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Enhancing Immunisation Communication: Perspectives from Doctors and Vaccinators in Kano, Nigeria

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Abstract

Background: Despite the proven efficacy of vaccines in reducing child mortality, low- and middle-income countries (LMICs) like Nigeria face significant challenges in achieving universal immunisation coverage.

Objective: To explore the perceptions of paediatricians and vaccinators regarding communication barriers, vaccine hesitancy, and strategies to improve immunisation demand.

Methods: A Human-Centred Design (HCD) approach was employed, involving focus group discussions (FGDs), root problem analysis, downloading and brainstorming/ideation. The participants included 29 doctors (9 paediatricians and 20 medical officers caring for children) and 30 vaccinators drawn from 10 hospitals in Kano State, Nigeria. Data were analysed using grounded theory to identify key themes.

Results: The major challenges identified in achieving universal immunisation coverage included off-schedule vaccination (OSV), adverse events following immunisation (AEFI), caregiver misconceptions, and health system inefficiencies. Doctors reported confidence in discussing vaccines but cited time constraints and language barriers. Vaccinators identified maternal illiteracy, socioeconomic factors, and healthcare worker attitudes as key contributors to the lack of immunisation. Proposed solutions included enhanced training on AEFI communication, community engagement, women's empowerment, and improved health system support.

Conclusion: Strengthening immunisation coverage and communication on immunisation requires multifaceted strategies, including provider training, community mobilisation, and systemic improvements. Addressing these barriers can enhance vaccine uptake and reduce child mortality in Nigeria.

Keywords: Adverse Effects Following Immunisation (AEFI), Community mobilisation, Illiteracy, Immunisation coverage, Vaccine hesitancy.

Introduction

Routine immunisation coverage in Nigeria remains suboptimal and is characterised by significant geographic, socioeconomic, and demographic disparities. [1] Recent analysis using the 2021 Nigeria Multiple Indicator Cluster Survey/National Immunisation Coverage Survey confirms that Nigeria continues to have the highest number of zero-dose children globally, with over 2.3 million children affected. This number includes no immunisation and incomplete or under-immunised children, particularly the first dose of a diphtheria, tetanus, and pertussis-containing vaccine. [1, 2] The prevalence of zero-dose and under-immunised children is highest in the northern regions and among socially deprived groups, with substantial heterogeneity at sub-national levels. [3, 4] Basic vaccination coverage among children aged 12–23 months remains well below global targets. [4] The 2023 Nigerian Demographic and Health Survey estimated basic vaccination coverage (defined as receipt of 1-dose BCG, 3-dose DTP-HepB-Hib, 3-dose polio, and 1-dose measles) at 39%, with 30% of children in this age group being zero-dose. [3] Barriers to immunisation coverage include misinformation, logistical challenges, and caregiver hesitancy.

A previous PAN Survey identified off-schedule vaccination and communication about Adverse Effects Following Immunisation (AEFIs) as challenges to immunisation coverage in Kano, forming the basis for this study. This study examines perspectives from healthcare providers to identify actionable solutions to poor uptake of immunisations.

Methods

Study design

The study employed a qualitative, participatory research design, using a Human-Centred Design (HCD) [5, 6] approach to identify challenges and co-create solutions related to off-schedule vaccination (OSV) and communication around adverse events following immunisation (AEFI), which were identified as the major reasons for poor immunisation coverage in Kano from a previous PAN survey. (unpublished).

Study setting and participants

Two workshops were conducted in 2022 at the Centre for Infectious Diseases Research (CIDR), Bayero University, Kano, Kano State, Nigeria. The participants included paediatricians and doctors involved in child healthcare and immunisation services, and facility-based vaccinators, including nurses and community health workers. Each workshop consisted of five breakout groups, with each group comprising eight participants and facilitated by trained moderators and note-takers.

At the end of the workshop, the management of Aminu Kano Teaching Hospital, CIDR and the Head of the Kano State Primary Health Care and Development Agency were briefed on the findings from the workshop.

Data collection activities

Data were collected through a series of interactive workshop sessions, structured as follows:

Focus Group Discussions (FGDs)

Three sessions of FGDs were conducted concurrently, each led by a facilitator and a note-taker. Participants discussed key issues related to OSV and AEFI communication. Facilitators used standardised guides to probe caregiver concerns, systemic barriers, and personal experiences with vaccine delivery and communication.

Root Cause Analysis (Fishbone Activity)

Groups developed problem statements based on the FGDs and used fishbone diagrams to identify high-level and root causes contributing to OSV and poor AEFI communication. Each group participant was asked to write three different problem statements they identified based on

outcomes of the FGDs. The facilitator taped the written statements on top of the fishbone diagram. Participants were then asked to use stickers to vote for a problem statement they thought was more accurate. The one with the highest vote was selected for the fish bone activity.

In the next step of the fish bone activity, participants were asked about the high-level causes of the problem identified in the previous step. Their responses were written at the bottom of the long fish bones. The participants were further probed on why the problems they identified happen, and their responses were grouped under categories to make up the smaller bones of the fish. This continued until it was difficult to ask why the problems happened (i.e. saturation). At the end of the session, each of the three groups appointed a rapporteur who would later summarise the issues discussed during the FGD and the root causes that were identified based on the fishbone activity.

Downloading feedback:
Each group was given three to five minutes to present the outcomes of the FGD and root cause analysis sessions. After the presentation from the groups, a 10-15-minute discussion was held. The discussion, led by a facilitator, was intended to get feedback and questions across group presentations.

Thematic ideation and prioritisation:
In this session, participants were asked to write down the problems they took away from the previous session (downloading feedback), and their responses were clustered based on similar themes. The groups determined the key themes that emerged from the brainstorming. The facilitators helped the groups brainstorm "How Might We" (HMW) address the key themes identified. Through group voting, the most relevant HMW questions were selected for further development.

Solution prototyping:
Participants created low-fidelity prototypes of potential interventions using storyboards and craft materials. Each prototype was pitched to the larger group, with discussions focused on feasibility, impact, and simplicity.

Intervention ranking:
Participants individually scored each prototype using a standardised Intervention Ranking Sheet across five domains: cost, acceptability, feasibility, simplicity, and potential for impact.

Data analysis and management
Workshop discussions and outputs were documented by note-takers and facilitators. Qualitative data from FGDs and root cause analyses were analysed thematically to identify recurring barriers and proposed solutions. Voting patterns and ranking scores were tabulated to assess consensus on preferred interventions.

Ethical considerations
This study was part of a national quality-improvement initiative led by the Paediatric Association of Nigeria (PAN) and supported by the American Academy of Pediatrics (AAP). Ethical approval was obtained from the Aminu Kano Teaching Hospital Research Ethics Committee with certificate number NHREC/28/01/2020/AKTH/EC/3513. All participants provided written informed consent and were assured of confidentiality and voluntary participation.

Results

The study explored the perspectives of doctors and vaccinators on barriers to optimal childhood immunisation and effective communication with caregivers. Participants identified a combination of interpersonal, behavioural, and structural

constraints. These challenges were reflected consistently across most workshop groups, as shown in Tables I–III.

Table I: Vaccinators' Perceptions on the Causes of Off-Schedule Vaccination (OSV)

Theme	Summary	Further Explanation
Problems with Health Systems	Overcrowding, inadequate staff, vaccine stockouts	Poorly structured health systems, lack of quality control, late commencement of services, poor work environment, and inadequate staffing affect vaccine delivery.
Lack of Women's Empowerment	Financial dependence, lack of family support, husbands refusing permission	Women lack decision-making autonomy and financial independence, which limits their ability to attend immunisation appointments independently.
Communication Failure	Poor understanding of the next immunisation schedule	Mothers are not adequately informed due to illiteracy, poor communication skills by staff, language barriers, lack of IEC materials, and insufficient time for explanation.
Superstitions and Misinformation	Beliefs in myths, rumours, and fake news	Common misconceptions include vaccines causing infertility or illness; these beliefs are fuelled by conspiracy theories, peer influence, politics, and general mistrust.
Attitude of Healthcare Workers	Irritability, poor listening, and negative interactions with mothers	Overworked and overwhelmed vaccinators sometimes display poor attitudes toward caregivers, affecting trust and willingness to return for scheduled vaccinations.

Doctors' Perspectives

Communication barriers

Doctors reported significant challenges related to communication in clinical settings. Crowded clinics with high patient turnover limit the consultation time, leading to a decrease in the opportunity for meaningful dialogue with mothers/caregivers. This is because the sheer volume of daily patients constrained the ability of doctors to address individual concerns in depth. Furthermore, doctors cited language differences between healthcare providers and caregivers, especially in multilingual communities, as a barrier to effective communication.

Caregivers' concerns

The doctors mentioned that a significant proportion of mothers/caregivers expressed anxiety about possible AEFI, such as fever or swelling at the injection site. These concerns were often amplified by misinformation or insufficient knowledge regarding vaccines.

Vaccinators' perspectives

Vaccination Off-Schedule (OSV)

Vaccinators highlighted off-schedule vaccination (OSV) as a major contributor to low routine immunisation coverage. The majority (78%) identified key factors contributing to missed or delayed vaccinations. These include high transportation costs and caregiver forgetfulness. These factors reduced opportunities for dialogue, weakened trust, and often disrupted adherence to the national immunisation schedule.

Systemic barriers

Vaccinators also highlighted broader systemic issues. Persistent overcrowding in clinics, a lack of adequately trained personnel, frequent vaccine stockouts, and the absence of clear protocols for managing AEFIs impeded their ability to effectively support caregivers and ensure consistent vaccine delivery.

Table II: Paediatricians' Perceptions on Improving Communication About AEFI and Side Effects

Theme	Suggestions	Further Explanation
Training and Capacity Building	Refresher training on immunisation and AEFI, including job aids and guidelines	Doctors expressed the need for regular updates, simplified protocols, and materials that guide discussions around adverse events following immunisation.
Time Management	Dedicated time for immunisation counselling	Overcrowding in clinics limits in-depth discussion with caregivers; dedicated slots or structured time can enhance clarity and caregiver trust.
Health System Support	Provision of IEC materials and job aids; functional immunisation rooms	Lack of printed visual tools hinders communication; functional, private immunisation rooms can improve provider-caregiver interaction and reduce distractions.
AEFI Management Tools	Availability of AEFI kits at immunisation sites	Having tangible tools and medications for managing side effects builds caregiver confidence and reinforces preparedness.
Community Engagement	Use of community influencers and sensitisation campaigns	Involving community leaders can normalise discussions about side effects, counter misinformation, and build trust in healthcare services.
Language and Communication	Use of local languages and culturally sensitive approaches	Doctors emphasised the need for language-appropriate messaging to overcome communication gaps due to illiteracy and language barriers.

Table III: Key themes and proposed strategies to improve immunisation communication

Theme	Strategy
Training	Conduct regular workshops for healthcare providers on AEFI communication.
	Include myth-busting sessions to address common misconceptions.
Community engagement	Involve local leaders (religious/community) as vaccine advocates.
	Train "champions" (e.g., mothers with positive vaccine experiences).
	Leverage social media/radio for awareness campaigns.
Women's empowerment	Provide financial literacy programs for mothers.
	Promote girls' education and delayed marriage to improve autonomy in healthcare decisions.
Health system strengthening	Distribute free AEFI management kits to clinics.
	Increase staffing and reduce overcrowding at vaccination sites.
	Expand mobile outreach to remote/hard-to-reach areas.

Proposed Interventions

Participants in the study suggested several multi-level strategies to address these challenges:

1. Capacity building through training

Both doctors and vaccinators emphasised the need for regular workshops focused on AEFI communication, managing caregiver anxiety, and countering vaccine myths. These initiatives

would equip frontline staff with the skills necessary to establish trust and communicate clearly during vaccination sessions to reduce vaccine hesitancy.

2. Community engagement

Engagement of trusted health advocates and community leaders was identified as a critical strategy for promoting vaccine acceptance. Study participants viewed social media and community radio as viable tools to combat misinformation and disseminate accurate information to broader audiences.

3. Women's empowerment

Across groups, participants underscored the importance of enhancing women's decision-making autonomy and economic empowerment. Empowered caregivers are more likely to prioritise vaccination, adhere to schedules and make informed decisions for their children. Participants suggested that female support with regard to financial literacy, health education, and community-based peer networks could improve caregivers' demand for routine immunisation and reduce delays caused by household or financial constraints.

4. Health System Strengthening

Participants identified health system improvements as essential for sustained progress. They recommended that all immunisation sites be equipped with AEFI management kits, recruit and train additional healthcare workers to reduce workload and improve service quality. The participants also recommended expanding outreach to remote and underserved communities to close the gaps in vaccine access inequities.

Discussion

This research offers important insights into the various communication barriers that impede optimal childhood vaccination coverage in Nigeria, focusing on the views of frontline healthcare professionals, doctors and vaccinators. The results support current findings that barriers related to communication, inefficiencies within the health system and factors linked to mothers/caregivers substantially impact immunisation coverage in resource-limited environments like northern Nigeria. [7,8]

This study provides insight into how interpersonal, behavioural, and systemic barriers undermine optimal routine immunisation uptake in northern Nigeria. Participants identified interlinked constraints, including AEFI-related fears, misinformation, low maternal literacy, communication gaps, and structural service-delivery challenges that contribute to off-schedule vaccination (OSV), low timeliness, and incomplete vaccination. These findings align with broader evidence from low- and middle-income countries (LMICs), where caregiver perceptions, service accessibility, and provider–caregiver communication are key determinants of vaccine uptake. [1-6]

Provider-related communication challenges were also prominent. Doctors in this study expressed confidence in discussing vaccines, yet cited structural constraints, such as limited consultation time and language discordance, as key challenges. These are similar to the findings from other LMICs, where overburdened healthcare systems limit meaningful interaction between healthcare workers and caregivers. [9] The implication is that even when healthcare workers are knowledgeable, systemic pressures undermine the quality of vaccine counselling. Structured communication training, incorporating empathy, motivational interviewing, and myth-refutation techniques, was shown to improve caregiver satisfaction and vaccination intentions. [9-11] Moreover, empathy among healthcare workers is linked to improved routine vaccination attendance by mothers, [9-11] hence the need for provider communication training that goes beyond technical knowledge to incorporate patient-centred communication skills. Such capacity-building aligns with

emerging global recommendations for strengthening interpersonal communication as a core component of routine immunisation. [11]

Vaccine hesitancy and misconceptions

Mothers' and caregivers' fear of AEFI, including fever and swelling, was a recurring theme. Fear of AEFI emerged as a major driver of hesitancy, which is consistent with global and Nigerian literature showing that even mild post-vaccination reactions can lead caregivers to postpone or refuse subsequent doses. [7-13]

These findings are similar to studies that demonstrate that substantial mistrust results from even minor post-vaccination symptoms. [12–20] The lack of awareness of efficient communication strategies for AEFI management in Nigeria may exacerbate this problem. Community narratives, peer influence, and misinformation further amplify such fears.[14-18] Additionally, myths and misconceptions often exacerbate the anxieties of mothers and caregivers, highlighting the significance of accurate, timely, and culturally sensitive information dissemination. [14–18] Prior Nigerian research, including an earlier work from Enugu, has shown that caregivers' perceptions of AEFI strongly shape their willingness to return for follow-up doses. [19-22] Strengthening anticipatory AEFI counselling has been shown to improve vaccine confidence. [9-11,17]

Off-Schedule vaccination and structural barriers

Vaccinators pointed to off-schedule vaccination (OSV) as the main reason for the low coverage following a previous PAN survey. The causes of these OSV include irregular vaccine supply, transportation costs, and maternal illiteracy. This is similar to the findings from previous immunisation studies conducted in sub-Saharan Africa, which identified these components. [19–24,26-28]

Innovative and Contextual Solutions

The solutions suggested by the doctors and vaccinators, which ranged from community mobilisation to women's empowerment and provider training, highlight the importance of context-specific interventions and are in line with human-centred design (HCD). [5,6,10] Mobile reminders (such as SMS-based scheduling systems) have been shown to reduce missed appointments in Kenya and other LMICs. [29,30] Furthermore, community-driven initiatives like community health champions in Ethiopia and male involvement in India have increased vaccine demand and trust. [31,32]

Training needs and AEFI communication

One important finding from the present research is that participants want more AEFI communication training. In addition to clinical expertise, healthcare professionals - particularly those working at the primary care level need resources to proactively advise mothers/caregivers about typical symptoms following vaccinations. Anticipatory, proactive guidance can enhance acceptance and lessen anxiety. This aligns with the World Health Organisation's advice to switch from reactive to preventive communication strategies. [10, 11] This challenge has been taken up by PAN, and an online course for doctors on AEFI has been created. Doctors, including those who participated, have been trained in the first session.

Empowerment of women and health literacy

Empowering women through financial and educational interventions is a long-term but essential strategy. Maternal education has frequently been associated with improved health-seeking behaviour, including vaccination adherence. [11, 12, 31-37,38- 43] Numerous studies and meta-analyses have found that children whose mothers have a higher level of education are more likely to receive all recommended vaccinations, experience fewer vaccination delays, and make better use of preventive health services. [38-43]

However, these empowerment programmes need to be paired with more extensive social and policy initiatives to effectively address poverty, gender inequality, and service accessibility.

Strengths and limitations

The main strength of this study is the inclusion of various provider viewpoints through the application of an HCD approach, which gives priority to context-specific, bottom-up and user-informed solutions. The study's geographic scope, however, may limit its generalizability across Nigeria's various regions and health systems. Furthermore, a thorough triangulation of the communication gap is limited by the lack of caregivers' perspectives, even though they are outside the purview of this paper.

Implications for policy and practice

The following must be incorporated into current strategies by national and subnational immunisation programs to increase immunisation coverage in Nigeria:

(1) Regular and structured communication training for all clinicians and vaccinators, to improve communication on vaccines, correction of myths and misconceptions by caregivers or parents.

(2) Technology-based reminders, like short-message-service (SMS), reminders, alarms and calendars using phones or support groups

(3) Community co-design of communication content that is culturally appropriate and acceptable.

(4) Institutionalisation of AEFI management protocols and kits in all facilities.

(5) Future studies should examine gender dynamics in vaccine decision-making, include caregiver perspectives, and assess the scalability of interventions informed by HCD.

Important gaps in Nigeria's immunisation ecosystem are highlighted by this study. Caregiver hesitancy is caused by systemic inefficiencies and false information, which is consistent with findings from around the world.

Conclusion and Recommendations

Important gaps in Nigeria's immunisation ecosystem are highlighted by this study. Caregiver hesitancy is caused by systemic inefficiencies and false information, which is consistent with findings from around the world. It would be possible to adapt creative solutions like male involvement (as observed in India) and SMS reminders (effectively employed in Kenya).

Based on our findings, various challenges are present and will need to be addressed to improve vaccine uptake in Kano. These include training doctors and other vaccine providers on AEFI communication and cultural competency, engaging communities via local leaders and media campaigns and addressing systemic barriers like stockouts and staffing. There also needs to be integration of these strategies into the state and National Immunisation Policy.

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