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Knowledge and Attitudes Toward Childhood Immunization Among Nursing Mothers in Gombe, Nigeria

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Abstract

Background: Childhood immunization remains one of the most effective strategies for reducing morbidity and mortality among children under five. Despite this, immunization coverage in Gombe State remains below optimal levels. This study assessed the knowledge, attitudes, and barriers to childhood immunization among nursing mothers attending a tertiary health facility in Gombe.

Methods: A cross-sectional study was conducted among 381 nursing mothers attending the immunization clinic at Zainab Bulkachuwa Women and Children Hospital, Gombe. Data were collected using an interviewer-administered questionnaire and analyzed using descriptive statistical methods with a significance level set at $p < 0.05$.

Results: Overall, 74.8% of mothers demonstrated good knowledge of childhood immunization. Higher educational attainment and urban residence were significantly associated with better knowledge. Attitudes toward immunization were generally positive; however, concerns about side effects and the perception that immunization is primarily the government's responsibility remained common. In addition, a considerable number of mothers reported missing scheduled immunization appointments, mainly due to health system challenges such as vaccine stock-outs and long waiting time.

Conclusion: While knowledge and attitudes toward childhood immunization were largely favourable, key gaps and barriers continue to affect optimal uptake. Addressing these challenges through targeted health education and strengthening health service delivery will be critical to improving immunization coverage and child health outcomes in Gombe State.

Keywords: Childhood immunization; Nursing mothers; Knowledge; attitude; Barriers; Under Five Children.

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Introduction

Childhood immunization remains one of the most effective public health interventions for preventing morbidity and mortality among children under five years of age World Health Organization, 2025. Globally, it has contributed significantly to the eradication of smallpox, the near-elimination of polio, and substantial reductions in deaths from vaccine-preventable diseases such as measles, diphtheria, and pertussis World Health Organization, 2025. The benefits of immunization are most critical for children under five years of age, who are particularly vulnerable to infectious diseases. It prevents between 3.5 million and 5 million deaths every year from diseases like measles, tetanus, and pneumonia United Nations Children's Fund, 2023. Despite these gains, millions of children in low- and middle-income countries remain under-immunized, particularly in sub-Saharan Africa United Nations Children's Fund, 2023.

Globally, nursing mothers' knowledge and attitudes toward immunization have been identified as critical determinants of childhood vaccination uptake, timeliness, and completion Ayo-Farai et al., 2025. In many sub-Saharan African settings, nursing mothers have been found to have poor knowledge of immunization schedules and vaccine-preventable diseases, which often translates into missed appointments and incomplete vaccination. Attitudes shaped by community rumours, religious interpretations, and past negative experiences with health services further influence mothers' decisions about immunization Galadima et al., 2021.

Despite proven vaccine efficacy and efforts from the Nigerian government and global partners, childhood immunization coverage in Nigeria remains inadequate. The National Demographic and Health Survey revealed that only 39% of children aged 12–23 months in Nigeria are fully vaccinated Nigeria Demographic and Health Survey, 2024. In Gombe State, the vaccination coverage is 49%. This coverage gap creates a pool of susceptible children, leading to persistent outbreaks of vaccine-preventable diseases, increased childhood mortality, and long-term disability, which strain the already fragile healthcare system Nigeria Demographic and Health Survey, 2024.

Therefore, understanding the interplay between knowledge, attitudes, and the barriers faced by nursing mothers is a critical public health imperative for improving child health outcomes in Gombe State and Nigeria at large.

Methods

Study Design

A descriptive study design was used to assess caregivers' knowledge, attitudes, and perceived barriers to childhood immunization.

Study Area and Population

The study was conducted at Zainab Bulkachuwa Women and Children Hospital, Gombe, a secondary health facility providing maternal and child health services, including routine immunization. The study population comprised nursing mothers with children under five years of age.

Sample Size and Sampling Technique

The sample size of 381 was determined using the formula for a single proportion Bolarinwa, 2020, based on an estimated proportion of mothers with good knowledge of childhood routine immunization (33.5%) from a previous study Oladepo et al., 2019, with a 95% confidence level and 5% margin of error.

The formula used is given as:

$$n = \frac{Z^2 p(1-p)}{d^2}$$

Where:

- n = minimum sample size
- Z = standard normal deviation at 95% confidence level (1.96)
- p = estimated proportion (0.335)
- d = margin of error (0.05)

Substituting the values:

$$n = \frac{(1.96)^2 \times 0.335 \times (1-0.335)}{(0.05)^2}$$

$$n = \frac{3.8416 \times 0.335 \times 0.665}{0.0025}$$

$$n = \frac{0.855}{0.0025}$$

$$n = 342$$

After adjusting for non-response and rounding up, the final sample size was 381.

A multistage sampling technique was used to select eligible respondents. First, service units where caregivers of children under five access care were identified. The immunization clinic was selected by simple random sampling (balloting) from the three available clinics.

Within the selected clinic, respondents were chosen using a systematic sampling method. The daily clinic attendance register served as the sampling frame, and a sampling interval of two (2) was obtained by dividing the total number of attendees by the required sample size. The first respondent was selected randomly between the first and second attendees, after which every second eligible caregiver was recruited until the desired sample size was achieved.

Data Collection and Measurement

Data were collected using a semi-structured questionnaire. Knowledge and attitude-related questions were scored, and categorization was based on established methods from similar studies, with suitable cutoff points adopted from the literature. Based on previous research, knowledge scores were classified as good (≥ 50%) Abate et al., 2019, while attitude scores were deemed positive (≥ 70%) Hassan & Buzaid, 2025.

Validity and Reliability

Experts reviewed the instrument to ensure content and face validity, after which it was pretested among a similar population. Reliability was assessed using Cronbach's alpha, which demonstrated acceptable internal consistency (0.74).

Ethical Considerations

Ethical approval was obtained from the Gombe State Ministry of Health (Ref: GMHREC 2026/005). Participation was voluntary, informed consent was obtained, and the confidentiality of respondents was strictly maintained.

Results

A total of 381 nursing mothers attending Zainab Bulkachuwa Women and Children Hospital, Gombe, participated in the study, yielding a response rate of 100%.

The ages of the respondents ranged from 18 to 45 years, with a mean age of 31.2 ± 6.8 years. The socio-demographic characteristics of the respondents are presented in Table 1.

A composite knowledge score showed that 285 (74.8%) of the mothers had good knowledge of childhood immunization, while 96 (25.2%) had poor knowledge. Similarly, the majority of respondents, 292 (76.6%), demonstrated a positive attitude towards immunization (Table 2).

Bivariate analysis revealed significant associations between selected socio-demographic characteristics and knowledge levels. Good knowledge was significantly higher among mothers aged ≥ 25 years, those with secondary and tertiary education, and those residing in urban areas (Table 3).

With respect to attitudes, higher educational attainment, urban residence, lower parity, and higher household income were significantly associated with positive attitudes towards childhood immunization (Table 3).

Table 1: Socio-demographic Characteristics of Nursing Mothers ($n = 381$)

Characteristic	Frequency (n)	Percentage (%)
Age group (years)		
< 25	89	23.4
25–34	212	55.6
≥ 35	80	21.0
Marital status		
Married	314	82.4
Unmarried	67	17.6
Education		
No formal/Primary	92	24.1
Secondary	159	41.7
Tertiary	130	34.1
Occupation		
Housewife	247	64.8
Employed	134	35.2
Number of under-five children		
0–1	142	37.3
2–3	239	62.6
Residence		
Urban	261	68.5
Rural	120	31.5
Access time to facility		
≤ 30 minutes	276	72.4
> 30 minutes	105	27.6
Monthly income		
< ₦50,000	272	71.4
≥ ₦50,000	109	28.6

Variables with $p < 0.05$ at the bivariate level were included in the logistic regression models. For knowledge, age ≥ 25 years, secondary and tertiary education, and urban residence were independently associated with good knowledge. For attitude, tertiary education and urban residence re-

mained significant predictors of a positive attitude (Table 4).

Overall, 109 (28.6%) of the children had missed scheduled immunization appointments. The most commonly reported reasons for missed appointments included vaccine stock-outs, lack of time, and concerns about side effects. Key service-related barriers identified were long waiting times and inconsistent vaccine availability.

Table 2: Knowledge and Attitude Levels among Nursing Mothers ($n = 381$)

Variable	Frequency (n)	Percentage (%)
Knowledge		
Good	285	74.8
Poor	96	25.2
Attitude		
Positive	292	76.6
Negative	89	23.4

Table 3: Factors Associated with Knowledge and Attitude among Nursing Mothers

Variable / Outcome	χ^2	p-value
Knowledge		
Age group	9.12	0.003
Education	41.5	<0.001
Residence	15.6	<0.001
Attitude		
Education	14.8	0.002
Residence	12.3	0.001
Number of children	6.7	0.012
Income	5.2	0.023

Discussion

This study assessed the knowledge, attitudes, and barriers to childhood immunization among nursing mothers attending a secondary health facility in Gombe State. The findings revealed that a majority of respondents demonstrated good knowledge (74.8%) and positive attitudes (76.6%) toward childhood immunization. However, notable service-related barriers and gaps in knowledge persist, which may affect optimal immunization uptake.

The high level of knowledge observed in this study suggests that most caregivers are aware of the importance of immunization and its role in preventing childhood diseases. This finding is consistent with previous studies conducted in Nigeria and other low- and middle-income countries, which reported relatively high awareness levels among mothers attending health facilities Ariyibi et al., 2023; Dabsu et al., 2026. Caregivers who frequently utilize maternal and child health services tend to have better knowledge of immunization practices. This aligns with global evidence indicating that regular contact with health services is a key determinant of caregiver awareness and vaccine uptake World Health Organization, 2025.

Despite the overall good knowledge, gaps were observed in specific areas such as awareness of vaccination schedules and timing. Similar findings have been reported in other studies, where caregivers demonstrated good general awareness but limited understanding of immunization schedules Dabsu et al., 2026; K., Park, 2015. These gaps may contribute to missed opportunities for vaccination and incomplete immunization.

Education and place of residence were found to be significant predictors of knowledge. Mothers with higher levels of education were more likely to have good knowledge compared to those with lower educational attainment. This is consistent with existing literature, which identifies maternal education as a strong determinant of health knowledge and health-seeking behaviour Ariyibi et al., 2023; Ohonba et al., 2019. Educated mothers are more likely to access health information, understand health messages, and make informed decisions regarding their children's health. Similarly, urban residence was associated with better knowledge, likely due to improved access to healthcare services, greater exposure to health information, and increased opportunities for health education. The study also found that a majority of respondents had positive attitudes toward immunization. This aligns with findings from previous studies reporting generally favourable perceptions of vaccines among caregivers Adeyanju, 2025; Dabsu et al., 2026. However, a notable proportion of respondents expressed concerns about vaccine side effects, indicating the persistence of misconceptions and fears. Similar concerns have been doc-

Table 4: Logistic Regression of Factors Associated with Knowledge and Attitude (n = 381)

Outcome Variable	Predictor	AOR	95% CI	p-value
Good Knowledge	Age ≥ 25 years	2.05	1.26–3.34	0.004
	Secondary education	3.12	1.85–5.27	<0.001
	Tertiary education	3.62	1.78–7.38	<0.001
	Urban residence	2.14	1.23–3.72	0.007
Positive Attitude	Secondary education	1.67	0.92–3.04	0.092
	Tertiary education	2.89	1.45–5.78	0.003
	Urban residence	2.34	1.32–4.15	0.004
	Income ≥ ₦50,000	1.54	0.80–2.97	0.198

Note: AOR = Adjusted Odds Ratio; CI = Confidence Interval. Statistically significant values are typically considered at $p < 0.05$.

umented in other studies, where fear of adverse effects was identified as a barrier to immunization uptake Adeyanju, 2025. Addressing misinformation and strengthening trust in vaccines remain critical strategies for improving immunization coverage Chukwuma et al., 2019.

Tertiary education and urban residence were independently associated with positive attitudes toward immunization. This further underscores the influence of socio-demographic factors on health behaviour. Mothers with higher levels of education are more likely to trust health interventions and adopt preventive practices, while urban residents benefit from improved access to health information and healthcare services.

Service-related barriers were prominent in this study. A significant proportion of respondents reported long waiting times and vaccine stock-outs as major challenges. These findings are consistent with previous research identifying health system constraints, such as supply chain inefficiencies and service delivery limitations, as key barriers to immunization in low-resource settings Olaniyan et al., 2022. Long waiting times may discourage caregivers from attending immunization sessions, while vaccine stock-outs directly restrict access to essential services.

Conclusion

This study demonstrates that nursing mothers in Gombe State generally possess good knowledge and positive attitudes toward childhood immunization. However, important gaps remain in knowledge of immunization schedules, concerns regarding vaccine safety, and persistent service-related barriers such as long waiting times and inconsistent vaccine availability. Maternal education and urban residence emerged as significant determinants of both knowledge and attitudes, highlighting the role of socio-demographic factors in shaping immunization behaviours.

Policy and Practice Implications

Improving childhood immunization uptake requires a multifaceted approach. Strengthening health education interventions to address knowledge gaps and misconceptions is essential, particularly among less educated and rural populations. In addition, health system improvements are needed to ensure consistent vaccine supply, reduce waiting times, and enhance the overall quality of immunization services. Targeted strategies that address both demand-side and supply-side barriers will be critical for achieving optimal immunization coverage.

Future Research

Further research is needed to deepen understanding of the contextual factors influencing immunization uptake. Community-based studies would provide more representative insights beyond facility-based populations. Additionally, intervention studies evaluating strategies to address knowledge gaps, reduce vaccine hesitancy, and improve service delivery efficiency are recommended to inform

evidence-based policy and practice.

Authors' Contributions

FA: Conceptualization and proposal development; Data collection and drafting of all chapters of the book. US: Review of the proposal and manuscript development. HR: Review of the proposal and overall supervision. ASM: Manuscript development. AA: Data analysis. HFS: Manuscript review

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Conflicts of Interest

The authors declare no conflict of interest in the conduct of this study.

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What is Known About This Topic

Childhood immunization is widely recognized as one of the most effective public health interventions for preventing morbidity and mortality among children under five. It has contributed significantly to the control, elimination, and near-eradication of several vaccine-preventable diseases. Existing literature consistently indicates that caregivers' knowledge and attitudes toward immunization are key determinants of vaccine uptake, timeliness, and completion. Studies conducted in sub-Saharan Africa and other developing regions have reported varying levels of knowledge among mothers, with many demonstrating good knowledge but limited understanding of immunization schedules and specific vaccine-preventable diseases.

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