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A qualitative assessment of influenza vaccine uptake among children in Kenya

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ABSTRACT

Background: Influenza is a significant contributor to acute respiratory infections (ARI), and children < 5 years are at increased risk of severe influenza disease. In Kenya the influenza vaccine is not included in the Kenya Expanded Programme on Immunization (KEPI). To inform roll-out of a national influenza vaccination program, we implemented an influenza vaccine demonstration project in Nakuru and Mombasa counties in Kenya from 2019 to 2021 and set out to establish factors driving influenza vaccine acceptance and hesitancy among caregivers of children aged 6–23 months.

Methods: Using semi-structured questionnaires, we conducted eight focus group discussions among community members and twelve key informant interviews among healthcare workers to elicit both lay and expert opinions. Thematic analysis of the interviews was conducted using the World Health Organization's "3 Cs" model of vaccine hesitancy to determine reasons for acceptance or hesitancy of the influenza vaccine.

Results: The influenza vaccine was well received among community members and healthcare workers though concerns were raised. Vaccine hesitancy was fuelled by misconceptions about reasons for introducing the vaccine (confidence), perceptions that influenza was not a serious disease (complacency) and administrative fees required at some facilities (convenience). Despite the use of various advocacy, communication and social mobilisation strategies targeted at educating the community on the influenza disease and importance of vaccination, there remained a perception of inadequate reach of the sensitization among some community members. Contextual factors such as the COVID-19 pandemic affected uptake, and parents expressed concern over the growing number of vaccines recommended for children.

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Conclusion: Despite lingering concerns, caregivers had their children vaccinated indicating that vaccine hesitancy exists, even among those who accepted the vaccine for their children. Efforts targeted at increasing confidence in and reducing misconceptions towards vaccines through effective communication strategies, are likely to lead to increased vaccine uptake.

Background

Influenza is an important cause of acute respiratory infections (ARI), resulting in substantial morbidity, mortality and economic burden globally [1]. Children less than five years, pregnant women, the elderly, and persons with underlying medical conditions are at increased risk of severe influenza disease [2]. In Kenya, the highest rates of influenza-associated hospitalization are among children less than 2 years [3,4] and vaccination could substantially reduce this burden [1,5]. Despite local evidence of disease burden and availability of an effective and safe vaccine, influenza vaccination is not yet included in the Kenya Expanded Programme on Immunization (KEPI) for children.

Though vaccines are one of the most effective public health interventions in use [6], vaccine uptake has declined driven by concerns around the safety and need for vaccines given the reducing burden of vaccine preventable diseases in some communities [7–10]. Misinformation about vaccines has increased globally, more so with the advent of social media and more recently, the Coronavirus Disease 2019 (COVID-19) pandemic [11–14]. Additionally, as the number of recommended childhood vaccines increases, concerns around immune overload have arisen [14].

Vaccine introduction into a country often requires a demonstration project [15], focusing on logistics, delivery mechanisms and scheduling considerations [16]. In addition, understanding reasons for vaccine acceptance or hesitancy among the local population is crucial for providing insights into healthcare decision-making and the local communities' perception of need. These remain key factors for tailoring inclusive, context specific and effective communication messages for a successful vaccine program [6].

Based on a request from the Kenya National Immunization Technical Advisory Group (KENITAG) for more evidence to support inclusion of the influenza vaccine in KEPI, an influenza vaccine demonstration project was conducted in Kenya among children 6–23 months of age between 2019 and 2021 [17].The demonstration project compared the performance of two vaccine delivery strategies; year-round and campaign, with an aim to make recommendations on the best strategy for national roll-out of the influenza vaccine.

As part of the demonstration project, we conducted a qualitative study seeking to understand the factors associated with influenza vaccine acceptance and hesitancy to inform future communication strategies and vaccine program approaches. We employed the "3 Cs" vaccine hesitancy model as described by the World Health Organization (WHO) Strategic Advisory Group of Experts (SAGE) on Immunization [10,18] to explore the reasons caregivers chose to either vaccinate or not vaccinate their children with the influenza vaccine. The "3 Cs" model encompasses: confidence as related to trust in the efficacy and safety of vaccines and the systems that deliver them, complacency which arises from a perception of low disease severity hence deeming the vaccines as unnecessary and convenience related to access to the vaccines whether physically or economically [10]. (Supplementary Table 1) [10].

Using the 3Cs model, we explore both the reasons for influenza vaccine acceptance and hesitancy (uptake) among caregivers of children 6–23 months of age during the influenza demonstration project. These findings could inform strategies to increase vaccine coverage and optimise the control of vaccine preventable diseases.

Methods

Study setting

This study was implemented alongside an influenza vaccine demonstration project in Kenya which was conducted from November 2019 to October 2021 and compared vaccine uptake using year-round and campaign vaccination strategies [19]. The influenza vaccine (Sanofi's Vaxigrip®) was administered to children 6–23 months of age, in two doses four weeks apart as part of routine immunization services at health facilities. The year-round strategy provided the vaccine throughout the year, while the campaign strategy provided it for only four months in 2021.

The demonstration project took place in Nakuru and Mombasa counties which represent culturally and geographically diverse communities. Nakuru county, in the Rift Valley region, is geographically vast and composed of a largely rural Christian population [20]. Mombasa county is a densely populated urban county located in Kenya's coastal region. It comprises a heterogenous population from all over the country, and half its residents are Muslim [20]. Coverage of routine vaccines among children in both counties is higher than the national average (80 % fully immunized), and slightly higher in Mombasa (93 %) compared to Nakuru (91 %) [21].

The year-round strategy was implemented in Nakuru's Njoro sub-county and Mombasa's Jomvu sub-county. The campaign strategy was implemented in Nakuru North sub-county in Nakuru and Likoni sub-county in Mombasa (Table 1). In the two counties, all public, private and faith-based health facilities offering immunization services were included. The overall coverage of the first dose of the influenza vaccine was 59.7 % for the year-round and 63.2 % for the campaign strategies respectively [17]. Sensitization of the community about the influenza vaccine was done through posters, roadshows, and door-to-door visits by community health volunteers (CHVs).

Data collection

Between May and September 2021, we conducted structured focus group discussions (FGDs) among community members and key informant interviews (KIIs) among healthcare workers in the target sub-counties. FGDs were utilised to allow examination of community experiences, while KIIs were selected to elicit expert opinions from those implementing the existing vaccination program.

CHVs not involved in the demonstration project selected participants

Table 1
Summary of influenza vaccine demonstration project in Nakuru and Mombasa counties Jun to Oct 2021.

Indicator	Summary			
Strategy	Year-round strategy		Campaign strategy	
County	Nakuru	Mombasa	Nakuru	Mombasa
Sub-county	Njoro	Jomvu	Nakuru North	Likoni
Duration	Nov 2019 – Oct 2021	Dec 2019 – Oct 2021	Jun – Sep 2021	Jul – Oct 2021
FGD Participants	11 male, 12 female	11 male, 12 female	13 male, 12 female	13 male, 9 female
KII Participants	1 male, 2 female	1 male, 2 female	3 females	1 male, 2 female

FGD – Focus group discussion, KII – Key informant interview.

for the FGDs from members of the community who were caregivers/parents of children aged < 2 years, regardless of whether their children had received the influenza vaccine or not. FGDs, each composed of 10–12 individuals, were conducted for each gender separately to allow gender-specific issues to emerge.

Key informant interviews were conducted with individual healthcare workers (HCW) providing immunization services, purposively selected by the county KEPI officer. These healthcare workers were selected from either a publicly, faith-based or privately owned dispensary, health center, or sub-county hospital to represent several levels of health service delivery.

A qualitative researcher not involved in implementing the demonstration project conducted the FGDs and KIIs at facilities with the help of a research assistant at selected health facilities. Two FGDs (one each for males and females) were held per sub-county, lasting 45–90 min, exploring the perceptions of caregivers about influenza disease, perceived benefits and risks of influenza vaccines, and factors considered when deciding to vaccinate their children. Three KIIs were held per sub-county lasting 30–60 min, assessing healthcare workers' perspectives on influenza disease and their experience of providing influenza vaccine at their facility. Emergent themes were explored across both interview groups for consistency and reliability.

Data analysis

All interview sessions were audio recorded and notes taken. Audio recordings were downloaded after completion of fieldwork and stored securely. The audio files were then deleted from the recorder. One researcher performed clean transcription of the audio files, which a second researcher then reviewed.

Interviews were read to explore emergent issues and we utilized deductive coding to assign themes based on the WHO "3 Cs" of vaccine hesitancy [18]. We defined vaccine hesitancy as the delay in acceptance of refusal of vaccination despite availability of vaccination services [10,22]. The coding process identified themes related to uptake or refusal of the vaccine in the target communities. Results from the FGDs and KIIs were interpreted alongside each other rather than in contrast.

Data were analysed using NVIVO version 12.5.0. Verbatim quotes have been included in the results to demonstrate key findings from the study and are reported based on the interview group (e.g. male FGD, female FGD, or KII with HCW), sub-county (i.e. Njoro, Nakuru North, Jomvu or Likoni) and vaccination strategy (i.e. whether year-round or campaign).

Ethics statement

All study participants were aged > 18 years and gave their consent before participating in the study. Ethical clearance was obtained from the Kenya Medical Research Institute Scientific and Ethics Review Unit (KEMRI/SERU/CGHR/344/4087) and U.S. Centers for Disease Control and Prevention institutional review board (Project ID: 0900f3eb8194b62d).

Results

A total of eight FGDs and 12 KIIs were conducted across the two counties. Forty-eight males and 45 females participated in the FGDs. Their children were aged 18 months on average and 70 % of participants reported that their children had received the influenza vaccine. We did not collect the caregivers' ages or level of education. Nine female and three male participants were interviewed during the KIIs from dispensaries (n = 4), health centers (n = 6), and sub-county hospitals (n = 2). Their age ranged from 25 − 55 years and all of them had tertiary level education.

Factors affecting influenza vaccine uptake

Confidence factors

Trust in the effectiveness and safety of vaccines: Some community members reported they trusted the science behind vaccine production and testing to deliver safe and effective vaccines.

> "*We also hear that there are government laboratories so before any vaccine is introduced it must have been investigated for safety in those laboratories. For me I just believed what the government said and brought my child to be vaccinated.*" **Women's FGD, Nakuru North sub-county (Campaign)**

Key informants however, noted that inadequate knowledge on the vaccine made the community hesitant to accept it, but with provision of adequate information, they were likely to receive the vaccine.

> "*Many people in our community want to get enough knowledge first before they accept the influenza vaccine… however, after sensitization and education, many started accepting it*". **KII HCW, Likoni sub-county (Campaign)**

Other community members were concerned about side effects observed with the influenza vaccine leading them to question having their children receive it.

> *Some refuse because of the side effects, how the child reacts after being immunized. Some say that once the child was immunized, they have a long illness of "homa" (flu), they became weak, so they are afraid of these side effects. These side effects from the influenza vaccine are the ones the child takes long to recover from, the child is weak….*" **Women's FGD, Nakuru North sub-county (Campaign)**

Healthcare workers reported witnessing few adverse events, low resistance to uptake, and overall high demand for the vaccine.

> "*I will say it is a positive impact and I have not gotten [reports of] any side effects or allergies. I will say it is a good vaccine.*" **KII HCW, Jomvu sub-county (Year-round)**
>
> "*Acceptability is good. You see we are only doing it in Njoro, but you will get children coming for the first dose from the neighbouring sub counties like Elburgon, Molo and Narok. If you ask them why they have come from there, they say they have come for influenza vaccine − this shows there is demand…*" **KII HCW, Njoro sub-county (Year-round)**

Community members highlighted the role parents could play in increasing awareness and confidence in the influenza vaccine.

> "*Those who have received the vaccine and have not experienced any side effects, should come forward and help in eliminating the fear by sharing their experience…this would have a positive impact on the uptake of the [influenza] vaccine.*" **Men's FGD, Jomvu sub-county (Year-round)**

Trust in the systems that deliver the vaccines (reliability & competence of the health services and health professionals): Various strategies were used to communicate the availability and benefits of influenza vaccination including CHVs, road shows and posters. Most parents had heard about the influenza vaccine and reported being aware that the vaccine was available for children and protected against severe respiratory illness. Facility healthcare workers were considered trusted sources of information on the vaccine.

> *"In Njoro, we heard about the influenza vaccine from those whose children had been vaccinated. They did road shows and explained very well about the vaccine. The doctors also talked about it and they even put up many posters in many shopping centers. For us every time we came to the clinic here in Njoro the healthcare workers took time to educate us about influenza, this really helped us and we then spread the word about the availability of a vaccine for influenza."* **Women's FGD, Njoro sub-county (Year-round)**

Conversely, CHVs were considered inadequately qualified to provide

crucial vaccine information. Some community members also had a negative perception of CHVs due to encounters with them in past government-led initiatives, such as food distribution exercises, during which community members perceived CHVs as not being impartial.

> **"***CHVs do not have much knowledge about vaccines because they are common people in the community but when the doctors come people will listen to them. Doctors will explain better in words that will make the community members understand.***" Women's FGD, Jomvu sub-county (Year-round)**
>
> "*Despite the availability of the CHVs, at times the community tend not to give them an audience since they are also biasedly involved in other social-economic benefits that are issued by the government aimed at benefiting the community especially during the COVID-19 pandemic.*" **FGD women's, Likoni sub-county (Campaign)**

Regardless of the efforts made at communicating about the influenza vaccine, an important factor that fuelled vaccine hesitancy was the perceived lack of adequate sensitization and education about the vaccine, leading some community members to have low levels of trust in the health services. Concerns regarding insufficient information about the vaccine were frequently raised because the vaccine was considered new. Although participants of both genders requested more information on the influenza vaccine, it appeared that men, more so than women, felt that they had received insufficient information regarding the influenza vaccine across the implementation strategies.

> "*We are used to other vaccines that have been in existence for many years… we know polio and other vaccines like BCG, however, for the influenza vaccine, it is new to us and the government must provide enough information*". **Men's FGD, Njoro sub-county (Year-round)**

In campaign sub counties, even among parents and caregivers who had accepted the vaccine for their children, they felt that the exercise had been hurried without proper community engagement leaving many with unaddressed questions.

> *"Mobilization is to be done early enough to allow the community to understand the message before the vaccination is rolled out but not the way it has been done with the influenza vaccine."*. **Women's FGD Likoni sub-county (Campaign)**

Trust in the motivations of policy makers who decide on the needed vaccines: While some community members considered the government and doctors as trustworthy sources of information on the new vaccine, some parents reported taking their children for influenza vaccination despite their lingering doubts and unanswered questions. An **FGD with men in Nakuru North (Campaign)** noted that:

> *"For the influenza vaccine we have accepted it because the doctors said so although we don't really know much about it. Many are ignorant even after reading the posters and they have declined the vaccination. It is also confusing to some why this vaccine is being offered only here. Those in the bordering areas are wondering if it is indeed the Government offering it, why then is the vaccine being provided in selected areas."*

The influenza vaccine was rolled out during the COVID-19 pandemic and this had various effects including low turnout in some facilities due to pandemic containment measures. Distrust of the influenza program and the government was observed among some community members, including in Likoni sub-county. Community members hinted at the government introducing new vaccines for financial gain even though the vaccine was being offered at no cost at public health facilities or disguising the COVID-19 vaccine as the influenza vaccine.

> "*Some people say that the government is aiming at financial gains at the expense of the vaccine.*" **Women's FGD, Likoni sub-county (Campaign)**
>
> "*There are many vaccines these days and we have heard that some older people have declined the COVID-19 vaccine and now the government is targeting children. Also, some CHVs were unable to tell us the difference between these two diseases during community mobilization which made us conclude that that the influenza vaccine might be the COVID-19 vaccine. We must be worried until we get the full information especially because influenza vaccine is a recent one not like polio*". **Men's FGD, Likoni sub-county (Campaign)**

A healthcare worker in Likoni confirmed that acceptability of the vaccine was compromised by these perceptions:

> *"They have accepted. However, some have fears about vaccines. They think that the influenza vaccine is connected to the COVID-19 vaccine which makes some develop fears.*" **KII HCW, Likoni sub-county (Campaign)**

The mode of vaccine introduction in particular sub-counties and the difference in services provided between public, faith-based and private health facilities was questioned by community members. As the influenza vaccine was already available in the private sector, the government requiring a demonstration project to generate data to justify its inclusion in the public sector was not well understood.

> "*Why should the government allow private hospitals to sell the influenza vaccine and when it comes to public hospitals, they must conduct research*?" **Men's FGD, Likoni sub-county (Campaign)**

While HCWs believed that the influenza vaccine would benefit from the trust associated with the well-established childhood immunization program, community members raised concerns as to why the vaccine would be specifically targeted towards children given that the disease affects everyone.

> "*For the influenza vaccine, some people fear and ask questions like why should the vaccine target children and not all people as in the case of COVID-19…*" **Men's FGD, Likoni sub-county (Campaign)**

Conversely, fear of COVID-19 led to uptake of influenza vaccine among some community members as parents tried to protect their children from severe respiratory disease.

> *"According to the context of the COVID-19, we tell the mothers that influenza is also a deadly disease that can affect their children. Because it is also a respiratory disease like COVID-19, so, with that information and the current context of COVID-19, they come in big numbers."* **KII HCW, Jomvu sub-county (Year-round)**

Complacency factors

Perceived low risk of disease: While some community members during the FGDs spoke to the benefits of the vaccine, others also considered the infection easily treatable using over-the-counter medication and home remedies. As such they did not consider influenza vaccine a high priority compared to other vaccines used to prevent diseases such as polio.

> *"Polio disease is a serious one and can negatively affect the child, but influenza is a normal disease with no or fewer effects on a child's health."* **Men's FGD, Likoni sub-county (Campaign)**

Conversely, in sub-counties employing the year-round strategy the influenza vaccine was positively perceived because influenza was viewed as a potentially serious disease and the vaccine was perceived to be effective in reducing the number and severity of respiratory infections:

> "*Because you hear mothers saying that after their babies received the vaccine, they no longer have cases of running nose and flu. I also have experience with my baby who had challenges with flu and running nose frequently but after receiving the vaccine, they no longer have the problem and we no longer have to come to the hospital frequently."* **Women's FGD, Njoro sub-county (Year-round)**

Religious influences and low education levels among the targeted

population were seen to contribute to low vaccine uptake with some community members considering the vaccine unnecessary.

> "*Religion, some believe that God heals all diseases and vaccines aren't that important.*" **Women's FGD Jomvu sub-county (Year-round)**

Convenience factors

Physical availability of vaccine: In Njoro a HCW observed that at some point, influenza vaccines were out of stock for months which diminished vaccine access.

> "*Some children didn't get the second dose because we ran out of the influenza vaccine for some months. Mothers could come at 6 months because they now knew about the vaccine. So, the mothers went and when they come for measles at 9 months then is when we realized that the child never got the influenza [vaccine] because it was not available*". **KII HCW, Njoro sub-county (Year-round)**

Willingness to pay: Private health facilities that usually required payment for vaccination services reported a lower turnout as community members had to pay an administrative charge to receive the influenza vaccine, while in public health facilities no payment was required.

> "*Also, another challenge is that in our facility there is an amount scheduled for people to pay for vaccines. So, we have been having low turnout for influenza because people think they are supposed to pay for it.*" **KII HCW, Nakuru North sub-county (Campaign)**

Ability to understand: Healthcare workers reported that although information education and communication (IEC) materials for the influenza vaccine demonstration project had been provided in both English and Swahili they occasionally needed to interpret the posters for community members who could not read.

> "*They are normally in English and this is usually a challenge as most of them are not written in Kiswahili though the influenza one has a Kiswahili version, the others do not. But anyway, even if it is written in English…a few may read and those that cannot we try to interpret.*" **KII HCW, Njoro sub-county (Year-round)**

Study participants proposed various communication strategies to promote vaccine uptake including the use of village leaders, churches and the radio.

> "*Posters are not everywhere but only in the shopping centers. What about those who are in the rural areas and do not come to the shopping center? Like there are old women who … don't know how to read posters but they listen to the radio. So, if it is not advertised in the media how will she know about this vaccine?"* **Men's FGD, Nakuru North sub-county (Campaign)**

Appeal of immunization services: Community members noted that influenza vaccination services were well organised with nurses dedicated to administering the vaccine.

> "*According to me, the influenza vaccine is good and well organised. We even have more nurses who specifically offer the influenza vaccine.*" **Women's FGD, Jomvu sub-county (Year-round)**

However, healthcare workers and community members also highlighted that the increasing number of childhood vaccines was raising concerns among caregivers.

> "*But also, these vaccines are too many, why can they not be combined so that the babies do not have to receive so many injections? Like combine this influenza vaccine with another one so that the children are more comfortable and they do not cry so much because of the many injections.*" **Men's FGD, Nakuru North sub-county (Campaign)**

Geographic accessibility: Limited access to facilities in some areas hindered vaccine uptake, while proximity to facilities or planned outreaches was thought to increase uptake.

> "*No, there are places that don't have many facilities. Like we have a challenge in Neswit where we only have one facility and it is a very vast area.*"
> "*Yes, like I said, by opening more facilities that are nearer to the community, then people will prefer to go to those facilities.*" **KII HCW, Njoro sub-county (Year-round)**

Discussion

Our study highlights vaccine acceptance alongside hesitancy, which was exacerbated by local resistance to the COVID-19 vaccine. We elicited reports of inadequate sensitisation of the public from residents of sub-counties implementing the campaign strategy and among men, regardless of sub-county and strategy. Healthcare workers from campaign sub-counties corroborated these reports. Our findings revealed persistence of vaccine distrust even among those whose children received the influenza vaccine, which suggests more needs to be done to allay concerns about vaccination even among those who receive vaccines. Concerns about an increasing number of vaccines, or "vaccine overload," were also identified, indicating a need for careful consideration of future additions to the national immunization program.

Global literature suggests that perceptions of low risk of the disease among most risk groups plays a major role in reducing influenza vaccine uptake [23,24]. Our observation that communities or individuals that had been exposed to (or knew of) the severe effects of influenza spoke positively about the vaccine, suggests that better understanding among members of the public about the burden of influenza disease in very young children is important for success of the program. Disseminating findings of the national influenza surveillance program [25] to the general population in addition to scientific audiences would increase community awareness of the burden of influenza disease. Increased disease awareness is known to improve vaccine acceptance and would support the need for continued influenza surveillance as part of an influenza vaccination program [4,16,26].

Insufficient information leads to poor uptake of new vaccines [27,28]. Perceptions of low access to information were more pronounced among campaign sub-counties and male parents, who have limited opportunities to interact with the healthcare system compared to their female counterparts. For women, interaction with the health system occurs at numerous points including antenatal and postnatal visits, during delivery and when bringing infants for childhood vaccination. This offers numerous opportunities to interact with and build trust in the health system, services and professionals. During such visits, health talks may be provided, increasing women' knowledge and confidence on issues such as recommended vaccines. We chose channels of communication that limited sensitisation to intervention sub-counties to avoid information leakage into non-intervention sub-counties and this might have inadvertently led to less effective outreach among men. This highlights the importance of using various methods of communication including tailoring messaging by gender and allowing sufficient sensitization time.

Timing of influenza vaccine introduction in relation to contextual factors, such as the COVID-19 pandemic, played an important role in the community's perception of the vaccine. This was especially evident in Likoni sub-county, but not as significant in Nakuru North despite concurrent implementation using the campaign strategy. Sub-counties implementing the year-round strategy did not report similar concerns, likely because influenza vaccination had begun more than a year before the COVID-19 vaccine was available to the public. This illustrates the different responses to vaccination that may be anticipated in Kenya when a national program is rolled out. Rumours about new vaccines, or new target populations for old vaccines have been prevalent in the recent past in Kenya [29,30], and would likely affect a national influenza vaccination program. This highlights the need to carefully time introduction of a new vaccine and ensure sufficient information about

the disease and the vaccine is available in advance of vaccine roll out [31]. However, we acknowledge that this may not always be feasible, as in the case of a pandemic. Our results show that addressing the community's difficulty in distinguishing between influenza and COVID-19 is a key consideration for community acceptance.

Our findings also suggest that vaccine "overload" is an emerging cause of vaccine hesitancy, especially as the number of vaccines recommended for children increases. The World Health Organization currently recommends at least 9 vaccines for children less than 12 months of age with even more recommended in particular high-risk settings [32]. There are reports of parents declining vaccines for their children because they deemed them to be getting too many injections, especially if multiple vaccines are administered during the same clinic visit [7,33]. While multivalent vaccines reduce the number of injections a child receives, they may not fully allay parents' concerns about the number of vaccine antigens administered to children in the first year of life. We anticipate that as more vaccines become available for children, the vaccine overload issue will gain more prominence.

Healthcare workers play an important role in influenza vaccine uptake among children [13,23,34,35]. In our demonstration sites, trust in healthcare workers led to influenza vaccine uptake despite lingering doubts. Doubts around accepting vaccines for their children remain prevalent among parents leading them to either delay or refuse vaccination, or have their children vaccinated while unsure [36]. Many of these concerns revolve around questions on the need for the vaccines [8,37], potential side effects [36,37,8], and religious beliefs [8]. Healthcare workers remain a key influence on parents [38] and sharing stories of vaccinating their own children has been shown to boost confidence and acceptance among parents [39].

Vaccine stock-out experienced during the implementation period was shown to reduce the physical availability of the vaccine causing some children to miss the second dose. Additionally, the nominal administrative cost to access the vaccine at private health facilities also hindered uptake of the vaccine. This is in keeping with previous studies, including in Kenya that have shown vaccine stock-outs lead to missed opportunities to vaccinate resulting in low vaccine coverage [40–43]. Other literature also notes that additional costs like administrative fees tacked onto free services like vaccination, reduces their uptake [43,44].

Regardless of the mode of implementation, the demonstration project was perceived by both community members and healthcare workers to have resulted in a reduction in cases of medically attended influenza-like-illnesses.

Although we used a person not directly involved in implementation of the project to conduct the FGDs and KIIs, social desirability bias could still have influenced the responses from study participants. Moreover, as most of the study participants reported having taken their children for influenza vaccination, we may have missed out on the voices of influenza vaccine refusers who were unequally represented in our FGDs.

Despite these limitations, our study had an important strength. While in many cases vaccine demonstration projects are implemented externally to routine services, posing a challenge to understanding the requirements of health system integration, our project was piloted as part of the routine services offered at health facilities. Our findings therefore reflect an accurate account of real-world implementation of influenza vaccination.

Conclusion

Although community members brought their children for vaccination, they raised concerns around issues like side effects and age of the target population, implying vaccine hesitancy. Ensuring access to comprehensive and timely information about the influenza disease and benefits of the vaccine among parents, may serve to increase confidence and address complacency thereby leading to higher vaccine uptake. Additionally, addressing perceptions of vaccine overload will likely facilitate successful introduction of new vaccines such as the influenza vaccine into the national immunization program.

Disclaimer

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CRediT authorship contribution statement

Nzisa Liku: Conceptualization, Data curation, Formal analysis, Writing – original draft, Writing – review & editing. **Caroline Mburu:** Data curation, Investigation, Methodology, Writing – review & editing. **Kathryn E. Lafond:** Funding acquisition, Writing – review & editing. **Malembe Ebama:** Funding acquisition, Writing – review & editing. **Mamu Athman:** Writing – review & editing. **Salma Swaleh:** Project administration. **Isaac Jewa:** Project administration. **Elen Ngware:** Project administration. **Virginia Njenga:** Project administration. **Elizabeth Kiptoo:** Project administration. **Catherine Munyao:** Project administration. **Christine Miano:** Project administration. **Edwina Anyango:** Project administration. **Samson Thuo:** Project administration. **Wycliffe Matini:** Project administration. **Harriet Mirieri:** Project administration. **Nancy Otieno:** Project administration. **Mwanasha Athman:** Project administration. **Patrick Chanzera:** Project administration. **Zahra Awadh:** Project administration. **Monica Muthoni:** Project administration. **Patrick Kingori:** Project administration. **M. Kariuki Njenga:** Project administration, Supervision. **Gideon O. Emukule:** Funding acquisition, Supervision, Writing – review & editing. **Eric Osoro:** Project administration, Supervision. **Collins Tabu:** Project administration. **Jeanette Dawa:** Conceptualization, Supervision, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jvacx.2024.100507.

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