

An Explorative Assessment of Factors Associated with Vaccine Hesitancy in Rural and Urban Communities in Akwa Ibom State, Nigeria

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Abstract Vaccine hesitancy remains a critical bottleneck to optimising immunisation coverage and herd immunity globally. In sub-Saharan Africa, particularly within Nigeria's socio-cultural landscape, vaccine deployment faces varied structural, cognitive, and contextual impediments. This study explored the multiple factors influencing vaccine hesitancy across rural and urban communities in Akwa Ibom State, Nigeria. Utilising an exploratory, cross-sectional qualitative design, 12 In-Depth Interviews (IDI) were conducted across three Urban (Uyo, Abak, Oron) and three Rural (Itu, Oruk Anam, Nsit Ibom) Local Government Areas. Participants were selected through stratified purposive sampling to reduce bias. Narratives from IDIs were transcribed, coded and interpreted using thematic analysis, incorporating both inductive and deductive approaches. Rural participants exhibited high foundational demand and positive vaccine optimism, driven primarily by perceived disease severity, and this was aided by peer-to-peer diffusion of positive vaccination experiences. However, their vulnerability stemmed from information deficits. Conversely, urban cohorts exhibited fragmented risk perceptions, deep-seated institutional mistrust, and acute sensitivity to systemic and physiological risks. Urban settings were uniquely vulnerable to digital misinformation accelerated by dense, unmediated information within their environments. Local authority structures varied fundamentally: rural areas relied heavily on centralised, culturally legitimised figures (village heads, town criers), whereas urban networks required decentralised communication modes (churches, broadcast media, digital networks). Vaccine hesitancy is highly context-specific and ecologically distinct in Akwa Ibom State. Public health interventions must discard homogeneous, top-down communication paradigms in favour of tailored, double-loop community participation strategies that embed peer-champion mechanisms and localised risk communication within existing rural and urban communities.

Keywords Perspectives, Qualitative Study, Urban-Rural Communities, Vaccine Hesitancy.

Introduction

Vaccines have become the mainstay for controlling infectious diseases globally. Epidemiological data synthesised by the World Health Organisation (WHO) regularly emphasise immunisation as the single most effective health intervention for accelerating child survival rates and reducing preventable morbidity [1]. Immunisation against diseases such as Japanese encephalitis, measles, meningitis A, diphtheria, Haemophilus Influenzae type B, polio, rotavirus, rubella, tetanus, tuberculosis, and yellow fever has resulted in a 40% reduction in infant mortality globally and a 50% reduction in the African region [1]. It is well known that the use of vaccines has led to the eradication of diseases, including smallpox [2]. The uptake of vaccines depends on access to vaccines, vaccine affordability, public awareness of the vaccine, acceptance of the vaccine, and its activation in the population in which it is administered [3]. The factors that affect vaccine uptake vary across many countries. While there has been considerable expectation around the vaccines, there remains significant hesitancy to receive them across populations worldwide, including in Nigeria.

The concept of vaccine hesitancy is complex and has been described as context-specific in relation to the vaccine, time and the environment [4]. Vaccine hesitancy is not a novel concept and has been observed across economies globally [5]. The World Health Organisation has described vaccine hesitancy as one of the ten threats to global health [4]. Vaccine hesitancy is defined as a delay in accepting or refusing vaccines despite the availability of vaccine services [4]. It occurs on the continuum between high demand for vaccines and the complete refusal of vaccines. Vaccine hesitancy may arise in various situations, ranging from systemic problems in vaccine access and delivery to limitations associated with events such as natural disasters.

The determinants of vaccine acceptance, hesitancy, and outright refusal depend on numerous community factors [6].

Individual and group influences implicated in vaccine hesitancy include beliefs, attitudes, and health-related motivations. Myths and beliefs about immunisation in Nigeria have contributed to vaccine hesitancy, as exemplified by some studies [7-9]. In Nigeria, these myths and rumours constitute barriers to the uptake of immunisation services [7]. In developed economies such as Canada and the Netherlands, a sense of self-efficacy regarding the importance of vaccination was a positive driver of vaccination uptake [8, 9]. Having an immunisation card and receiving immunisation services at a health facility were associated with positive uptake of immunisation services [7]. The level of awareness individuals have about the severity of vaccine-preventable diseases is important for vaccine uptake. When the disease was perceived as less severe, this perception served as a barrier to vaccine use [10].

Contextual factors likewise play a role in vaccine hesitancy. There are contrasting opinions on whether education is a positive or negative driver of vaccine acceptance and hesitancy. In a study conducted in Italy, parents' educational status was significantly associated with vaccine refusal or acceptance [11]. Zhang and colleagues reported that higher educational status was a negative driver of vaccine acceptance [12]. This result, however, was not consistent with findings from Nigeria, which reported that higher education was a positive driver of vaccine acceptance [13]. In another study, lower education was a barrier to vaccination uptake and contributed to vaccine hesitancy [14]. Some studies have described the socioeconomic status of families as a positive and negative driver of immunisation uptake. In a study conducted in Italy, the researchers reported that rising perceived economic hardship was associated with vaccine hesitancy [11]. This finding, however, was not consistent with findings from some other Western

countries. In a study in the United States of America, high socioeconomic status was a barrier to vaccine uptake [15]. However, within the same climate, low socioeconomic status was associated with increased uptake of immunisation services [16]. In a study in Nigeria, low socioeconomic status was a negative driver for vaccine uptake [14]. The significance of regularly communicating immunisation messages to the public was an important driver of vaccine acceptance, and its eventual uptake [7, 17, 18].

In a study conducted in Nigeria, the ease of access to health facilities offering immunisation services was a driver of vaccination uptake in those areas [7]. The introduction of new interventions, as seen with COVID-19 vaccines, was often met with mistrust and concern about their effectiveness. This can cause considerable hesitancy and, on occasion, outright refusal, especially when severe complications are associated with the vaccine [19]. The objective of the study was to explore the factors affecting vaccine hesitancy in rural and urban communities in Akwa Ibom State, Nigeria. This allows for community-based exploration of these factors in these geographical areas.

Materials and Methods

Study population and design: The study population comprised household heads from rural and urban communities in Akwa Ibom State. The selected urban local governments were Uyo, Abak, and Oron, while the rural local governments were Itu, Oruk Anam, and Itu LGAs in Akwa Ibom State. These local governments were selected through simple random sampling. We used an exploratory cross-sectional qualitative design.

Sampling of participants for In-Depth Interviews: Participants were selected through stratified purposive sampling to ensure representation across educational attainment, marital status and age groups. Respondents selected must have lived in the communities for

at least 6 months and be able to communicate in either English or Pidgin English.

Data Collection

Twelve in-depth interviews were conducted among selected participants from the study communities. One household head was selected from each selected urban and rural community. Selection considered gender, educational status, employment status, and duration of residence in the community. One male and one female participant were selected from each community; similarly, participants with higher education and those with secondary education or below were included. Data were collected using a structured discussion guide adapted from the National Resource Centre for Refugees, Immigrants, and Migrants [20]. The interviews explored perceptions regarding vaccination, vaccine uptake, and vaccine hesitancy among households in urban and rural communities. Interviews were conducted in English or Pidgin English by the principal investigator or trained research assistants in quiet and private settings to promote open discussion. Each interview lasted approximately 45–60 minutes and was audio-recorded with additional field notes documenting nonverbal indicators and observations.

Data Analysis

Data were analysed using thematic analysis. Audio recordings were transcribed verbatim and reviewed repeatedly to achieve familiarity with the data. Unique identifiers were used for rural and urban respondents in the study, i.e., “A” for rural respondents. Transcripts were coded. Related codes were grouped into categories and themes. Deductive and inductive approaches were used to interpret the study's findings, and categorical matrices were developed to highlight emerging patterns.

Ethical approval was obtained from the Akwa Ibom State Research Ethics Committee, State Ministry of Health

(AKHREC 07/10/25/366). Informed consent was sought from the community heads and participants before the interviews.

Results

A total of 12 in-depth interviews were conducted in both rural and urban communities.

Participants' ages ranged from 22 to 55 years, and most were married and educated. All urban respondents had at least a secondary education, while one rural participant reported no formal schooling (Table 1).

Table 1. Sociodemographic Characteristics of Participants

Variables of Interest	Rural	Urban
Age (years)		
Less than 25	1(16.7)	1(16.7)
26–40	2 (33.3)	2(33.3)
41–54	2(33.3)	3 (50.0)
≥55	1(16.7)	0 (0.0)
Marital status		
Married/cohabiting	4(67.7%)	3(50.0%)
Single	2(33.3%)	3(50.0%)
Educational status		
Educated	5(83.3%)	6(100.0%)
Not educated	1(16.7%)	0(0.0%)

Rural Communities

Rural participants generally described vaccines as beneficial for preventing diseases. Several participants perceived the vaccines as

beneficial and were enthusiastic about receiving them, describing them as the required intervention to minimize the spread of the virus (COVID-19). (Table 2).

Table 2. Rural Participants' Perceptions of Vaccine Use for Disease Prevention

Domain	Participants	Participants Responses	Summary of Perceptions
Perceptions about vaccine use to prevent diseases	A1	Yes, because though few people that have taken it will testify that the vaccines is good, that makes them even their children to take it	Participants show strong positive perception towards receiving the vaccines and indicated strong desire to receive the vaccines when available.
Perceptions about vaccine use to prevent diseases	A2	I think the vaccine is very good, if they bring it to us, our people here will be happy to take it.	Participants show strong positive perception towards receiving the vaccines and indicated strong desire to receive the vaccines when available.
Perceptions about vaccine use to prevent diseases	A3	We always feel happy when any opportunity comes for us to take the vaccines.	Participants show strong positive perception towards receiving the vaccines and indicated strong

			desire to receive the vaccines when available.
Perceptions about vaccine use to prevent diseases	A4	Because nobody wants to die, so we are looking for the vaccine	Participants show strong positive perception towards receiving the vaccines and indicated strong desire to receive the vaccines when available.

Rural participants reported concerns related to vaccine safety, fear of adverse outcomes, and limited awareness. Some participants stated that community members were afraid because

vaccines were perceived as new, while others noted that reassurance from vaccinated relatives or community members reduced concerns (Table 3).

Table 3. Rural Participants' Misconceptions and Safety Concerns about Vaccines

Domain	Participants	Participants Responses	Summary of Perceptions
Misconceptions about the vaccines	A5	So far I have not seen any bad news, in Ona (The local community) here I have not seen in anywhere people afraid of taking vaccines. The important is that you have to enlightened them through their local dialect, the important of vaccines, and let them know there's no danger	Misconceptions are generally around vaccine safety and availability. Hesitancy is created with minimal awareness.
Misconceptions about the vaccines	A6	Most at times, people living outside the community, when they take it (the vaccines), they will call us here and inform us that the vaccines is very good in case they bring it here, will should take it.	Misconceptions are generally around vaccine safety and availability. Hesitancy is created with minimal awareness.
Misconceptions about the vaccines	A3	"...they are some people that are afraid, that if they take it, they will die, but we that are enlightened we educate those that are not educated"	Misconceptions are generally around vaccine safety and availability. Hesitancy is created with minimal awareness.
Misconceptions about the vaccines	A4	Some people express fear because it's new, there's no awareness	Misconceptions are generally around vaccine safety and availability. Hesitancy is created with minimal awareness.

Rural participants identified several channels through which vaccine information and services were communicated. These included village heads, town criers, health

workers, government representatives, non-governmental organisations, phone calls, taxes and direct community engagement (Table 4).

Table 4. Rural Participants' Perspectives on Factors Influencing Vaccine Hesitancy and Communication Pathways

Domain	Participants	Participants Responses	Summary of Perceptions
Factors that affect vaccine hesitancy	A5	Through the village head or through the towncrier	Vaccine hesitancy is reduced when local resources and channels participate actively in promoting vaccination
Factors that affect vaccine hesitancy	A6	"...people are going around distributing the vaccines or you go to a health care center, to get the vaccines, through government or NGOS"	Vaccine hesitancy is reduced when local resources and channels participate actively in promoting vaccination
Factors that affect vaccine hesitancy	A3	The Government, the healthcare providers, through calls and text message	Vaccine hesitancy is reduced when local resources and channels participate actively in promoting vaccination
Factors that affect vaccine hesitancy	A4	Try talking to them, telling them that vaccine is very good to prevent diseases from entering the body	Vaccine hesitancy is reduced when local resources and channels participate actively in promoting vaccination
Factors that affect vaccine hesitancy	A1	They should explain it as a nature to them, so that they will have interest in it. I think before the vaccine is being shared, let the chief in the village, announce in the village square for everyone	Vaccine hesitancy is reduced when local resources and channels participate actively in promoting vaccination

Urban Communities

Urban participants express mixed perceptions about vaccination. Some participants describe vaccines as useful for

disease prevention and reported positive experiences with vaccination. Others reported concerns about vaccine safety, particularly regarding COVID-19 vaccines (Table 5).

Table 5. Urban Participants' Perception of Vaccine Use for Disease Prevention

Domain	Participants	Participants Responses	Summary of Perceptions
Perceptions about vaccine use to prevent diseases	B1	I think the vaccines help the body; they prevent diseases	Positive perception about vaccines, with some hesitancy because of some misconceptions
Perceptions about vaccine use to prevent diseases	B2	In our village, Ediene Abak, we are so excited; we received and it was very good, and many	Positive perception about vaccines, with some hesitancy because of some misconceptions

		people that receive it, there's no bad complain about it	
Perceptions about vaccine use to prevent diseases	B3	For vaccine like COVID-19, due to the theory, people believe that the vaccine was not safe	Positive perception about vaccines, with some hesitancy because of some misconceptions
Perceptions about vaccine use to prevent diseases	B6	...when there was Covid-19, a lot of people will say, Covid-19 vaccines do kill people, that when you take the first one the second one will make you sick.	Positive perception about vaccines, with some hesitancy because of some misconceptions

Urban participants reported misconceptions about vaccines, including fears of death, severe illness, body dysfunction, and rumours that

COVID-19 vaccines contain microchips. Some participants also reported concerns about side effects following vaccination (Table 6).

Table 6. Urban Participants' Misconceptions and Safety Concerns about Vaccines

Domain	Participants	Participants Responses	Summary of Perceptions
Myths and misconceptions about vaccines	B1	I think the vaccines will be good for the community, if they have opportunity to get it.	Urban communities seem to hold misconceptions that are linked to access to the vaccines, and effects following administration of the vaccines.
Myths and misconceptions about vaccines	B2	People felt that some of their body wasn't functioning well, and they couldn't perform certain duties, due to the effect of the vaccine	Urban communities seem to hold misconceptions that are linked to access to the vaccines, and effects following administration of the vaccines.
Myths and misconceptions about vaccines	B3	Some people think they might die if they take the medicine	Urban communities seem to hold misconceptions that are linked to access to the vaccines, and effects following administration of the vaccines.
Myths and misconceptions about vaccines	B4	...Like vaccine for the COVID-19 story, people being injected with microchips...	Urban communities seem to hold misconceptions that are linked to access to the vaccines, and effects

			following administration of the vaccines.
Myths and misconceptions about vaccines	B6	I don't really see the disadvantages of it, because it's for our own good, some people will think or say that when I take the vaccines I will get so so disease...	Urban communities seem to hold misconceptions that are linked to access to the vaccines, and effects following administration of the vaccines.

Urban participants identified several factors and communication channels related to vaccine hesitancy. This included misinformation, reports from people who had received vaccines, village heads, religious institutions, radio, community meetings, social media and other local communications platforms (Table 7).

Table 7. Urban Participants' Perspectives on Factors Influencing Vaccine Hesitancy and Communication Pathways

Domain	Participants	Participants Responses	Summary of Perceptions
Factors that affect vaccine hesitancy	B1	In the community they must be few people that don't want it, but the people that took it, they will spread the information, they will be so interested in taking it now, no negativity	Spread of misinformation from a few persons Participation of local community and religious leaders
Factors that affect vaccine hesitancy	B2	Village head will do the work and tell them	Spread of misinformation from a few persons. Participation of local community and religious leaders
Factors that affect vaccine hesitancy	B3	Media like Radio, community meeting, visiting churches	Spread of misinformation from a few persons. Participation of local community and religious leaders
Factors that affect vaccine hesitancy	B6	There is no disadvantages, because if you're not informed you are deformed, if you think getting vaccinated will cause you any problem you have signed your death sentence, so vaccination is pure and good.	Spread of misinformation from a few persons. Participation of local community and religious leaders

Discussion

The findings of this qualitative assessment of the factors driving vaccine hesitancy in rural and urban communities in Akwa Ibom State, Nigeria, reveal the interplay among cognitive, social, and organisational factors that form

individual and community responses to vaccination. The study shows a largely positive disposition towards vaccines, especially in the context of COVID-19. It also reports factors such as persistent misconceptions, safety concerns, and information deficits as drivers of vaccine hesitancy. This evidence is consistent

with the wider literature on vaccine hesitancy in sub-Saharan Africa and corresponds with the World Health Organisation's (WHO) Strategic Advisory Group of Experts on Immunisation (SAGE) 3Cs conceptual framework, which identifies confidence, complacency, and convenience as the three primary determinants of vaccine hesitancy [21].

Misconceptions about vaccine safety were a common theme in both rural and urban communities. In urban settings in particular, participants described rumours that COVID-19 vaccines contained microchips that would cause organ dysfunction or could result in death. These outcomes mirror those reported in a scoping review of COVID-19 vaccine hesitancy in Nigeria, which documented widespread myths, including claims that vaccines were designed to cause sterility, induce illness, or cause harm [22]. This finding is not peculiar to Nigeria; Zimmerman and colleagues reported that, globally, multiple contexts have demonstrated historical medical distrust and limited health literacy [23]. This index study showed that misconceptions in rural areas were less entrenched than in urban communities because enlightened community members helped counter community members' fears by sharing their personal vaccination experiences. This peer-to-peer diffusion of positive vaccine experiences is a well-established mechanism for building social trust and reducing hesitancy, as positive peer testimonies serve as social proof that can override abstract fears [24]. There appeared to be a heightened perception of susceptibility and severity, which drove a strong positive inclination toward receiving preventive interventions. Conversely, urban cohorts manifested a more fragmented perception of severity. Although accepting the abstract benefits of immunisations, urban community participants appeared highly sensitised to institutional risks, heavily weighing the instant physiological disruptions of vaccination against the theoretical threat of the disease itself.

Access to information, especially through trusted sources, increased vaccine acceptance markedly among rural participants. Vaccine hesitancy seemed to stem from information deficits rather than active opposition to vaccination itself. This contrasted with urban respondents, who seemed to be more frequently exposed to conflicting information from electronic and social media, as well as informal interpersonal networks, resulting in a more complex and contested vaccination landscape. This aligns with evidence from a study in sub-Saharan Africa, which found significant vaccine hesitancy in Nigeria, with rural residents exhibiting different hesitancy profiles than their urban counterparts [25]. Similarly, it has been reported that urban residents faced a distinct set of hesitancy drivers compared with rural populations, with exposure to misinformation and media access acting as key differentiating factors [26]. Participants' references to fears of death, bodily harm, and government-distributed vaccines indicated wider patterns of medical mistrust that are based in historical experiences of healthcare inequity, inadequate health system performance, and perceptions of governmental self-interest. The 1996 Pfizer-Trovan clinical trial incident in Kano is a reference point for many today [27]. Dealing with these structural determinants of hesitancy requires a long-term devotion to transparent, accountable, and community-responsive health governance, rather than one-off vaccination campaigns.

The role of trusted community figures, such as traditional rulers, village heads, town criers, and religious leaders, in mediating vaccine acceptance or rejection. Respondents consistently emphasised that vaccine communication delivered through these culturally accepted and legitimate channels was more effective than messages from external health authorities or government. This finding resonates strongly with evidence from elsewhere in Nigeria and Africa. A mixed-method study of COVID-19 vaccine uptake in

Nigeria found that community trust and the involvement of local leaders were among the strongest predictors of vaccine acceptance, and that scepticism towards government messaging was a major barrier [28]. Rangi and colleagues reported that deploying trusted local advocates to promote vaccination led to considerable improvements in vaccination uptake, especially in hard-to-reach communities [29]. The results jointly indicate that vertical, government-to-community communication tactics are insufficient on their own, and that vaccine programmes must be embedded within existing community social structures to be effective. Urban respondents seemed to lack a single unifying traditional authority, with residents turning to a mixture of religious institutions, electronic broadcast media, and interactive digital networks. Urban participants highlighted that “channels like the church, electronic media, social media and so on, played major roles in reducing vaccine hesitancy”. The study showed that the spread of positive feedback from early vaccine adopters who completed their schedules without complications was a key driver of wider community acceptance. As an urban respondent noted, once a small group successfully completes the procedure without issues, “they will spread the information, they will be so interested in taking it now”.

The findings from this qualitative study carry important ramifications for public health policy and vaccination programme design in Akwa Ibom State and Nigeria more broadly. First, health promotion campaigns, especially those aimed at vaccination against emerging diseases, should be customised to the specific information environments and misconception profiles of rural and urban communities, rather than applying a uniform national communication strategy. Also, engaging traditional rulers and religious leaders, alongside health care workers and peer champions, during these campaigns reduces vaccine hesitancy. It is important that health

literacy actions that address common myths and misconceptions in the local dialect are integrated into routine community outreach, notably in rural areas where access to verified health information is limited. Peer testimonies and community-level social proof should be harnessed by structured peer ambassador programmes, as evidenced by both this current study and community champion research from sub-Saharan Africa [29]. This study has its limitations, as it relies on responses from a small group of individuals in rural and urban communities, whose personal experiences may not generalise well to other contexts. The findings, however, provide an experiential path for identifying the causes of vaccine hesitancy and resolving them.

Conclusion

This study demonstrates that vaccine hesitancy is a complex, context-specific issue influenced by distinct environmental and social factors. Rural hesitancy is largely driven by clear information gaps, yet remains highly receptive to traditional, centralised leadership and positive peer feedback. Urban hesitancy, by contrast, is shaped by complex risk-benefit calculations, institutional mistrust, and exposure to digital misinformation within a highly fragmented communication landscape.

To improve vaccine uptake, future immunisation strategies must consider localised, adaptive programs that respect and integrate the unique social and cultural structures of both rural and urban communities.

Conflicts of Interest

None to declare.

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Ethical Approval

Ethical approval was received from the Akwa Ibom State Ethical Review Board in October 2025.

Data Availability

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Author Contributions

- **Idongesit Nta Wilson:** Conceptualisation, Implementation/fieldwork, Data curation, Data management, and writing.

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- **Elizabeth Adedire:** Conceptualisation, writing.

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