

Seeking Input from Communities, Caregivers, and Frontline Health Workers on The Perceived Barriers and Potential Solutions to Reaching Zero-Dose and Under-Vaccinated Children in Kenya:

A PHOTOVOICE STUDY

FINAL REPORT



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MOMENTUM works alongside governments, local and international private and civil society organizations, and other stakeholders to accelerate improvements in maternal, newborn, and child health services. Building on existing evidence and experience implementing global health programs and interventions, we help foster new ideas, partnerships, and approaches and strengthen the resiliency of health systems.

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ABBREVIATIONS

CBPR	community-based participatory research
CHV	community health volunteer
COVID-19	SARS-CoV-2
FGD	focus group discussion
IDI	in-depth Interview
KHIS	Kenya Health Information System
KII	key informant interview
SEM	socioecological model
USAID	United States Agency for International Development

OPERATIONAL DEFINITIONS

Community health volunteers: Lay individuals of varied backgrounds from or based in the communities they serve, who have received brief training on a health problem (in our case immunization).

Frontline health workers: Employees who provide immunization in their communities.

Fully immunized child under 1 year of age (in Kenya): A child who has received a Bacillus Calmette-Guerin (BCG) vaccination; three doses of the diphtheria, pertussis, and tetanus (DPT)-containing vaccine; three doses of the polio vaccine; and a measles vaccine.

Immunization: A process by which a person becomes protected against a disease through vaccination. This term is often used interchangeably with vaccination.

Immunization schedule: A list of recommended vaccines each person should receive according to age, including number of doses for each and how far apart they should be spaced.

Missed communities: Where clusters of zero-dose and under-immunized children live and in which services are often lacking and socioeconomic inequities and gender-related barriers prevail.

Photovoice: A visual research methodology that gives participants cameras to document, reflect upon, and communicate issues of concern, while stimulating social change.

Under-immunized children: Children who have started but not received all recommended vaccines in a country's immunization schedule, as measured by those children missing the third dose of DTP-containing vaccine.

Vaccination: The act of introducing a vaccine into the body to produce protection from a specific disease.

Vaccine: A preparation that is used to stimulate the body's immune response against disease. It is usually administered through needle injections, but some can be ingested orally or sprayed into the nose.

Zero-dose children: Children who have not received any routine vaccine. For operational purposes, Gavi defines zero-dose children as those who lack the first dose of DTP vaccine.

EXECUTIVE SUMMARY

Objective. Research was conducted in rural and peri-urban areas in three counties (Homa Bay, Vihiga, and Nairobi) in Kenya to identify the major barriers to childhood immunization and potential solutions.

Design. This qualitative study used a cross-sectional design. It adopted a community-based participatory research approach that sought to collaborate with the communities in which the study was conducted. The study collected data using Photovoice, a visual research methodology whereby participants take photos to document an issue of concern. This was accompanied by in-depth and key informant interviews, and focus group discussions to identify barriers and potential solutions to childhood vaccine uptake. These were followed by a workshop to probe proposed solutions and make them specific, short-term, realistic, and implementable by local health workers and the community. Information analysis used the socioecological model to understand the interplay between individual, community, and societal factors and how it affects access to and use of immunization services, as well as potential local solutions.

Participants. The study included 182 community members and 14 local health personnel. Among the former were caregivers of zero-dose and under-immunized children and community leaders and health volunteers. Among the latter were frontline health workers and health management team personnel. Purposive sampling was employed in the recruitment of all study participants.

Results. Consistent across communities, the main barriers to vaccination services related to personal capacity (older caretakers, gender-based violence concerns, lack of partner support, unconducive religious and cultural beliefs and practices); organizational capacity (e.g., inconvenient clinic hours, long waits at a clinic, vaccine supply shortages); and financial capacity (e.g., poverty, poor transport infrastructure, teen pregnancy/motherhood, overcrowded households, alcohol abuse). The study elicited practical solutions from participants, most of which focused on problems related to personal and financial capacity, since health system-related limitations were considered out of their control. These solutions were grouped into five categories: conditional cash transfer; identifying and reaching out to underserved groups; community engagement; targeted health education; and health service organization.

Conclusions. By engaging with local communities and using the Photovoice method, the study identified barriers and solutions specific to the Kenyan context. The findings are consistent with existing literature on barriers to childhood immunization. The solutions that community members proposed focused on increasing personal and financial capacity and improving access by delivering vaccinations at convenient locations including people's homes. Public health practitioners should meet with people and get and respond to their feedback and establish public oversight committees through which community members lead solutions, including framing vaccination as a public good.

INTRODUCTION

Despite immunization having been recognized as a human right that is critical to realizing global health security, challenges to coverage abound and vary among and within countries (WHO 2020). It is estimated that every year, 20 million infants do not receive a full course of even basic vaccines (WHO/UNICEF 2020). Almost half of these children are in Africa. Furthermore, of the 20 million who do not receive a full course of basic routine vaccines (diphtheria, measles, polio, tetanus, tuberculosis, and pertussis), 14 million are zero-dose children—those who have not received any vaccines (ibid).

To ensure that the benefits of immunization are equitable among and within countries, the Immunization Agenda 2030 recommends the adoption of tailored strategies to understand and overcome barriers to vaccination (WHO 2020). This process should be guided by four core principles. The first is a people-centered approach in which gaps in coverage and equity among marginalized and disadvantaged groups are filled by involving representatives of local communities and health providers. The second principle is to adopt a country-owned approach in which national immunization programs use strategies based on local research to deliver services. The third principle is to adopt a partnership-based approach to overcome barriers to equitable immunization coverage. This principle presupposes that partnerships will be built with local communities and representatives of marginalized groups to understand obstacles to vaccination (including gender barriers faced by recipients, caregivers, and health workers) and to minimize inequities. The fourth principle calls for a data-guided approach in which immunization data systems expand sub-nationally to map and track zero-dose, under-immunized, and marginalized groups to ensure that they are covered by the immunization program.

Based on these principles, this study sought to explore and establish key barriers and potential solutions to the uptake of routine vaccines among zero-dose, under-immunized children, and missed communities in Kenya's Vihiga, Homa Bay, and Nairobi counties. It employed Photovoice as a community-based participatory research (CBPR) approach. Photovoice (Liebenberg 2018) is a visual research methodology that puts cameras into the participants' hands so they can document, reflect upon, and communicate issues of concern, while stimulating social change. The photographs formed the basis upon which the researchers conducted in-depth interviews (IDIs) and focus group discussions (FGDs) to identify the solutions and interventions to community members' health challenges. The four goals of using Photovoice are to:

- Enable participants to record their community experiences.
- Reflect upon circumstances surrounding their health challenges.
- Analyze the contributing factors of the challenges.
- Come up with recommendations and propose solutions (Wang 1999).

Thus, photos stimulate the researcher and community members to define their experiences, identify challenges, and develop and reflect on their experiences to improve their access to high-quality, affordable health care. In so doing, Photovoice empowers individuals to understand and critically discuss the contextual issues that affect their health and well-being, and to collectively communicate their shared concerns/needs/vision to each other and to those with authority to allocate resources toward creating needed change (Wang & Burris 1994, 1997).

Kenya Context

Overall, Kenya’s immunization system has made considerable progress in vaccination coverage and equity. According to the WHO Immunization Data Portal, as of 2022, the country achieved a high overall vaccination coverage, with 92% of children receiving the third dose of the DTP vaccine in 2018.¹ However, like many nations, Kenya faces challenges with equitable distribution of vaccines among various social and economic groups. Studies have shown that children of mothers with less education, living in poverty, and residing in remote areas tend to have lower vaccination rates.² Kenya launched a drive to immunize millions of children who missed critical vaccines between 2019 and 2021, but childhood vaccination coverage levels are still decreasing in the country.³ According to Ministry of Health data, although the average proportion of fully immunized children under one-year of age in 2022 in Nairobi, Vihiga, and Homa Bay counties was 77%, 96%, and 76% respectively, the wards in these three counties with the lowest coverage of fully immunized children was 27%, 17%, and 10% correspondingly. This shows that while county-level averages are impressive, some areas have poor full immunization coverage. This calls for a nuanced understanding of the barriers to immunization from a community-based, locally owned, and data-driven perspective to help develop interventions that are tailored to the needs and social and cultural circumstances of people and communities that record low coverage.

1 <https://immunizationdata.who.int/pages/profiles/ken.html>.

2 Simon Allan, Ifedayo M. O. Adetifa, Kaja Abbas. Childhood immunisation coverage in Kenya by socioeconomic, geographic, maternal, child, and place of birth characteristics: equity impact analysis. BMC Infectious Diseases doi: 10.1186/s12879-021-06271-9.

3 <https://allianceforscience.org/blog/2023/04/kenya-ramps-up-immunization-efforts-as-who-aims-to-vaccinate-33-million-children-in-africa-by-2025/>.

RESEARCH OBJECTIVES

Broad

This study explored the key barriers and potential solutions to the uptake of routine vaccines among zero-dose and under-immunized children in Vihiga, Homa Bay, and Nairobi counties using a CBPR perspective.

Specific

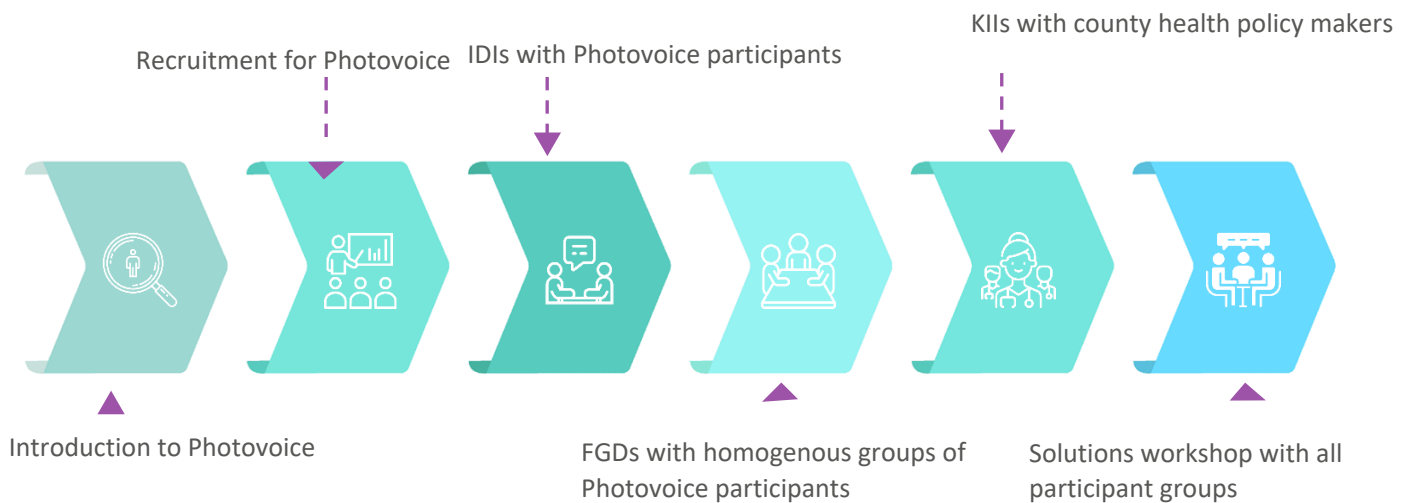
The research had four main objectives:

1. Identify geographical areas with high prevalence of zero-dose and under-immunized children and missed communities through a review of data and discussions with health workers and community members.
2. Identify the major barriers to getting zero-dose and under-immunized children fully vaccinated from a community-based perspective.
3. Identify opportunities and context-specific solutions for overcoming these immunization barriers.
4. Classify barriers and solutions using the proposed socioecological model (SEM) to understand their interplay along the intrapersonal, interpersonal, organizational, community, institutional, and policy levels.

METHODS

Study Design

This study used a qualitative approach and a cross-sectional study design. It adopted a CBPR approach that sought to collaborate with the communities where the study was being conducted. The study collected data using Photovoice, complemented with IDIs, KIIs, and FGDs.



Sites

The study took place in three counties, below, that are prioritized for MOMENTUM Routine Immunization Transformation and Equity, a project aimed at enhancing routine immunization programs.

HOMA BAY According to the 2019 National Population and Housing Census, Homa Bay had a population of 1,131,950. The county is in southwestern Kenya along Lake Victoria, where it borders Kisumu and Siaya counties to the north; Kisii and Nyamira counties to the east; Migori County to the south; and the Republic of Uganda to the west. Homa Bay's youth account for 49.1 percent of the total population. The coverage of fully immunized children, according to the Kenya Demographic and Health Survey (KDHS) 2022, was 76%. This is below the national average of about 80%, indicating the need to improve immunization coverage in the county.

VIHIGA According to the 2019 National Population and Housing Census, it had a population of 590,013. It borders Nandi County to the east; Kisumu County to the south; Siaya County to the west; and Kakamega County to the north. The county's demographic profile depicts a population of 46% of persons younger than 15 years. The immunization coverage for the county according to the KDHS 2022 was 96%.

NAIROBI is Kenya's capital. According to the 2019 National Population and Housing Census, it had a population of 4,397,073. It borders the counties of Kiambu to the north and west; Kajiado to the south; and Machakos to the east. While KDHS says that 77% of children 12–23 months are fully vaccinated, studies show that the coverage in informal settlements is lower, with higher levels of missed opportunities and low coverage of routine vaccination (Mutua et al. 2020).

Ward Selection

In Homa Bay, the study selected Kibiri Ward, which according to the Kenya Health Information System (KHIS) data, has 11% immunization coverage, and Wang'chieng Ward, which has 39%. Both are in Karachuonyo Sub-county. Wang'chieng ward borders Kisumu County and has two major ecological zones: Chuowe, a low-lying area near Lake Victoria that floods; and Kobuya, the hilly part of the region. Low fish stock in the lake area around Chuowe has led to unchecked sand harvesting that has degraded the soil and infrastructure. The sand harvesting business has benefited opportunists who sell it outside the county and harmed locals. The lower part of Kobuya has the same characteristics as Chuowe. Two areas within Kibiri were selected: Termay, served by a private health facility; and Kandiege, served by a public health facility. The intention here was to see if barriers to immunization were different in the areas served by two types of health facilities.

In Vihiga County, Emabungo Ward, which registered 22% immunization coverage, and Luanda Township Ward, which had 37% immunization coverage according to KHIS data, were selected as study sites. Both are in Luanda Sub-county. Emabungo is in a hilly and rocky area that is hard to reach because of its poor road network. Luanda Township is an urban area. The Luanda Township Health Center is a high-volume facility that has many children whose records show missed vaccinations.

In Nairobi County, the study selected Mugumuoni and South C wards of Langata Sub-county. According to KHIS data, Mugumuoni registered 16% immunization coverage, while South C had 12%. Part of Mugumoini has informal settlements that are part of the wider Kibera informal settlement, while another part has a middle-class settlement. South C is largely middle-class but has a pocket of hard-to-reach Maasai pastoralists. It also has a Somali population who largely lives in gated communities that rarely admit anyone, even health workers.

Participants

The study included community members and local health personnel. Among community members were caregivers of zero-dose and under-immunized children (a parent or other guardian who took primary care or had responsibility for a 25–36 month-old child); community leaders (including but not limited to administrative chiefs and village elders); and community health volunteers (CHVs). Among local health personnel were frontline health workers (individuals who worked at the health facilities and were responsible for administering vaccinations to children under 34 months of age) and health management team personnel (individuals who made decisions and provided oversight for the delivery of health care services including immunization at health facilities and/or at the ward/sub-county levels).

Procedure for identifying zero-dose children

The research team selected wards that based on KHIS data had the lowest coverage in the county. This data was shared with county and sub-county immunization staff, who confirmed or suggested other areas with the most challenges to vaccination.

The team then reviewed immunization diaries and defaulter tracing registers at facilities to identify children who had been missed or were not immunized. The CHVs and community health committee members were also asked to recommend families that had immunization challenges.

CHVs subsequently visited caregivers' homes and verified the vaccination status of the children using the family vaccination card or booklet, then sought to enroll the caregivers in the photovoice study until enrollment numbers were reached. The research team was clear that enrolling zero-dose children were the priority for the study, and only selected underimmunized children if there were none.

Through this process, only one zero-dose child was identified; the remaining 73 children were underimmunized. Data from the Kenya Demographic and Health Survey in 2022 released subsequent to the study enrollment confirmed very high coverage in the three study counties (DTP1 coverage at 97% in Nairobi, 98% in Homa Bay, and 100% in Vihiga), despite administrative data being lower.

The study also recruited co-researchers who were not directly involved in generating data except in the solutions workshop. Their role was to support recruitment of participants, mobilize community members for various activities and offer supportive supervision during fieldwork. Hiring co-researchers to support institutional researchers is common in CBPR (Wilson 2019), because they have ties to and a deeper understanding of the community. In this study, the research team recruited community health assistants, whose role is to facilitate links between the health system and the community. They supervise CHVs at the ward-level, and they have a direct link to ward health facilities. Furthermore, the co-researchers were trained on the possible power asymmetry during field support and how to avoid biasing the data collection process.

Sampling and Sample Size of Participants

Purposive sampling was used to recruit all study participants (Table 1). The research team adjusted the sampling for Homa Bay during county entry meetings. To capture the diversity of the wards sampled, we had four CHVs, four female caregivers, four male caregivers, and four community leaders. We increased the number of FGDs from two to four. Participants completed written consent forms and gave permission to be contacted to schedule an interview.

TABLE 1. SAMPLING AND DATA COLLECTION METHODS

Participant Category	Data Collection Method				Solutions workshop
	Photovoice	IDI	FGD	KII	
Female caregiver	2 Nairobi	2 Nairobi	12	-	3
	2 Vihiga	2 Vihiga	10		3
	3 Homa Bay	3 Homa Bay	16		3
Male caregiver	2 Nairobi	2 Nairobi	10	-	3
	2 Vihiga	2 Vihiga	10		3
	4 Homa Bay	4 Homa Bay	16		3
CHV	2 Nairobi	2 Nairobi	12	-	3
	2 Vihiga	2 Vihiga	10		3
	4 Homa Bay	4 Homa Bay	17		3
Community leader	2 Nairobi	2 Nairobi	8	-	3
	2 Vihiga	2 Vihiga	12		3
	4 Homa Bay	4 Homa Bay	18		3
County health management team member	-	-	-	4 Nairobi	2
				4 Vihiga	6
				6 Homa Bay	6
Total	31	31	151	14	26

Data Collection Methods

The data collection methods used in this study included Photovoice, IDIs, KIIs, and FGDs. IDIs were with community leaders and CHVs, whereas KIIs were mostly with people with first-hand knowledge of service delivery, such as health staff. These qualitative methods allowed in-depth exploration of a sensitive issue from multiple perspectives.

Photovoice data were collected by caregivers of zero-dose vaccine or under-immunized children, community leaders, and frontline health workers/CHVs. All involved in the Photovoice exercise, including research assistants, co-researchers, and community members, received a one-day training on the study objectives and Photovoice use. Additionally, research assistants and co-researchers received a 3-day training on the study protocol, research ethics, and skills required to conduct Photovoice research. Study participants were each issued a disposable camera and paired with a co-researcher. During Photovoice data collection, co-researchers ensured that participants took relevant photographs of their living and working environments to tell their stories and propose solutions to immunization challenges.

Immediately after Photovoice data collection, the research team printed all the photographs for each Photovoice study participant. All of the adequate quality photographs formed the basis of IDIs, which were conducted using a guide that sought to establish: 1) how the study participants described the photographs they had taken; 2) the key message they wanted to convey through the photographs; and 3) the changes they wanted to see in situations captured by the photographs.

FGDs were conducted with participants from the various categories to validate data collected by the Photovoice study participants and to confirm how similar or different their experiences were from the general community. A moderator/interviewer and note taker were present during each FGD, after which they debriefed to compare and confirm observations and impressions. The FGDs were recorded using an audio recorder.

KIIs with the health management team identified immunization challenges and opportunities, and proposed solutions to identified challenges.

All interviews (IDIs, KIIs, and FGDs) were conducted in the language the participants were most comfortable using. These included English, Swahili, Luyore, and Dholuo.

The solutions workshop aimed to probe solutions to immunization barriers proposed in the study's earlier phases to make them specific, short-term, realistic, and implementable by local health workers and the community. The workshop convened the five study participant categories: female caregivers, male caregivers, CHVs, community leaders, and the sub-county health management teams involved in immunization. Participants were initially grouped by category to brainstorm new and/or build on the proposed solutions. These discussions were guided by a summary of the barriers and accompanying photos.

After the smaller homogeneous group sessions, participants reconvened for a plenary session to assess the solutions, improve their feasibility, and propose next steps for their implementation. The moderator took measures to minimize possible power asymmetries among a heterogeneous group of people with differing knowledge and status. For example, professional members spoke after non-professional members to reinforce the participatory and egalitarian nature of the workshop. This also allowed health management team members to use their deeper knowledge and experience to assess solution feasibility. This session was audio recorded and later transcribed.

DATA MANAGEMENT AND ANALYSIS

After the photos were taken, the cameras were collected and taken to a specialized studio for processing. The research team used the digital format of the photos during IDIs with the respective photo takers. Photos were captioned using the IDI transcript, which asked: what can we see in the photo? what is happening in the photo? and what does the photo mean to you? During captioning, the research team used participants' words and edited them for clarity and conciseness.

Subsequently, the research team printed the photos that participants prioritized for capturing the most significant immunization barriers and solutions. These were used as stimuli for the FGDs with participants who had characteristics similar to the Photovoice participants.

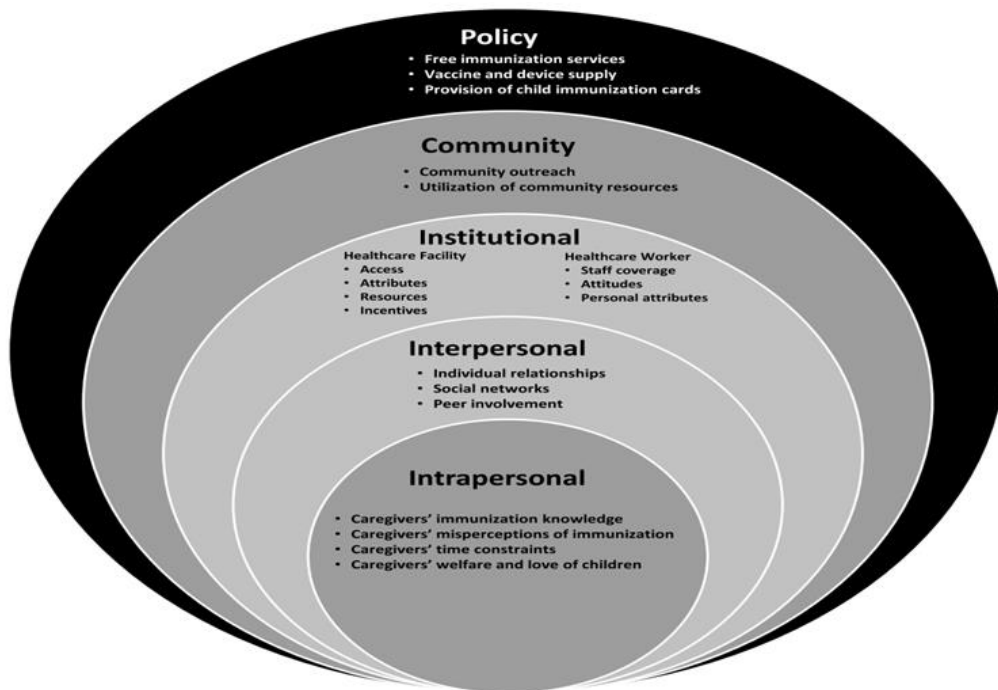
The interviews were recorded, and the audio recordings transcribed into text using Microsoft Word. Interviews conducted in other languages were translated into English for analysis. Digital data were organized and saved in a password-protected shared folder on Google Drive as backup. Only the technical research team had access to the data. During data collection, transcription, and storage, unique identifying numbers were used to refer to study participants to ensure confidentiality.

Data Analysis

The team conducted a thematic analysis by following the below steps:

- Data preparation, which included transcription of the audio recordings and notes collected during the interviews and consultations.
- Data familiarization through reading transcripts.
- Data organization through development of the coding framework, followed by coding and generation of thematic summaries using NVivo version R1(TM) software.
- Data interpretation through detailed reading, constantly comparing codes and formulating propositions to describe the properties and scope of each category (challenges and solutions).
- Thematic grouping of the barriers identified by SEM level, namely individual, relationships, community, and societal.⁴
- Matching potential solutions to specific SEM levels to recommend systematic interventions that could be applied at one or multiple levels.

FIGURE 1: THE SOCIAL-ECOLOGICAL MODEL WHICH HYPOTHEZES THE FACTORS INFLUENCING CHILDHOOD IMMUNIZATION UPTAKE Source: (Olaniyan et al., 2021)



⁴ <https://www.cdc.gov/violenceprevention/about/social-ecologicalmodel.html>

FINDINGS

The overlapping themes about barriers to childhood immunization in three counties in Kenya were divided according to the SEM model into personal barriers (perception of need, attitudes and beliefs, and previous experience with health service); organizational barriers; and financial barriers (direct and indirect cost). The individual and relationship level of the model were grouped together as “personal”; community level as “organizational” and societal as “financial” variables. The individual level identifies biological and personal history factors that decrease the likelihood of being vaccinated. The relationship level identifies close and community relationships that may influence positively or negatively the likelihood of being vaccinated. Financial level included all barriers closely related to poverty context, not only individual but also community-related poverty, which affects the likelihood of being vaccinated. Likewise, community-supported solutions focused on responding to each of these types of barriers. The research included short- and long-term solutions proposed by community members. Long-term solutions included poverty alleviation and infrastructure development. In this report, we focus on short-term solutions.

Barriers

PERSONAL

OLDER CARETAKERS: Frequent reliance on older caretakers such as grandparents created challenges in accessing health care and immunization services for children, which can be difficult for them to understand and manage.



“The grandmother has been left with responsibilities which are on her and being old she doesn’t know it’s time for the children’s immunization. She will just continue with her work and not take care of the immunization of the children.”

LACK OF PARTNER SUPPORT AND GENDER-BASED VIOLENCE: Women facing gender-based violence or lacking support from partners struggled to access health care and immunization services for their children. Men’s lack of involvement is so ingrained in the community that men do not feel bound to support their wives in the immunization process, even when they are idle and not engaged in economic pursuits.



“Most of the male caregivers engage in a lot of gambling in the streets, which consumes most of their time. They forget there is vaccination, so they default because they don’t have time. We have a health volunteer who has come to offer guidance and counseling and to give information about immunization.”

RELIGIOUS BELIEFS AND PRACTICES: Some religious practices hindered health seeking behavior and children’s access to immunization services. Religious beliefs and practices as barriers to immunization were noted by study participants in all three counties.



“In this sect, when a child is born, he/she is committed to prayer. They believe that the child gets good health from God. So, even if they don’t attend health facilities, the child already has protection from God.”

CULTURAL BELIEFS AND PRACTICES: Data on cultural beliefs and practices as barriers to immunization were identified in Vihiga. For example, the use of traditional medicine excludes immunization, and elaborate cultural practices such as prolonged funeral rites take precedence over other routine activities, including taking children for immunization.

MYTHS, MISCONCEPTIONS, AND LACK OF KNOWLEDGE: Lack of full knowledge about modern compared to old vaccination schedules create confusion and suspicion. For instance, some people think that vaccination is a means of sterilization. This is aggravated by health workers who do not bother to explain what vaccines they are giving to the child or why they are doing it in a particular manner. Other barriers to full comprehension include having a vaccinator who doesn't speak the client's language and misconceptions that private health facilities charge for vaccination.

ORGANIZATIONAL

HEALTH SYSTEM-RELATED: Inefficiencies and challenges within the health care system can hinder the delivery of vaccination services and contribute to inequities in immunization coverage. The study identified a range of health-facility-based barriers. Most participants mentioned crowded immunization clinics (mentioned in Nairobi County), vaccine stock outs, poor record keeping, and unavailability of services or service providers.

FINANCIAL

POVERTY AND LACK OF TIME TO GO TO HEALTH CENTERS: Poverty, lack of social amenities, and time constraints were major barriers to immunization reported across counties and study participant categories. Children in poor households are more likely to be under-immunized, and household wealth is a significant determinant of vaccine inequity. Access to health facilities and vaccination points can be challenging due to distance, especially in rural areas (UNICEF 2023). Poverty was either mentioned on its own or in combination with time constraints. The need to earn a living forces the very poor to seek low-paying or unpredictable jobs with long hours that often leave them no time to take children for immunization.

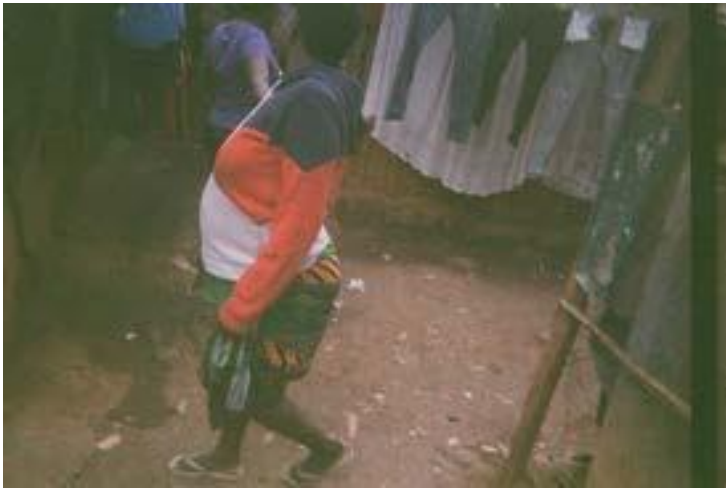


A mother with a jembe (hoe) on the farm. She prioritizes providing food so that her children don't sleep hungry, instead of taking them for immunization.

POOR TRANSPORT INFRASTRUCTURE AND CHALLENGING TERRAINS: Challenging terrain, mainly in Vihiga and Homa Bay, and poor transport infrastructure are common barriers that are compounded by long distances to the health facility in some areas. In Homa Bay areas in the lowlands are prone to flooding from the rivers or Lake Victoria. This

means it is difficult for communities to access health facilities and for health workers to reach communities. Transport costs are usually higher in such circumstances, which is a further barrier to attending clinics.

TEEN PREGNANCY AND MOTHERHOOD: Teen mothers rarely follow through with the immunization process. They leave their children with grandparents, are ashamed and embarrassed of their circumstances, and are stigmatized, which hinders immunization seeking behavior. Research has shown that mothers, especially teenagers, often face sociocultural and socioeconomic obstacles that hinder their ability to immunize their children (Topuzoglu et al). Based on the short-term solution focus of this study, the research team decided to classify teen pregnancy and motherhood as mostly a financial barrier.



“Due to early pregnancy, the girl is ashamed and does not have the courage to even go outside the house. Even when she leaves, she feels very ashamed because of the early pregnancy. That means even when she finally delivers, she will feel ashamed to take the baby for immunization at the health facility and thus the baby isn’t vaccinated.”

LACK OF CHILD SPACING: People who don’t have access to birth control often have overcrowded households. These homes lack space, resources, and infrastructure, which can result in delayed access to immunization and other health care services for children.

ALCOHOL ABUSE AND GAMBLING: Parents or caretakers with alcohol abuse issues may not prioritize or be able to attend vaccination appointments. The research team decided to classify alcohol abuse as mostly a financial barrier (i.e., spending money on alcohol and not on immunization seeking). Alcohol and substance abuse were also mentioned as barriers across participants and counties. Gambling was a barrier in Nairobi’s informal settlements, which some viewed as a form of earning a livelihood, suggesting that gambling would take precedence over seeking immunization.

Community- and Local Health Official-Supported Solutions

These themes highlight the complex and interconnected nature of barriers to childhood immunization in Kenya and emphasize the need for a comprehensive and tailored approach to improve vaccination coverage. Solutions were generated in the Photovoice phase, FGDs, and most importantly at the solutions workshops with all study participants. Most proposed solutions were generated through consensus.

Structural interventions such as poverty alleviation, improved infrastructure, sensitization and health education, local administration involvement in immunization processes, and outreach to communities are needed to overcome these barriers. As noted however, this study focused on short-term solutions, which we grouped into five categories:

CONDITIONAL CASH TRANSFER: Conditional cash transfer programs have been used to increase vaccination coverage among underprivileged families (Chandir et al. 2022). Research has shown that offering small financial incentives to parents and caregivers can significantly boost vaccination rates, particularly among children from low-income

households. These types of cash transfers allow caregivers to take time from work and can pay for transport. Participants proposed specific populations for this type of support, among them extremely poor households, older caretakers, teen mothers, and large families. Local health officials in three districts initially considered conditional cash transfers a solution beyond the scope of health service providers. However, community members identified financial limitations, time constraints, and transportation barriers as significant obstacles to vaccination service access. Participants suggested mapping underserved groups first, and using community engagement (see below) to support these groups in the meantime.

IDENTIFYING AND REACHING OUT TO UNDERSERVED GROUPS: Underserved groups that may have lower immunization coverage include those that are socially and economically disadvantaged, isolated, and difficult to reach. Research has shown that disparities in vaccination coverage by social vulnerability have increased, particularly during the COVID-19 pandemic (Cuadros et al. 2022). Participants at receiving and delivery ends discussed and considered the importance of tailoring immunization programs to the needs of specific underserved and marginalized population groups. These included older caretakers, people subjected to gender-based violence, people living in extreme poverty, people who abuse alcohol and drugs, teens who are pregnant and mothers, and large families. They emphasized the significance of improving risk awareness and developing innovative immunization services to increase coverage among these groups. Health authorities participating in solution-focused workshops noted the potential ease of identifying and reaching these groups through the CHV network, which can support targeted outreach efforts. However, participants noted the need to develop specific tools and a framework to pinpoint underserved populations and to secure necessary resources to conduct these outreach campaigns.

COMMUNITY ENGAGEMENT: Community engagement can create social norms that are conducive to vaccination, build trust, correct misinformation, and disseminate timely information on vaccine and immunization strategies. Community engagement efforts have been used in Ebola and polio vaccine campaigns and are recommended for COVID-19 campaigns. They can encourage behavior change, improve vaccine willingness and uptake, and remove access barriers. According to local health officials in the three study districts, the country's CHV platform could be used to implement community engagement activities. Additionally, community participants stated the importance of asking residents to identify what will work to improve vaccination practices in their communities, and to continue building trust and promoting behavior change with local leaders, faith-based organizations, and health committees.

TARGETED HEALTH EDUCATION: Health education can improve vaccination coverage by filling knowledge gaps and shifting attitudes about vaccination. Several studies have demonstrated the ability of health education interventions to increase vaccination knowledge and coverage (WHO 2021). Underserved populations who study participants mentioned for health education included older caretakers, men, religious leaders, traditional medicine practitioners, people who abuse alcohol or drugs, and teen pregnant/mothers. Targeted health education was also considered by local health officials as an important and feasible intervention, and participants suggested that traditional medicine practitioners and birth attendants could serve as community health educators.

HEALTH SERVICE ORGANIZATION: Improved health service provision can increase vaccination coverage. Participants said that health care facilities could offer flexible vaccination times; clear and updated information on vaccination service availability and vaccination reminders; and improved outreach to underserved populations. These included extremely poor households, hard-to-reach households, and teen pregnant/mothers. According to local health officials participating in this process, improved health service provision such as through flexible vaccination times would require the involvement of policymakers. They also said that other solutions, such as providing clear and updated information on vaccination services availability and vaccination reminders, would require government and development partner resources for mass messaging and acquisition of communication devices.



“Educate people about prayers and the hospital. It is important to pray and it is also equally necessary that children are taken to health facilities to get protection against various diseases. God cures but at the hospital is where you get treated.”

LIMITATIONS

Study limitations include the following:

- The study did not include the health workers who administer vaccines in the facilities and during outreaches, so did not capture their experiences through the photovoice portion of the activity; their participation was elicited through KIs and the solutions workshop. These important frontline health workers were in some cases subjects of criticism in the study. The inclusion of photographs taken by health workers may have enriched the study and broadened perspectives.
- Despite concerted efforts, the study only recruited a few female caregivers from the Somali community in South C, where many people live in gated compounds and adhere to cultural-religious practices that restrict women from interacting with people who are not in their families. The female caregivers who were allowed to participate in the FGD were escorted to and from the venue by male chaperones. Lack of proper immigration documentation may also explain the difficulties in recruiting these women.
- The use of disposable cameras did not allow Photovoice participants to see their pictures until they were processed, limiting the field supervision the research team could offer. Participants expressed a preference for digital phone cameras, with which they were more familiar. Because of this:
 - The study had a lot of blurred photos that could not be used in the analysis, meaning a lot of data was lost. Digital cameras may be preferable for future studies.
 - Some insightful data was inadmissible because it raised ethical concerns. This was particularly the case for data capturing caregivers’ mental health challenges as a barrier to immunization.
 - One element of Photovoice is its ability to empower people by providing skills in photography and a camera to convey their health and other socioeconomic and political experiences to community members and policymakers. However, this study opted to use disposable cameras only during the discrete data collection period, so participants did not keep any cameras long-term or photos of their experience.

DISCUSSION

Most solutions identified in this study focused on those related to personal and financial capacity, since participants considered health system-related limitations out of their control. These solutions were grouped into five categories: conditional cash transfer; identifying and reaching out to underserved groups; community engagement; targeted health education; and health service organization.

The study's findings are consistent with existing literature on barriers to childhood immunization. For example, a systematic review in sub-Saharan Africa found that parents/caretakers' barriers included lack of knowledge of immunization, distance to access point, financial deprivation, lack of partner support, and distrust in vaccines and immunization programs.⁵ Another study found that children in indigenous households are less likely to access preventive and curative care, with inadequate public health subsidies locking them out of the health system.⁶ Another study⁷ found that adverse socioeconomic factors, low level of education, lack of awareness of diseases and their vaccines, religious and cultural beliefs, and individual/group influences were commonly cited obstacles to vaccination acceptance. A study in Nigeria by Sulaimon Adedokun et al. found that children of women 15–24 years of age were more likely to be incompletely immunized than children of older women. According to participants in this research, the solutions include: 1) better community engagement, specifically with the priority groups mentioned in the research and including improved education, communication, and support; and 2) health system/service adjustments to enable and expand access and uptake of services. Most solutions are familiar in the literature but may not be implemented systematically at local levels. Participants considered them feasible to implement, some with existing resources such as the CHV network, and others with additional resources.

Aligned with this recommendation, participants proposed mapping underserved community groups as the second most-important solution. This is related to the next proposed solution: community engagement, which is a prerequisite for identifying underserved groups, which calls for cohesion and trust. The people who participants identified as underserved have challenges and needs including limited access to resources and increased risks, and require specific support and protection to ensure their well-being and equal participation in society. The correlation between barriers and solutions calls for work with community leaders, health care providers, and other trusted individuals to build trust and mitigate concerns. Real barriers such as work schedules, transportation, and lack of access to technology also contribute to low vaccine uptake. Addressing these barriers can help to increase vaccine uptake. While some solutions were broad in nature, such as poverty alleviation, many proposed interventions and efforts are feasible within the context of the health system, such as:

INCREASING ACCESS TO VACCINATION SERVICES: Ensure that vaccination services are readily available and accessible to all community members.⁸

DELIVERING VACCINATIONS AT CONVENIENT LOCATIONS: Offer vaccination at sites that are convenient for community members, such as clinics, pharmacies, and community centers.

OFFERING VACCINATION AT HOME: Home vaccination services are convenient for individuals with mobility limitations or busy schedules.

5 Adedokun S. et al. Incomplete childhood immunization in Nigeria: a multilevel analysis of individual and contextual factors. *BMC Public Health* (2017) 17:236.

6 Bangura et al. Barriers to childhood immunization in sub-Saharan Africa: A systematic review. *BMC Public Health* (2020) 20:1108.

7 Guzman-Holtz A et al. Barriers to vaccination in Latin America: A systematic literature review. *Vaccine* 38 (2020) 470-48.

8 Abdullah M, Ahmad T, Kazmi T, Sultan F, Afzal S, Safdar RM, et al. (2022) Community engagement to increase vaccine uptake: Quasi-experimental evidence from Islamabad and Rawalpindi, Pakistan. *PLoS ONE* 17(12): e0274718. <https://doi.org/10.1371/journal.pone.0274718>

EDUCATION, REMINDERS, INCENTIVES, AND CO-INTERVENTIONS: Develop targeted educational materials, send reminders, offer incentives, and implement co-interventions to change vaccine-related behaviors.

Public health practitioners should engage with the public, listen to feedback, and adapt programs accordingly. They should establish local public oversight committees (leveraging existing Community Health Committees [CHCs] for this role) so that community members can lead solutions and frame vaccination as a public good.⁹ Public health practitioners can continue to earn community trust and improve vaccine uptake by building relationships, centering community voices, working toward equity, and being transparent about progress and setbacks.¹⁰

While most studies on vaccination barriers use survey methods, this study took a different approach. It partnered with communities to identify localized barriers and solutions. It used the Photovoice method, which, when coupled with qualitative methods such as interviews, has the potential to capture nuances within a community that interview-based methods alone cannot. This study provided a deep understanding of the challenges and experiences of people who are often missed by immunization efforts. Its findings may have increased community acceptance because its members helped identify and offer solutions to their vaccination challenges. Based on the findings of this study, other study methods, such as surveys, could be used to subsequently explore or quantify the prevalence of the issues identified in this study.

CONCLUSIONS AND RECOMMENDATIONS

In conclusion, the research conducted in three counties in Kenya aimed to identify the major barriers to childhood immunization and propose solutions from a user perspective. The study found that the main barriers to vaccination services were related to personal capacity, organizational capacity, and financial capacity. By engaging with local communities and using the Photovoice method, the study was able to identify barriers and solutions specific to the local context. The findings are consistent with existing literature on barriers to childhood immunization. The solutions proposed by community members focus on addressing personal and financial capacity, as well as improving access to vaccination services, delivering vaccinations at convenient locations, and offering home-delivered vaccination efforts. This study's findings affirm barriers that have been identified globally and in Kenya as contributing to non- and under-vaccination of children. These include poverty, limited access to health services, and lack of knowledge and trust in vaccines.

The study recommends that decision-makers and other involved entities use its barriers and solutions to guide interventions to improve immunization coverage. In finding solutions for any public health-related problem, it is crucial to seek and use the input of the people who are affected. Thus, the importance of participatory research and community engagement methods cannot be overstated.

⁹ <https://nap.nationalacademies.org/resource/26068/interactive/vulnerable-communities.html>

¹⁰ Idem

ANNEX 1

Ethical Considerations

Ethical considerations are of utmost importance when using Photovoice. The study protocol was submitted for approval to the AMREF Ethics and Scientific Review Committee and we did not commence fieldwork until receiving the approval. All research team members were trained on human subjects research, and before data collection, all data collectors were further training on the importance of voluntary choice, privacy, and confidentiality. A research permit was also sought and received from the National Commission of Science, Technology, and Innovation before the study began.

Informed Consent

Research team members considered each participant's choices and opinions and refrained from hindering or influencing the actions of participants. All Photovoice, IDIs, KII, and FGDs participants were informed about the study objectives, processes, procedures, requirements, benefits, risks, and how the findings would be used via the participant information and consent form (see Appendixes A and B) to ensure they made informed choices. Participants were informed that participation was voluntary and they could stop taking part in the study at any time. They were also asked to provide consent for audio recording and/or note-taking during the interview, and those who declined were excused from the data collection.

Consent forms were provided and read aloud to ensure participants understood what the study entailed. The consent forms were available in English and local languages (Kiswahili, Dholuo, and Kinyore). Those who were unable to sign the consent form stamped their thumbprint.

Risks

This study involved no more than minimal risk of harm to participants. However, there was a time burden on participants who volunteered to participate in the Photovoice, IDIs, and FGDs. The other risks associated with this activity included participants being uncomfortable taking photos of their environment and that sensitive information would be shared in the photos or during the sessions. To mitigate these risks, the research team worked with the research assistants and co-researchers to provide demonstrations and conducted discussions and role-playing with participants during each session.

In addition, there was a minimal risk of community criticism as a result of sharing culturally sensitive beliefs through photographs. This risk was minimized through sensitivity training for research assistants and co-researchers. During the study orientation, Photovoice participants were trained on the ethics of photography, including how to take photos while protecting participants' and subjects' identities. Participants were briefed on how to take photographs in the community without drawing unnecessary attention, as the use of cameras in the community sparked people's interest. When study photographs were displayed during the validation meeting, subjects' faces and markers of identity were blurred.

Study participants were also informed before the interview that if they were uncomfortable answering any questions, they could skip them and could stop the interview, which were conducted in a safe, private place, at any time. Our informed consent emphasized that the study would have no bearing upon participants' status in their community and that participation was voluntary and would not affect their or their family's access to health care or other support services. All persons working on the project were informed about and asked to maintain strict confidentiality and signed a confidentiality agreement prior to fieldwork.

Benefits

There were no direct benefits or compensation to the subjects for participation. However, as mentioned, participants were entitled to transport reimbursement and refreshments/meals. At the end of the data collection, they received a framed photograph and certificate for their participation in the study.

Protection of Privacy and Confidentiality

Confidentiality of the study participants was maintained at all levels during data collection. All persons working on the project were asked to protect confidentiality and keep the study information private in line with research ethics, and to the fullest extent allowable by law. All researchers handling data signed a form stipulating how they would enhance confidentiality. Data were collected in halls and offices that were procured by LVCT health or suggested by respondents and assessed for privacy and confidentiality by research team members. Study participants were assigned unique codes and personal identifiers were not included in the recorded interviews, discussions, or notes.

Adverse Events

While many measures were taken to reduce adverse events, it is possible that participants experienced psychological discomfort from participating in the study. Plans were in place to report unanticipated problems involving risks to participants or others, serious or continuing noncompliance, and any other internal review board-reportable incident to the study investigator and the local ethics committee.

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