vaccinated.

Importantly, the study identified statistically significant but weak positive correlations between knowledge and vaccine acceptance, and between attitude and acceptance, suggesting that while both factors contribute to acceptance, they do so modestly and independently. These insights underscore the need for targeted, evidence-based health communication strategies integrated into undergraduate nursing and midwifery curricula, enabling future healthcare professionals to effectively communicate vaccine benefits, address misinformation, and improve public confidence in immunization programmes.

Overall, enhancing the knowledge base and addressing attitudinal barriers in health-related student populations may serve as a strategic leverage point to improve vaccine uptake and advocacy, particularly in resource-limited and vaccine-hesitant contexts like parts of Nigeria and sub-Saharan Africa.

## Abbreviations

| | |
|---|---|
| WHO | World Health Organization |
| TSCNM | Taraba State College of Nursing and Midwifery |
| COVAX | COVID-19 Vaccine Global Access |
| DNA | De-oxy Ribonucleic Acid |

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## Author Contributions

**David Philip Dangoji:** Conceptualization, Data curation, Formal Analysis, Resources, Writing – original draft

**Martins Dimas Bujums:** Methodology, Resources, Writing – review & editting

**Lawrence Zorai:** Conceptualization, Resources, Supervision

## Data Availability Statement

Data for this study is available from the corresponding author upon reasonable request.

## Conflicts of Interest

The authors declare no conflicts of interest.

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## Research Field

**David Philip Dangoji:** Public Health, Epidemiology, Neuroscience, Nutraceuticals, Biological Anthropology, Molecular Biology

**Martins Dimas Bujums:** Human Anatomy, Clinical Anatomy, Anthropology, Health Sciences, Anatomical Education and Medical Education

**Lawrence Zorai:** Endocrinology, Reproductive Physiology, Metabolic Physiology, Public Health