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Zero-dose children in Kano State, Nigeria: a multi-site qualitative study of non-initiation and social and behavioural change communication levers

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ABSTRACT

Zero-dose children are increasingly concentrated in underserved communities, with progress stagnating despite improved routine immunisation coverage. Nigeria is a high-burden country, with Kano State a high-zero-dose setting, despite investments, highlighting that technical service adequacy alone cannot overcome gaps in caregiver trust for services. The study draws on behavioural and systems frameworks that view vaccine uptake by cognitive, social, and structural factors. The 5C model (confidence, complacency, constraints, calculation, collective responsibility) and 5As (access, affordability, awareness, acceptance, activation) guide interpretation of trust, risk perception, and logistical realities within immunisation systems and social communication. A qualitative multi-site design included 44 focus groups with caregivers, leaders, and mobilisers, and 50 interviews with providers and officials across five Kano LGAs. Data were collected using Hausa-translated guides, transcribed, and coded in NVivo 14 through a combined deductive–inductive approach with double coding for rigour. Respondents described a coverage paradox where immunisation programmes coexist with zero-dose pockets. Barriers included fear of side effects, poverty, and distrust of free services. Levers included faith-led engagement, mobilisers, and pain-relief guidance. Zero-dose cases in Kano reflect perceived vaccine risk and economic hardship, interacting with concerns about service quality, necessitating equity-focused communication through trusted messengers.

ARTICLE HISTORY

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KEYWORDS

Zero-dose; immunisation uptake; vaccine hesitancy; health communication; community mobilisation

Introduction

Global estimates suggest that zero-dose children are increasingly concentrated in fragile or underserved communities, and that progress in reaching them has stalled even where overall routine immunisation coverage has improved (UNICEF Eastern & Southern Africa, 2023; WHO, 2024; World Health Organization, United Nations Children’s Fund (UNICEF), & Gavi, the Vaccine Alliance, 2023). Nigeria is home to one of the largest absolute numbers of zero-dose children worldwide, and Kano State has been repeatedly profiled as a high-burden subnational setting within this broader picture (Gavi Zero-Dose Learning Hub, 2024).

In Kano, considerable investments in supply-side improvements such as cold-chain strengthening, defaulter tracking, and intensified outreach have raised coverage in many wards but left pockets of children who never receive the first dose of pentavalent vaccine. These observations reinforce evidence that a technically sound service system is insufficient if caregivers do not understand, trust, or feel respected by those services, or if information about vaccines is misaligned with local explanatory models of illness and healing (Cascini et al., 2021; de Figueiredo et al., 2020). Demand-side barriers, social norms, and longstanding experiences with public services shape whether zero-dose households move from suspicion to acceptance.

Emerging Nigerian evidence also suggests that distrust of free government health services is not merely a local curiosity but reflects deeper concerns about the quality, safety, and accountability of the

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health system. Studies of substandard and falsified medicines, for example, highlight how weak post-market surveillance and fragmented regulation undermine public confidence in publicly provided or subsidised products (Umar et al., 2025). In such a context, offers of free vaccines may be interpreted through a lens of risk rather than protection, particularly where rumours about hidden agendas or dangerous side effects circulate unchecked.

The present study is informed by behavioural frameworks that conceptualise vaccine uptake as the product of interlocking cognitive, social, and structural influences. The 5C model emphasises confidence, complacency, constraints, calculation, and collective responsibility as psychological antecedents of vaccination, while the 5As focus on access, affordability, awareness, acceptance, and activation (Mutombo et al., 2022; Ruggeri et al., 2024). Applying these lenses to zero-dose children in high-coverage areas allows a more critical understanding of how trust, perceived risk, gender dynamics, and everyday logistics interact with formal service provision.

Despite growing attention to zero-dose children as an equity priority, most empirical work has focused on low-coverage or crisis-affected settings, or has relied on household surveys that identify risk factors without exploring how caregivers and frontline workers make sense of vaccination in their own words (UNICEF Eastern & Southern Africa, 2023; WHO, 2024). Much less is known about why pockets of children remain zero-dose in settings where services are nominally available and coverage rates are otherwise high. This qualitative multi-site study addresses that gap by examining how caregivers, health workers, and community actors in selected Kano State wards explain persistent non-initiation, and by identifying contextually grounded communication strategies that could be integrated into routine social and behavioural change communication. Rather than presenting a definitive how-to manual, the study offers an empirically informed, equity-focused account of the mechanisms through which communication and trust-building might reduce zero-dose pockets in similar settings.

Aim and research questions

To explain the persistence of zero-dose children in Kano State through a communication-and-systems lens that integrates caregiver beliefs, household decision-making, trust in messengers, and service experience with the state's investment and delivery context.

Research questions

1. To what extent is the zero-dose problem recognised as salient and urgent among caregivers, providers, community leaders, and programme actors in Kano State?
2. What are the key drivers of zero-dose status – particularly the roles of belief systems, social and gender norms, misperception/misinformation, adverse-effect experiences, and distrust of 'free' services?
3. Which communication and service strategies are most credible, feasible, and likely to reduce zero-dose cases in the near term? (e.g. imam-led advocacy, VCM re-engagement, side-effect counselling, small transport offsets, and localisation of providers).

This study develops a context-informed set of equity-sensitive communication priorities and small service adjustments that could support first-dose initiation. Rather than a universal 'how-to guide', the contribution is a grounded synthesis of what different respondent groups in Kano judged credible, feasible and respectful, and how those preferences map onto practical SBCC design and delivery.

Materials and methods

Research design

A qualitative, multi-site design fused KIs and FGDs attempting to interpret the reasons for continued existence of zero-dose children from a communication-and-systems perspective. Fieldwork started in July

Table 1. Sampled local governments for zero dose in Kano State.

Local government	Wards	Health facilities	Zone	Number of FGDs	Number of KIs
Nasarawa LGA	1. Gawuna 2. Hotoro South 3. Tudun Murtala	1. Gwagwarwa PHC 2. Hotoro South Health Clinic 3. Tadun Murtala Health Clinic	Kano Central	8	10
Danbatta LGA	1. Danbatta East 2. Sansan	1. Women Centre 2. Dalal Barde 3. Sansan PHC	Kano South	7	9
Kiru LGA	1. Dangora 2. Badafi 3. Maraku Kiru	1. Dangora BHC 2. Badafi PHC 3. Maraku PHC	Kano South	10	6
Ungogo LGA	1. Tudun Fulani 2. Bachirawa 3. Zango	1. Jajira Health Post 2. Bachirwa PHC 3. Rimin Kebe PHC	Kano Central	11	10
Kumbotso LGA	1. Chalawa 2. Chiranchi 3. Panshekara	1. Chalawa PHC 2. Chiranchi PHC 3. Panshekara PHC	Kano Central	8	9
State-level officials	–	–	–	0	6
TOTAL	–	–	–	44	50

Note. FGDs=Focus Group Discussions; KIs=Key Informant Interviews; PHC=Primary Health Centre; BHC=Basic Health Centre. An em dash (–) indicates not applicable.

Table 2. Selected local government and their locations.

Local government	Location	Prevalence category
Nasarawa Local Government	Kano central	High
Danbatta Local Government	Kano North	Moderate
Kiru Local Government	Kano south	High
Ungogo Local Government	Kano central	High
Kumbotso Local Government	Kano central	High

2024 and continued until April 2025, covering a time frame of sampling-changing neighbourhoods and cadres, with project reporting applicable to established qualitative interview and focus group norms. Data were collected in five Kano State LGAs with highest priority: Danbatta, Kiru, Kumbotso, Nassarawa, and Ungogo. These LGAs were purposively selected to accommodate the urban/semi-urban/rural mix into their profiles and for their documented presence of zero-dose burden.

Table 1 summarises the sampled local government areas and respondent groups, and Table 2 lists the specific locations where FGDs and KIs were conducted.

The prevalence category was ranked by the Kano State emergency routine immunisation coordination center (06/2024)

Eligibility criteria were defined by respondent group. Caregivers (women and men) were eligible if they were aged 18 years or older, were a parent or primary caregiver of at least one child eligible for routine immunisation (0–23 months), had lived in the ward for at least six months, and had been directly involved in household immunisation decisions during the past 12 months. Routine immunisation (RI) service providers (e.g. CHEWs, nurses, facility in-charges) were eligible if they had delivered or supervised RI sessions in the selected facility for at least six months. Volunteer community mobilisers (VCMs), Ward Development Committee (WDC) members and other community actors were eligible if they had supported RI mobilisation, defaulter tracing or community engagement for at least six months. Community leaders (e.g. ward heads, faith leaders) were included if they had held their roles for at least 12 months and were familiar with local norms and service-use patterns.

Exclusion criteria applied across groups: individuals younger than 18 years, those unable to provide informed consent, non-residents or recent arrivals (<6 months) without adequate experience of local immunisation services, caregivers not involved in immunisation decision-making, and participants whose participation could create undue risk or coercion (including those in direct supervisory relationships with the research team) were excluded.

The semi-structured KII and FGD guides focused on four main domains of inquiry: knowledge/awareness, beliefs and narratives, barriers and facilitators, and feasible strategies. Probes touched upon

adverse-effects experienced after Penta-1, trust in messengers [for instance, imams], and conceptions about free services. The guides were developed in English, translated into Hausa, then back-translated for conceptual fidelity. Moderators were bilingual. The consent language followed international templates to maximise clarity and voluntariness.

Procedures

Recruitment operated through ward structures and facility leads. All recording was preceded by written informed consent or, in cases where the participant could not write, a witnessed thumbprint. In order to uphold privacy, sessions were held at neutral community venues; the proceedings were audio-recorded with a note-taker present. These were transcribed and then translated into English in two steps, with random audio-text audits and discrepancy logs. Data were kept on encrypted devices, with access being restricted, in consonance with accepted ethics norms for research with human participants.

Data analysis

Data management and coding were supported by NVivo 14. An initial coding framework was developed deductively from the interview guides, the 5C and 5A frameworks, and the zero-dose equity literature, and then iteratively refined as new inductive codes emerged. To enhance rigour, two researchers independently double-coded an initial subset of transcripts from each respondent group and LGA. Coding discrepancies, such as differences in how segments were assigned to themes like trust, convenience, or gender norms, were identified through NVivo comparison queries, discussed in joint reflexive meetings, and resolved by consensus, with a third senior researcher consulted when required. The agreed framework was then applied to the full data set, and matrices comparing themes across respondent groups and LGAs were used to test the stability and transferability of themes.

Ethics

Ethical approval to carry out the research was obtained from the Kano State Bureau of Statistics (Ref: KSBS/MDAs/NGOs/4/BIII/013, 23 May 2024) and the Kano State Primary Health Care Management Board (5 June 2024). Procedures conformed with the National Code of Health Research Ethics (NHREC, 2007), while also taking into consideration internationally recognised principles concerning respect for persons, beneficence, and justice (HHS/OHRP, 2025). Any information that could link directly to a person was separated from the transcripts and stored on encrypted drives with limited access privileges on the basis of their role.

Results

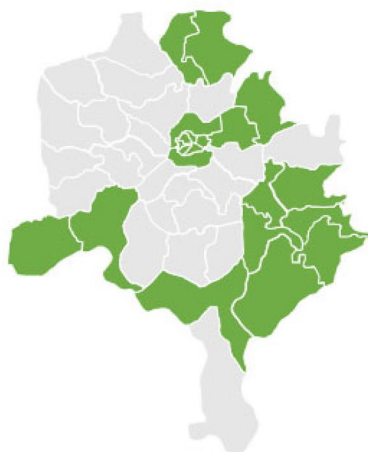
Findings are presented by analytic theme. To reduce repetition and foreground analytic synthesis, only a small set of de-identified verbatim quotations is used to illustrate each theme, while the narrative summarises patterns across respondent groups and LGAs.

Salience and coverage paradox

Across the sites, informants generally described high activity in routine-immunisation programmes with the existence of small but consistent pockets of non-vaccination, stemming from mobility and new arrivals; [Figure 1](#).

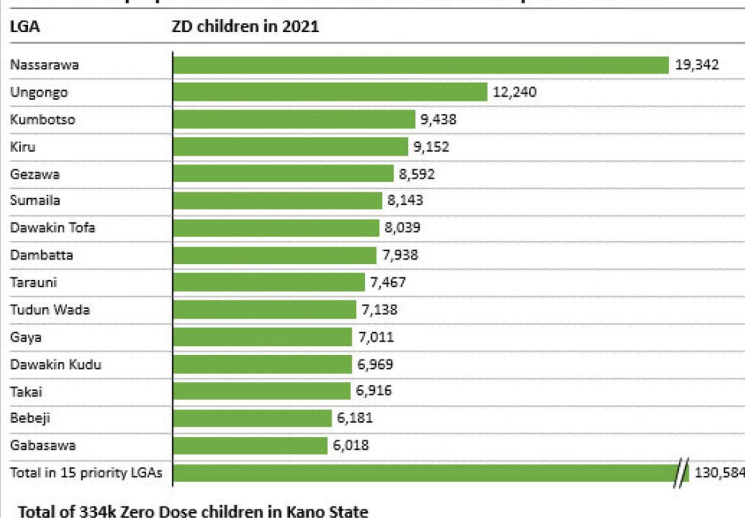
Figure 1 provides descriptive programme context drawn from Kano State routine immunisation monitoring (Emergency Routine Immunisation Coordination Centre/DHIS2 reporting, June 2024 extract). Values represent administratively reported zero-dose counts (children eligible for RI who had not received Penta-1) aggregated across the state and trended over time. The figure is used to situate the qualitative findings and to illustrate the 'coverage paradox' – persistent pockets of non-initiation within a generally high-coverage system – rather than to make causal claims.

NPHCDA 15 priority LGAs in Kano State



Source: NPHCDA

Number and proportion of zero dose children across GON-prioritized LGAs



Activa

Figure 1. Kano trends in zero-dose children.

Table 3. Prevalence of zero-dose children in 15 identified LGAs in Kano State.

LGA category	LGAs with high rates of zero-dose cases			LGAs with moderate rates of zero-dose cases			LGAs with low rates of zero-dose cases
	Rural	Urban	Semi-urban	Rural	Urban	Semi-urban	Rural
LGA list	Kiru LGA	Nasarawa LGA Kumbotso LGA Ungogo LGA	Tarauni LGA	Gezawa LGA Sumaila LGA Tudun Wada LGA Gaya LGA	Danbatta LGA	–	Dawakin Tofa LGA Dawakin Kudu LGA Gabasawa LGA Bebaji LGA Takai LGA

Figure 1 provides the trend context, and Table 3 lists LGA prevalence bands for reference.

.....there are rare cases of zero-dose children, the members of the community are immunizing their children, those that are coming in from other places are the ones that have problems, and mostly they are villagers, they have migrated from their places maybe because of certain problems that are worrying them. Ward Head

I have never seen or heard about zero-dose children; I know that in this community, anytime immunisation providers visit here, then all children are brought out for immunisation. Ward Head

In this community, there are no cases of zero-dose. Village Head

You can see that this is a register book, which consists of the list of clients that I am counselling, about three hundred and forty of them, but out of them, there are ten cases of zero dose; I have tried as much as I can, but I couldn't make it. VCM Dantamahe

There are husbands that don't like their children to be immunized; they are zero-dose children, and he will even be telling you that this is his own idea and that none of his child has ever been immunized, and he will not accept it, and he will never listen to the ward heads, they are very strict, they never cooperate. VCM Panshekara

The zero-dose report was correct, but due to the intervention of incentives, the number of zero-dose has gone down. RI SP Tudun Murtala

Beliefs and misconceptions

Interviewees consistently described infertility narratives and other misconceptions (e.g. vaccination as a 'Western plot' or as a population-control strategy) across both rural and urban wards. Figure 2

summarises the distribution of vaccine-related misconception themes by site, based on the coded qualitative dataset.

And there are some that are rejecting the immunisation because, according to them, it is nothing other than the plan of the Western world, introduced to prevent reproduction. They said that since people did not accept family planning, that is why it has been decided to immunise their children so that if they grow up and get married, they cannot be able to give birth. RI SP Dangora, Kiru

Akwai mutanen da sukai imani da cewa allurar riga-kafi zata hana yaran su haihuwa

(There are some people who have the belief that immunisation will prevent their children from giving birth.) Female Caregiver, Zango Dantamashe

Allurar riga-kafi ta nasa yara su zama marasa tarbiyya (Immunisation brings about immorality, as it makes children become notorious.) Male Caregiver, Panshekara

Some are saying that the immunisation is not part of religion, it is just brought to harm people. VCM, Jajira

And we thank God that those people with such ideas have seen that people are still giving birth despite taking the immunisation, so maybe that idea has been wiped away from their minds. RI SP Dangora, Kiru

Primary barriers

Interviews linked first-dose non-initiation primarily to adverse effects following Penta-1, poverty and transport costs, distrust of 'free' services, and household decision power centred on husbands and paternal grandmothers. These primary and secondary factors, and their interrelations, are summarised in Figure 3.

Adverse effects (notably Penta-1 pain/fever)

Wasu iyayen su yanke hukunci cewa ba zasu kara kawo yaransu allura riga-kafi ba saboda bayan da aka yi musu allurar penta 1 tasa yaransu zazzabi da ciwon jiki (Some parents decide not to bring their children for immunisation again after administering the Penta 1 vaccine because it causes fever and pain for the children.) Female Caregivers, Jajira

After administering the vaccine, you will see that the child will be crying seriously due to severe fever, or the legs will become stiff, so that is why some husbands will ask their wives never to take their child for immunisation again. Female Caregiver, Danbatta

Some common reasons include the effects of the Penta vaccine which is painful, because children take a long time, day and night crying, and some parents will be complaining that the child did not allow them to have sound sleep, or they will not take him for the immunisation again. So apart from the Penta 1 vaccine, there are no complaints about the other vaccines. Female Caregiver, Danbatta

There was an incident that happened years ago, whereby due to vaccine reactions some children became physically disabled, and some were even dying, so as a result of this, some parents got scared, and they

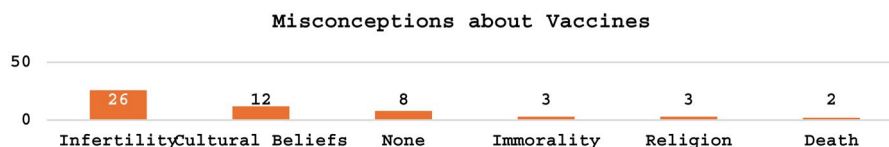


Figure 2. Distribution of vaccine-related misconceptions by theme and site.

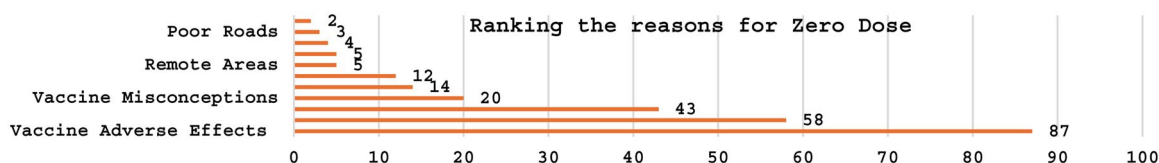


Figure 3. Primary and secondary barriers/drivers of zero-dose.

started rejecting immunisation, until when they were enlightened, and afterward they continue accepting it. Wakilin sarkin Fulani

Anytime I ask them to take their children for immunisation, they will say that they will not do the vaccination, because rashes will appear all over their body, I have tried for several times but they have never attempted to bring their children. VCM Dantamashe

Why don't they like to bring their children for immunisation? some will say it is due to the effect of the immunisation that the children will be crying and preventing them from having a sound sleep. So we use to ask mothers that which one do they prefer, a child to have whooping cough for about 90 days, or just to cry for three days, due to the immunisation. RI SP Kiru

Another problem is that some of the vaccines are very strong, so it will be better if you will be providing those which are milder... because sometimes after administering the vaccines, adverse effects follow, and that's why some of them never return for the next dose. RI Service Provider, Kiru

Poverty and transport costs

During the mosquito net distribution exercise, nobody cares to bring it to them, because they are in remote places, but when it is time for immunisation, we know every nooks and corners that we can find them, so they will not agree. LERRIC

They believe that there is nothing good about it, that is why they are followed to their houses to get their children immunized because the authorities never approach people with anything that will be useful to people. You have to spend money before getting anything that is good. Female Caregiver, Dangora

Some of the challenges we experience in taking our children for immunisation is that sometimes, it's hard before you get transport, and sometimes we don't have transport money. Male Caregiver, Panshekara

People keep on complaining that, they are facing economic problems, and they are not given anything that will alleviate their sufferings, but they are always being worried about immunisation, and they are not given free treatment. VCM, CHIPS, Jajira

Some of the people are complaining of the current economic situation, they are saying that the cost of living is high and the government never bothers about them. that, they should be distributing rice or soap, rather than giving people N1000. RI SP Hotoro

They will be saying to us that you did not bring food for us, and you are just worrying us with immunisation. They will say that we don't need any immunisation; we need food. RI SP Danbatta

Distrust of 'free' services

People are rejecting immunisation because they are not given free medical care, according to them anytime they attend the hospital, they must pay for any service rendered to them, so they are asking that, why is the immunisation free of charge and that is why they are not giving their accepting the immunisation. Ward Head

You know that there is nothing done to them other than bringing immunisation for them, and they have been left with hunger and poverty, that's why some of them will tell you that, they never trust the immunisation and according to some of them, whenever the government is offering you certain services free of charge, it is done for cheating people. RI SP Dangora

Household decision power (male heads; paternal grandmothers)

Sometimes mother-in-laws are contributing in making things backward because in some places they are those that never allow children to be immunised because they will be saying that during their time they were not immunised and they remained in a healthy condition. RI SP Bachirawa

Usually, in our communities, there is a father that will agree to allow his child to be immunized especially in the first visit, then if you return and administer Penta 1 immunisation, he will tell you that the child will not be immunized again, because due to the pain which the child was experiencing, he disturbs him and prevents him from having sound sleep. Health worker, Dangora

Some of the challenges include the way in which some male parents are disliking the immunisation, making them not to allow their wives to take the children for the vaccination. Female Caregiver, Bachirawa

There is problem if the husband doesn't agree with the immunisation. Female Caregiver, Panshekara

So sometimes if you ask a woman her reason for not bringing her child for immunisation, she will tell you that it was the child's grandmother that said the child should be taken to traditional doctors. WDC

The reason for the continuance of zero doses in this community is because some people have stuck to their old ideas, ... there was a woman that born her first child; I tried to make her bring the child for immunisation, but her husband called his mother through the phone and said to her, have you ever taken me to the hospital, she said no, I have never, then he said, have I ever been immunised, she said never and she said no, don't do it. VCM Bachirawa

Figure 3 quantifies the qualitative ranking displayed in the bar chart. Percentages are derived from the coded dataset by counting, for each barrier/driver, the number of participants who mentioned the issue as a primary (first-order) reason for non-initiation versus a secondary (supporting) reason, and dividing by the total number of participants in the sample. This approach provides an interpretable summary of salience across respondent groups while keeping the underlying evidence qualitative and context-specific.

Secondary barriers

Informants also raised system constraints, geography, and rapid urban expansion as amplifiers of the primary barriers described above.

We are lacking working staff in this area. In the twenty years I have been working here, anyone brought here for work never agrees to stay longer; some of them will stay for only two years and seek a transfer and leave. Health Worker, Badafi

The immunisation services are poor; there is a lack of required services in some areas where there are no facilities. And sometimes parents come out as early as possible and have to wait for a long time before being immunised, so they get bored and go home. CSO Representative

Strategies reported by participants

Respondents consistently proposed messenger-based engagement, re-activation of VCMs, targeted incentives, localisation of staff, improved provider communication, and practical pain-relief guidance. An overview of respondent-proposed strategies to increase first-dose initiation is presented in Figure 4.

Engage imams/traditional leaders

Muslim scholars can reach out to hesitant parents, they can use their Islamiyya schools or preaching grounds, to enlighten such parents about the importance of immunisation. RI SP, Zango

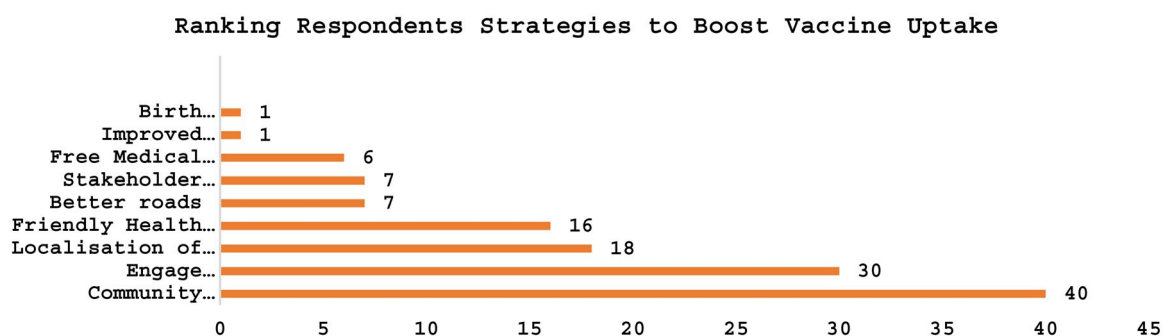


Figure 4. Strategy bundle to boost vaccine uptake.

Reactivate/expand VCMs

The VCMs are the ones that are really assisting us in this issue, in the past the thing was going smoothly, but after disengaging the VCMs many problems rose up,...so their role is very significant because they have techniques for convincing the women. Ward Head

Targeted incentives

Now, our defaulters have reduced just because of the N1000 they are given. There are those who are anxiously waiting for the immunisation day just because of that money. Therefore, if they are given some incentives, surely they will accept immunisation because we are living in a situation in which people are needy. VCM, Kumbotso

If you start giving people money for vaccination, do you think it is an ideal way to solve the problem? How many millions of people will you give that money, and what if you stop?. CSO

Recruit/localise staff; strengthen provider communication; bundle pain-relief guidance

To recommend recruiting from within communities, a village head argued:

The reasons for this may come from the people, and it might be due to the way in which the healthcare workers are recruited; it will be better that the service providers work in their native areas because the community members will be familiar with them, so they will not do or bring any harmful thing. Village Head

Immunisation providers should try to be friendly with the community members whenever immunisation services are being carried out, never regard them as inferior, you should be having fun with them, and they will easily accept what you have brought to them. VCM, Danbatta

Gender and uptake

Across communities, respondents reported no systematic sex bias in child vaccination; two noted more girls vaccinated locally, attributing this to a higher local population of girls rather than preferential access.

Discussion

Across the five LGAs, the findings suggest that persistent zero-dose pockets in an otherwise active immunisation programme are maintained less by simple lack of services and more by a coupled social behavioural pathway. Non-initiation clustered where risk perceptions (especially around first-dose side effects), social permission (household authority and elder influence) and credibility of public provision interacted with practical opportunity costs. This pattern fits the combined logic of the 5Cs and 5As: confidence and collective responsibility were shaped by social networks and messengers, while awareness and access depended on whether households could act on information within their daily constraints (Crawshaw et al., 2022; Ruggeri et al., 2024).

A key implication is that distrust of 'free' services should be treated as a health-system legitimacy signal rather than a narrow communication deficit. When caregivers interpret 'free' as 'low quality' or 'unsafe', SBCC that only repeats factual benefits can be counterproductive. Instead, communication needs to be paired with visible reliability cues consistent session timing, respectful treatment, clear explanations, and prompt management of minor adverse events so that households see the system as accountable. Broader Nigerian concerns about quality and safety in health commodities, including evidence of substandard products, can plausibly reinforce such distrust and help explain why it emerges even in high-coverage wards (de Figueiredo et al., 2020; Umar et al., 2025).

Fear of side effects after Penta-1 emerged as a high-salience barrier, consistent with wider evidence that safety concerns and anticipated adverse events are central drivers of vaccine hesitancy (Rosiello et al., 2021). Operationally, 'plain-language anticipatory guidance' should be standardised and delivered

before vaccination (and repeated at exit), with a simple structure: what mild effects are common, when they typically start and resolve, what safe home care looks like, danger signs that require return to care, and a named contact point. A short take-home card in Hausa, reinforced by VCM follow-up within 24–48 hours, can turn anxiety into manageable expectations and reduce drop-off after the first experience.

Implementation suggestions also need to be workable at ward level. ‘Short, time-locked transport reimbursements’ can be organised as a same-day voucher or token provided at the clinic/outreach point and redeemable within a defined window (e.g. 2–4 hours) through a local transport union focal person or mobile money agent. Eligibility can be restricted to pre-identified low-income households in the farthest settlements (using ward microplans), with verification based on a stamped child card or attendance register, and simple safeguards such as serial-numbered vouchers, periodic spot checks and public posting of redemption totals. Where possible, linking transport support to scheduled outreach days (including weekend sessions) can reduce opportunity costs without creating open-ended expectations.

Formal coordination with imam councils and women’s Islamiyya schools should move beyond ad hoc messaging. A practical mechanism is to agree on a short set of approved messages, train designated ‘immunisation focal persons’ within mosque and Islamiyya structures, and create a two-way referral and rumour-tracking loop with the ward health team. Monthly coordination meetings (ward head, facility in-charge, VCM lead, imam representative, women’s Islamiyya lead) can review rumours logged by mobilisers, agree responses, and align announcements with outreach calendars. These recommendations are best presented as a context-specific package of equity-oriented communication and service adjustments, rather than as a universal communication model or a standalone ‘how-to guide’.

Limitations

Qualitative evidence limits statistical generalisability and may be susceptible to social desirability bias. Nuance loss is possible during translation despite back-translation. Rapid urban change and mobility patterns can shift local realities over time. These risks were mitigated through triangulation across LGAs and respondent groups, double-coding with reconciliation, audit trails, and peer debriefs.

Conclusion

Small but resistant minority is responsible for sustaining zero-dose in Kano despite generally functioning services, acted upon by the salience of Penta-1 adverse effects, decision authority at the household level, economic stress heightening distrust of ‘free’ services, and mobility concentrating pockets of non-vaccination. The most viable pathway lies in anticipatory counselling for side-effects, conducted in plain language; using locally credible messengers such as imams, ward leaders, and respected women’s groups; having stable, localised outreach teams; revitalising VCM networks with simple feedback loops; and predictable clinic times that reduce waiting combined with short, time-limited transports offsets only where transport hardship is acute. If these communication actions are integrated with visible service reliability, Kano’s zero-dose gap will have a coherent, equity-oriented way to kickoff first doses.

Addressing zero-dose is fundamentally an equity issue in global health: it is a marker of children and households who are systematically excluded from the benefits of routine services. Progress should therefore be judged not only by average coverage, but by whether the hardest-to-reach wards and the most marginalised families can initiate and sustain vaccination without fear, stigma or avoidable cost.

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Ethics approval and consent to participate

Ethical approval was obtained from the Kano State Bureau of Statistics (Ref: KSBS/MDAs/NGOs/4/BIII/013, 23 May 2024) and the Kano State Primary Health Care Management Board (5 June 2024). Written consent or witnessed thumbprint was obtained from all participants.

Consent for publication

Not applicable (no identifiable personal data are presented).

Author contributions

CRedit: **Stanley Ukpai**: Conceptualization, Data curation, Formal analysis, Methodology, Project administration, Resources, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing; **Judith-Ann Walker**: Investigation, Software.

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Data availability statement

The data and materials that support the findings of this study are available from the corresponding author upon reasonable request, in line with Taylor & Francis's Share Upon Reasonable Request data policy.

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