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Determinants of Childhood Immunization Non-Compliance: A Cross-Sectional Study Among Nursing Mothers in Southwest Nigeria

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ABSTRACT

Background

Immunization remains one of the most effective public health strategies for reducing childhood morbidity and mortality. However, noncompliance with recommended immunization schedules continues to be a concern in resource-constrained settings. This study assessed factors influencing immunization noncompliance among nursing mothers attending a health facility in Nigeria.

Methods

A cross-sectional study was conducted at the Infant Welfare Clinic of the Seventh-Day Adventist Hospital, Ile-Ife. Data on mothers' knowledge, attitudes and compliance with child immunization were collected using structured questionnaires. Ethical approval was obtained from the hospital's Ethics Committee, and informed consent was secured from all participants. Data were analyzed using descriptive statistics and chi-square tests.

Results

The mean knowledge and attitude scores were 16.4 (range: 7–19) and 19.2 (range: 6–24), respectively. Based on the mean cutoff, 73.7% of mothers demonstrated high knowledge, while 71% exhibited a positive attitude toward immunization. Although nearly all mothers (96.3%) initiated immunization for their children, only 68.8% completed the full regimen. Chi-square analysis revealed no significant association between ethnic background or socioeconomic status and compliance; however, a significant association was found with maternal education.

Conclusion

The findings highlight that maternal knowledge and education significantly influence compliance with childhood immunization schedules. Targeted health education and culturally sensitive awareness programs are recommended to improve immunization uptake in similar low-resource settings.

KEY WORDS Immunization, Nursing Mothers, Nigeria, Vaccination, Compliance

INTRODUCTION

Immunization remains one of the most important public health interventions and a cost-effective strategy to reduce both mortality and morbidity associated with infectious diseases.[1] About four to five million deaths are

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prevented through immunization each year worldwide.[2] Despite global advances, the World Health Organization (WHO) and UNICEF reported in 2025 that around 20 million children worldwide missed at least one routine dose of DTP-containing vaccine, with overall coverage averaging 85%.[3] Immunization of infants and young children against serious infectious diseases is among the most successful and cost-effective interventions in preventive health care.[5] Immunization protects the entire community by preventing the spread of disease and providing protection for those who cannot be vaccinated. It is a proven tool in preventing and eradicating diseases; however, a considerable proportion of childhood morbidity and mortality is due to vaccine-preventable disease.[5]

Global and National Context

In 2023, the proportion of children who were unvaccinated by age 24 months was about 1%.[6] Coverage among children born during 2019–2020 ranged from 90% to 93% for ≥3 doses of poliovirus vaccine, ≥3 doses of HepB, ≥1 dose of measles, mumps and rubella vaccine (MMR), and ≥1 dose of varicella vaccine (VAR). The lowest coverage estimates (less than 70%) were observed for ≥2 doses of influenza and for the combined seven-vaccine series.[6] This is consistent with the global vaccination coverage timeline. Vaccination coverage shows substantial regional variation. In Europe, most countries exceeded 90% coverage for the complete DTP series in 2023, although some parts of Eastern Europe fell below 80%.[7,8] In Asia, Bangladesh achieved 89% full immunization among children aged 12–23 months, reflecting continued improvements in routine service delivery.[9] However, South American countries, such as Brazil, have been experiencing a decline in childhood vaccination coverage.[10]

In Africa, immunization in 2023 prevented approximately 1.8 million deaths and over 5 million "zero-dose" children received vaccines.[11] Significant progress has been made, including a 93% decline in circulating vaccine-derived poliovirus type 1 (cVDPV1) cases and a 65% reduction in cVDPV2 between 2023 and 2024.[12] Nonetheless, disparities are evident. Kenya reported 81% DTP3 coverage and South Africa 86%, while several low-income countries remain below 70%.[13] According to WHO-UNICEF reports, Africa increased DTP3 coverage from 72% in 2022 to 74% in 2023, maintained its wild polio–free status, eliminated maternal and neonatal tetanus in 43 of 47 member states, introduced the malaria vaccine in 13 countries and achieved 40% coverage for the first dose of HPV vaccine.[8]

Inadequate levels of immunization against childhood diseases remain a significant public health problem in resource-poor areas of Nigeria.[14] According to 2023 WHO/UNICEF estimates, Nigeria bears a substantial share of the global burden of zero-dose and underimmunized children, with over 2.1 million affected.[8,15] Full immunization coverage among children aged 12–23 months was approximately 63%, showing gradual improvement but remaining well below the global target of 90%.[8]

The Expanded Program on Immunization targets eight diseases, namely tuberculosis, poliomyelitis, diphtheria, pertussis, tetanus, hepatitis B, yellow fever and measles.[16] Nigeria operates the immunization schedule of the Expanded Program on Immunization, which prescribes five visits to receive one dose of Bacillus Calmette-Guérin (BCG), four doses of oral polio vaccine, three doses of diphtheria, pertussis, and tetanus vaccine and one dose of measles vaccine.[17]

Factors Influencing Non-Compliance

The reason for noncompliance with the immunization regimen in Nigeria is poorly understood. However, several contributing factors have been reported to influence noncompliance. They include socioeconomic status, education and cultural beliefs.[18-21] Mothers' health literacy is critical for understanding vaccine benefits and navigating health services.[22] Studies show that higher maternal immunization-related literacy positively influences children's vaccination coverage.[20,21] Likewise, higher parental education and greater household wealth are associated with increased likelihood of completing the vaccination series. Low socioeconomic status, sometimes resulting in counteractive practical circumstances such as a lack of transport, may play a role in preventing the completion of the full set of immunizations.[18] A study published by Hu and colleagues found that nonminority children with parents of higher socioeconomic background were far more likely to have complete immunization compared to children with parents of lower socioeconomic background.[19] In addition, beliefs and attitudes, such as fear of vaccination, can significantly affect children's immunization coverage. For example, some members of the Hausa/Fulani community fear that polio vaccines may cause infertility in girls.[23] Physical factors, including changes in residence, have also been identified as reasons for missed immunization appointments.[18]

Fatiregun and Okoro further investigated the determinants of vaccination coverage in rural Nigeria.[24] They found that mothers' knowledge of immunization and vaccination at a privately funded health facility was significantly correlated with the full immunization rates. Sadoh and Eregie evaluated 512 children for timelines in receiving vaccines and the completion of the immunization schedule.[25] They found that about 30% of the children presented after four weeks of age for their first immunization, 18.9–65% of the children were delayed in receiving various vaccines compared to the recommended ages and only 227 (44.3%) children were fully immunized.

Abdulraheem and colleagues also explored factors influencing incomplete immunization among rural Nigerian children.[26] They found that parents' objection, disagreement or concern about immunization safety accounted for 38.8%, long-distance walking for 17.5% and long waiting time at the health facility for 15.2% are among the most common reasons for partial immunization. They also found that about 68.8% of the children were not fully immunized by one year of age, 34.4% had experienced a missed opportunity for immunization and 36.4% were partially or incorrectly immunized. Several factors have been identified, but there is much left unexplored, particularly in rural settings in low- and middle-income countries.

Study Objectives

Immunizations are widely believed to boost children's immunity. However, there are gaps in the vaccination uptake rates, particularly in rural settings. This study aims to identify determinants of noncompliance with childhood immunization among nursing mothers in an underserved setting by assessing mothers' immunization-related knowledge and health literacy and examining whether ethnic background, socioeconomic status and maternal education are associated with non-compliance. Findings will clarify drivers of noncompliance in a low-resource context and inform targeted education and structural interventions to improve uptake.

MATERIALS AND METHODS

Research Design

This is a quantitative study that employed a descriptive cross-sectional design to investigate the factors associated with noncompliance with immunization regimens among nursing mothers attending the Infant Welfare Clinic, at the Seventh-Day Adventist Hospital, Ile-Ife, Osun State. The data used for this study were collected from August 24, 2015, to September 4, 2015.

Research Setting

The study was conducted among nursing mothers attending the Infant Welfare Clinic at the Seventh-Day Adventist Hospital, Ile-Ife. The hospital was originally founded on December 9, 1940, but began operations in 1942 with male and female wards. In 1944, a School of Nursing was established, providing research opportunities. In 1975, the hospital was taken over by Obafemi Awolowo University and was later reassigned to the Seventh-Day Adventist Mission on September 30, 1987. The hospital is located northeast of the federal highway from Ibadan to Ilesa, a few kilometers from the main gate of Obafemi Awolowo University.

The hospital houses several departments and facilities, including male and female medical-surgical wards, pediatric and neonatal wards, a postnatal ward, an intensive care unit, an outpatient department (which houses the infant welfare clinic), a casualty department, a laboratory, a cafeteria, accounts, and antenatal clinics. These units are staffed by qualified healthcare professionals. The Infant Welfare Clinic, which served as the focus of this study, is a subsection of the outpatient department.

Target Population

The target population consisted of nursing mothers who attended the Infant Welfare Clinic at the Seventh-Day Adventist Hospital from August 24, 2015, to September 4, 2015.

Sampling Technique and Sample Size

The Infant Welfare Clinic operates twice weekly, on Tuesdays and Thursdays, with multiple nursing mothers attending each session. Based on clinic records, at least 80 nursing mothers typically attended over a two-week period, which informed the target sample size. A consecutive sampling approach was used: all nursing mothers attending the clinic from August 24 to September 4, 2015, were invited to participate, and only those who provided consent were enrolled. Over the four clinic sessions during this period, approximately 80 mothers participated in the study.

Inclusion and Exclusion Criteria

The study included nursing mothers who attended the Infant Welfare Clinic at the Seventh-Day Adventist Hospital during the study period (August 24 to September 4, 2015) and who provided informed consent to participate. Mothers were excluded if they declined consent, were medically unable to participate, or were not the primary caregiver responsible for their child's vaccination.

Method of Data Collection

Data were collected using a self-administered structured questionnaire. The instrument was distributed to nursing mothers during clinic sessions, and the completed questionnaires were collected immediately to minimize loss or attrition. Before administration, respondents were briefed on the purpose of the study, provided consent to participate and were guided on how to complete the questionnaire. Clarifications were offered when necessary. Compliance with the vaccination schedule was primarily obtained through self-report. Mothers who requested their child's health records were provided with them; however, not all mothers had records available at the clinic, as some were new to the community.

All questionnaires were administered in English. As English is the official language of the country and most participants have at least a basic education, all were able to read and complete the questionnaire without difficulty. No participants required translation or assistance.

Instrument for Data Collection

The questionnaire was divided into three sections:

Section A: Sociodemographic Data – This section captured respondents' background information, including age, educational status, religion, ethnicity, occupation, and socioeconomic status.

Section B: Knowledge of Immunization – This section assessed mothers' awareness of immunization, including knowledge of vaccine-preventable diseases, perceived effectiveness of immunization, and prior experiences or knowledge of adverse effects.

Section C: Factors Influencing Compliance – This section explored potential determinants of non-compliance. Items assessed the influence of cultural/ethnic background, maternal education, religion, socioeconomic status, misconceptions and knowledge gaps. It also included questions on communication and publicity as possible strategies to improve compliance.

Validity and Reliability

The questionnaire was specifically developed for this study and underwent expert review by specialists in nursing research to ensure clarity, content relevance, and adequate coverage of key domains. Reliability was assessed through pilot testing and internal consistency checks during instrument development, although a formal reliability coefficient was not computed. While the tool was not adapted from previously standardized instruments validated in Nigeria, the expert review process and pilot testing helped ensure its validity and suitability for the target population.

Method of Data Analysis

Data were coded and analyzed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics, including frequency tables, were used to summarize demographic characteristics, while chi-square tests were employed to examine associations between sociodemographic variables and noncompliance with immunization regimens.

Knowledge and attitude scores were categorized as high/positive or low/negative using the mean score as the cutoff. This approach provides an objective, population-specific benchmark, allowing participants who scored above the mean to be classified as having higher knowledge or a more positive attitude relative to the overall sample.

Ethical Considerations

Ethical clearance was obtained from the Ethics Committee of the Seventh-Day Adventist Hospital, Ile-Ife. Permission to conduct the study was also secured from the hospital administration. Informed consent was

obtained from all participants who were assured of the voluntary nature of participation. Confidentiality and anonymity were maintained throughout the study, and respondents were informed that they could withdraw at any stage without penalty.

To ensure participant confidentiality, questionnaires were administered in paper format and completed by participants before leaving the clinic. Completed questionnaires were securely stored in a locked safe. Data were later entered into a password-protected personal computer and participants were de-identified during data entry to maintain anonymity. After data entry, paper questionnaires were stored securely in a locked cabinet for the required retention period and all identifying information was removed to maintain participant confidentiality.

RESULTS

Most (78.8%) of the respondents were within the age range of 30–34years and about half had a tertiary education, and were mostly Christians of Yoruba origin. About half of the civil servants earn more than 40,000 naira (200 USD) per month. The sociodemographic characteristics are presented in Table 1. Over 75% of the respondents indicated that immunization was commenced at birth, and the majority indicated that three vaccines by the names: OPV, BCG and DPT were given at birth. Of these vaccines, over two-thirds of the respondents agreed that the BCG left a scar on the skin, and most of them knew that it was given to prevent tuberculosis. Most of the respondents were also aware that immunization protects children from certain diseases such as tetanus, poliomyelitis, pertussis, diphtheria, yellow fever and measles. Respondents' knowledge scores were computed from 19 knowledge-based questions on immunization, with one point awarded for each correct response. The observed scores ranged from 7 to 19, with a mean of 16.4. Using the mean score as the cutoff, respondents who scored above 16.4 were categorized as having high knowledge while those scoring at or below the mean were categorized as having low knowledge. Overall, 73.7% of the mothers demonstrated high knowledge about immunization. The distribution of knowledge levels is summarized in Table 2.

TABLE 1. SOCIO-DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS (N = 80)

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	Below 19	6	7.5
	20–24	21	26.3
	25–29	18	22.5
	30–34	24	30.0
	≥35	11	13.8
Educational status	No formal education	6	7.5
	Primary	12	15.0
	Secondary	25	31.3
	Tertiary	37	46.3
Religion	Christianity	70	87.5
	Islam	8	10.0
	Traditional	2	2.5

Ethnicity	Yoruba	68	85.0
	Igbo	8	10.0
	Hausa	4	5.0
Occupation	Housewife	9	11.3
	Civil servant	37	46.3
	Self-employed	30	37.5
	Unemployed	4	5.0
Monthly income (₦)	<10,000	17	21.3
	10,000–29,000	18	22.5
	30,000–39,000	9	11.3
	≥40,000	36	45.0

This table presents the distribution of respondents according to their age, educational status, religion, ethnicity, occupation, and monthly income. Frequencies (n) and corresponding percentages (%) are shown for each category.

TABLE 2. SUMMARY OF RESPONDENTS' KNOWLEDGE ABOUT IMMUNIZATION (N=80)

Level of Knowledge	Frequency	Percent (%)	Minimum Score	Maximum Score	Mean	SD
High level of knowledge	59	73.7	-	-	-	-
Low level of knowledge	21	26.3	-	-	-	-
Total	80	100.0	7.00	19.00	16.44	2.90

This table presents respondents' levels of knowledge about immunization, showing frequencies, percentages, and summary statistics (minimum, maximum, mean, and standard deviation) for overall knowledge scores

Over 65% of respondents believed that vaccines are highly effective in reducing the prevalence of childhood killer diseases. However, about half disagreed with the statement that immunized children have a higher risk of developing such diseases. A large majority recognized the role of maternal education, media advertisements and effective communication in improving immunization practices. Most respondents disagreed that lack of time (76.3%), religious restrictions (76%) or distance from health facilities (68.8%) were barriers to completing their children's immunization schedule. Similarly, the majority (75.1%) disagreed that immunization could be dangerous to their child's health. Table 3 presents the participants' responses to factors and beliefs that influence compliance with the immunization regimen.

TABLE 3. COMBINED: FACTORS INFLUENCING COMPLIANCE, PERCEIVED VACCINE EFFECTIVENESS AND MOTHERS' COMPLIANCE WITH CHILD IMMUNIZATION (N = 80)

Statement	Response	Frequency (n)	Percentage (%)
Vaccines are highly effective in preventing killer diseases	Undecided	4	5.0
	Agree	24	30.0
	Strongly Agree	22	65.0
Immunized children have higher risk of disease	Strongly disagree	14	17.5
	Disagree	26	32.5
	Undecided	6	7.5
	Agree	16	20.0
	Strongly agree	18	22.5
Educated women immunize children better	Disagree	4	5.0
	Undecided	4	5.0
	Agree	5	6.3
	Strongly agree	6.7	83.8
Advertisement helps awareness on immunization	Disagree	4	5.0
	Undecided	2	2.5
	Agree	2	2.5
	Strongly agree	72	90.0
Effective communication improvise compliance	Disagree	8	10.0
	Undecided	4	5.0
	Agree	2	2.5
	Strongly Agree	66	82.5
Lack of time affects immunization appointments	Agree	3	3.8
	Strongly agree	12	15.0
	Undecided	4	5.0
	Disagree	36	45.0
	Strongly disagree	25	31.3
Immunization can be dangerous	Agree	2	2.5
	Strongly agree	14	17.5
	Undecided	4	5.0
	Disagree	33	41.3
	Strongly disagree	27	33.8
Distance to hospital affects attendance	Agree	2	2.5
	Strongly agree	11	13.8
	Undecided	6	7.5
	Disagree	32	40.0
	Strongly disagree	29	36.3
Distance to hospital affects attendance	Agree	1	1.3
	Strongly agree	16	20.0
	Undecided	4	5.0
	Disagree	28	35.0
	Strongly disagree	31	38.8

This table presents respondents' perceptions and factors influencing compliance with child immunization. It includes statements assessing perceived vaccine effectiveness, socio-demographic influences, communication factors, and barriers such as time, religion, and distance to health facilities. Frequencies (n) and percentages (%) are provided for each response category to illustrate the distribution of mothers' attitudes and beliefs toward immunization.

Respondents' attitudes toward compliance with immunization were assessed using six Likert scale questions, with response options ranging from Strongly Agree (1) to Strongly Disagree (5). The attitude score for each respondent was calculated by summing their responses across all items after reverse scoring negatively worded statements where applicable. The observed scores ranged from 6 to 24, with a mean of 19.2. Using the mean score as the

cutoff, respondents who scored above 19.2 were classified as having a positive attitude while those scoring at or below the mean were classified as having a negative attitude. Overall, 71% of the mothers demonstrated a positive attitude toward immunization, indicating generally favorable perceptions of child vaccination. The distribution of this score is summarized in Table 4. The completion rate was also assessed. Nearly all mothers reported vaccinating their children, though only slightly more than half completed the full regimen. While 96.3% reported having previously immunized their child, only about 69% reported that they were able to complete the regimen.

TABLE 4. SUMMARY OF RESPONDENTS' ATTITUDE TOWARDS IMMUNIZATION

Level of Compliance	Frequency	Percent (%)	Minimum Score	Maximum Score	Mean	SD
High level of compliance	57	71.3	-	-	-	-
Low level of compliance	23	28.8	-	-	-	-
Total	80	100.0	6.00	24.00	19.20	4.59

This table presents respondents' levels of knowledge about immunization, showing frequencies, percentages, and summary statistics (minimum, maximum, mean, and standard deviation) for overall knowledge scores

Chi-square tests were conducted to assess associations between sociodemographic characteristics and compliance with the immunization regimen.

i. Socio-economic status: No significant association was observed ($X^2 = 6.09$, $p = .107$).
ii. Level of education: A significant association was found ($X^2 = 16.36$, $p = .001$).
iii. Ethnic background: No significant association was found ($X^2 = 3.69$, $p = .158$).

DISCUSSSION

This study assessed the factors responsible for noncompliance with immunization regimens among nursing mothers attending the Infant Welfare Clinic at the Seventh-Day Adventist Hospital, Ile-Ife. The results reveal that while most mothers had initiated immunization for their children, only a portion were able to complete the recommended regimen. This suggests that important gaps can persist regardless of generally high knowledge levels and positive attitudes toward immunization. Therefore, noncompliance reflects a complex interplay of educational, cultural and social determinants. This is consistent with previous studies in Sub-Saharan Africa and South Asia that emphasize structural and contextual influences on vaccine uptake.[27,28]

The significant association noted between the educational level of nursing mothers and compliance with the immunization regimen supports previous studies in Nigeria and other low- and middle-income countries.[29,30] This highlights maternal education as a potential strong predictor of child health outcomes. Educated mothers are more likely to understand the benefits of immunization, navigate health systems, and resist misinformation. This highlights education not only as an individual asset but also as a structural determinant of health, shaping access to information, autonomy in health decision-making, and long-term health practices. It is important to clarify that a higher education qualification does not necessarily mean better health literacy. Health literacy involves the ability to read, listen, make informed decisions and apply these skills effectively in relevant health situations.[31]

In contrast, ethnic background was not significantly associated with compliance, which may reflect the very low number of minority participants in the study. Conducted in Southwest Nigeria, where the Yoruba population predominates, the study's sample was largely homogeneous. While cultural norms and communal beliefs can influence health decisions, the lack of a significant association in this study suggests that immunization adherence was relatively consistent among the respondents, though culturally sensitive approaches remain important for broader application.

Similarly, socioeconomic status did not emerge as a significant factor influencing compliance. This diverges from studies in other contexts where income and employment strongly predict immunization uptake.[18,19] Although

socioeconomic status did not show a significant main effect on immunization compliance, its potential moderating role should not be overlooked and may act as a modifier of adherence. Knowledge is likely to facilitate adherence when mothers have the socioeconomic resources to act on it. For example, among lower-SES mothers, high knowledge may be necessary but insufficient in the face of indirect costs (e.g., transportation, time away from work, caregiving demands) and access constraints. This reconciles high knowledge levels with noncompliance and the limited main effects of SES. Future studies should investigate knowledge-by-SES interactions and explore mechanisms.

Furthermore, the non-emergence of SES as a significant factor may reflect Nigeria's Expanded Programme on Immunization (EPI), which provides vaccines free of charge, thereby reducing direct financial barriers. However, indirect costs—such as time away from work, transportation, or caregiving responsibilities—may still create hidden burdens not fully captured in this study. This may justify education campaigns paired with structural supports (e.g., transportation stipends, extended clinic hours, community outreach, and mobile services) to ensure that gains in knowledge translate into completed immunization schedules across socioeconomic groups.

This aligns with previous research emphasizing that structural and logistical challenges may outweigh knowledge gains.[32,33] These findings reinforce the need to situate immunization compliance within broader sociopolitical and institutional contexts. Public health efforts to improve immunization compliance should combine knowledge empowerment with strategies that address contextual and socioeconomic barriers. Programs enhancing maternal health literacy should use simplified communication tools and peer-led advocacy, especially within diverse ethnic communities. While individual education campaigns are important, they must be complemented by community engagement, with community health workers acting as trusted intermediaries bridging biomedical knowledge and cultural expectations. Future research should use multisite, mixed-methods designs to capture both quantitative trends and qualitative insights into cultural, logistical, and psychological factors influencing vaccine hesitancy. This approach would clarify how health literacy interacts with access and beliefs, ultimately guiding equitable immunization policies across Nigeria.

This study has several limitations. The cross-sectional design limits the ability to establish causal relationships between identified factors and immunization non-compliance. In addition, the analysis relied primarily on bivariate tests due to the limited scope of the dataset, and potential confounding effects could not be fully addressed. The absence of adjustments for multiple comparisons may also increase the likelihood of Type I error. Future studies employing multivariate analysis are recommended to provide a more comprehensive assessment of the factors influencing immunization compliance. Second, reliance on self-reported data introduces the possibility of recall and social desirability biases, as mothers may overstate compliance or knowledge. In addition, reliance on self-reported vaccination compliance may have introduced social desirability bias. Third, the data for this study were collected in 2015, limiting contemporary generalizability. In addition, the study was conducted in a single health facility, which may not reflect the experiences of nursing mothers in other settings, particularly rural or urban areas with different cultural and socioeconomic dynamics. While Ile-Ife is rural and the clinic targets diverse socioeconomic groups, recruitment from clinic attendees likely favors mothers with higher literacy/SES, potentially biasing the sample. These factors restrict the generalizability of the findings. Nonetheless, the study provides important insights into the determinants of immunization non-compliance in a resource-constrained Nigerian setting. In addition, it offers practical implications for designing targeted health education and awareness campaigns to improve immunization coverage.

CONCLUSION

This study highlights that despite high awareness and initiation rates, completion of childhood immunization regimens among nursing mothers in a low-resource setting may be suboptimal. This suggests that knowledge alone does not guarantee adherence; cultural, structural and institutional factors must also be addressed. For policy and practice, interventions should prioritize culturally tailored communication strategies that respect and engage with diverse ethnic communities. In addition, outreach initiatives targeting women with lower formal education, delivered through accessible and community-based platforms, are recommended in communities with low literacy levels.

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