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TITLE PAGE

Title

Caregiver experiences when navigating childhood immunisation in urban communities in Sierra Leone

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ABSTRACT

Objective: To gain in-depth understanding of the caregiver experience when navigating urban immunisation services for their children.

Design: An exploratory qualitative assessment comprising 16 in-depth interviews using an interpretative phenomenology approach.

Setting: Caregivers were purposively recruited from slums (n=8) and other urban communities (n=8) in the capital city of Sierra Leone.

Participants: Caregivers of children ages 6 to 36 months old who were fully vaccinated (n=8) or under-vaccinated (n=8).

Results: Vaccination intention was motivated by a feeling of moral duty to 'do the right thing' for the child. In one instance, wanting to do the right thing also resulted in an active refusal of vaccination when a caregiver linked vaccination to the death of a prior child. Caregivers with vaccinated children expected that their 'strong and healthy' children would be able to take care of them later in life and believed that this can be facilitated through vaccination. Trusted information exchange and social support coupled with positive clinic experiences facilitated timely vaccination. However, vaccination was constantly hindered by myriad practical constraints that were compounded by negative clinic experiences. Although childhood immunisation is free-of-charge according to national policy, some caregivers willingly gave money to health workers as a token of appreciation while others begrudgingly did so as a perceived condition to receive good quality service. Caregivers desired more convenient and positive clinic experiences and deeper community engagement.

Conclusions: Health system interventions, community engagement, and vaccination outreach need to be tailored to for urban settings. Vaccine communication efforts may resonate more strongly with caregivers when vaccination is framed both around parental responsibilities to do the right thing for the child and the future benefits to the parent.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- This qualitative assessment sheds light on the complexities surrounding caregivers' experiences when navigating childhood immunisation services in urban poor settings and provides insights for improving immunisation outcomes.

- Theoretical guidance from interpretative phenomenology enhanced the assessment design, data analysis, and interpretation of the results.

- Caregivers of fully vaccinated and under-vaccinated children were purposively recruited to help understand how the two outcomes may be shaped by differences in the caregiver experience.

- The sample only comprised one caregiver with a child that had experienced a serious vaccine side effect, which limits having a rich understanding of such experience among caregivers and the potential linkages to future vaccination refusal.

- Only one caregiver had a zero-dose child that had not received any vaccines in the immunisation schedule. Future sampling strategies may therefore need to be more purposively adapted to also focus on understanding the phenomenon of zero-dose children in urban poor settings.

MANUSCRIPT

1. Introduction

There have been efforts to understand urban immunisation challenges in low- and middle-income countries (LMICs), including in urban slums and informal settlements.[1] Assessment of immunisation barriers in urban areas in LMICs identified a range of practical and social issues, such as population mobility, inaccurate denominators of children due to out-of-date population estimates and poorly defined geographic catchment areas, the lack of trust in the health system among vulnerable groups, overburdened health facilities, and weak community engagement and outreach.[2]

In Sierra Leone, the 2014-2016 Ebola epidemic disrupted the delivery of essential health services, including immunisation services, especially in urban areas.[3 4] Barriers that affected routine health services included the fear of contracting Ebola in health facilities, stigmatization of health workers, and shifting of resources to the epidemic.[5] As the Ebola epidemic waned, measles outbreaks became more frequent due to the decline in vaccination.[6] In the aftermath of the Ebola epidemic, the Government of Sierra Leone and its partners made major investments to rebuild health systems and restore public confidence in the health system.[7 8] However, challenges in access to and the uptake of immunisation services persist, including in urban areas.[9]

The United Nations Children's Fund (UNICEF) and partners developed the Caregiver Journey Framework to guide countries in understanding the experiences, processes, and structures that shape how caregivers seek and receive health services for their children, including essential immunisation.[10] In 2018, we operationalized the Caregiver Journey Framework through a qualitative approach in the Western Area Urban district (WAU) in Sierra Leone. We sought to understand the lived experiences of caregivers of vaccine-eligible children as they navigate urban immunisation services in Sierra Leone.

2. Methods

We aimed to understand how household dynamics, social factors, and formal healthcare delivery systems influence childhood immunisation uptake via the lens of primary caregivers of vaccine-eligible children in urban settings in Sierra Leone. Hence, we developed the Immunisation Caregiver Journey Interviews (ICJI) approach[11] based on the Caregiver Journey Framework using principles of interpretative

phenomenology,[12 13] which focuses on elucidating the essence of common experiences to explain, interpret, and make sense of a phenomenon.[14] We used a phenomenological approach to explore the lifeworld of caregivers in how they navigate childhood immunisation for their children repeatedly in low-resource, urban settings.[11] A semi-structured ICJI guide was used to explore the following domains: Decision-making and preparation, making the journey, experiences during vaccination visit, post-vaccination experiences, intentions to return, and perceptions of immunisation promotion activities in the community.

2.1. Setting

The WAU district in Sierra Leone comprises most of the capital city of Freetown with approximately 1.2 million inhabitants.[15] The district was heavily affected by the Ebola epidemic, partly due to high population movements and crowded housing conditions.[16] On average, there is less than one medical doctor per 10,000 population.[17] The Government of Sierra Leone introduced the Free Health Care Initiative in 2010 to remove cost barriers for essential health services for pregnant and lactating mothers and under-five children.[18] Childhood immunisation services are delivered through the Expanded Program on Immunisation using fixed sites that are supplemented by community outreach services to be conducted five times monthly.[19] Each catchment community has 10 community health workers (CHWs) who support the promotion of health services on a voluntary basis.[20] A coverage survey in 2019 estimated 86% coverage for three doses of diphtheria-pertussis-tetanus (DPT) vaccine in slums and 92% coverage in non-slum urban areas (92%) in the WAU district. However, coverage of the second dose of measles-containing vaccine was very low in the district (33% in slums and 29% in non-slum urban areas).[9]

2.2. Sampling and data collection

The sample size for this qualitative assessment was determined based on an approach that focuses on *qualitative information power* considering the study's aim, sample specificity, application of established theory, quality of dialogue, and analysis strategy.[21] In using interpretive phenomenology as the theoretical basis, we set out a study aim that focused on immunisation-related experiences among a well-defined sample of caregivers of vaccine eligible children. We anticipated that caregivers would provide rich narratives that offer in-depth insights into their experiences. With these considerations in mind, we purposively recruited a total 16 primary caregivers from eight communities in the WAU district, four of which were slums and four were other urban areas in the district to maximize variation in the sample. Within each community, two caregivers of children ages 6-36 months were purposively selected to capture a breadth of caregiver experiences—one whose child was fully vaccinated for age and another whose child had missed at least one scheduled vaccination visit. CHWs supported data collection teams in

visiting households to identify and recruit eligible caregivers in the selected communities. The data collection teams were accompanied by local CHWs in visiting an initial set of households in the community. Snowball sampling was then used to identify additional households with potentially eligible children whereby previously visited households pointed data collectors to other households with potentially eligible children. Data collectors visited such households to screen for eligibility. This process continued until two caregivers of eligible children were successfully recruited and interviewed from a particular community. Interviews were conducted on the same of day of recruitment after obtaining informed consent from the caregiver.

We recruited data collectors (interviewers and notetakers) who were fluent in English and the predominant local language in the WAU district (Krio). The data collectors had post-secondary educational training in social sciences and were experienced in conducting qualitative data collection in Sierra Leone. Two behavioural scientists trained the facilitators for a week on the assessment protocol. One of the trainers was from Sierra Leone and had experience conducting social science research in Sierra Leone. During the training, the English version of the guide was translated into Krio by locally hired staff together with the facilitators and trainer. The data collectors were trained on how to probe on the spot to obtain additional pertinent information from caregivers. Data collection occurred in August–September 2018. All interviews were audio-recorded with permission from participants; they were then transcribed and translated into English by the local team. Interviews lasted about an hour on average and were conducted in the vicinity of the homes of the caregivers. Data collection teams were trained on choosing suitable interview locations to enable caregivers to speak freely. The facilitators conducted debriefing sessions immediately after each interview to make note of key experiences and observations. We have previously documented practical lessons learned from implementing the assessment in Sierra Leone.[11]

2.3. Data analysis

We analysed the data using a combination of theoretical guidance from interpretative qualitative inquiry (IPA)[22] with non-theoretical aspects of qualitative content analysis for inductive coding of meaning units and categorization of codes in latent constructs.[23] Two analysts (one male, one female) read all transcripts and created analytic memos and then analysed the transcripts using both within-case and cross-case analysis. In the within-case analysis, we developed a narrative profile for each caregiver to bring key aspects of their lived experiences to the foreground—consistent with the IPA approach in qualitative research. In the initial part of the cross-case analysis, each analyst coded three different transcripts (six total), using an inductive approach to identify and interpret meaning units within the text. To gain alternative interpretations of the coded meaning units, three of the coded transcripts were shared with a

third qualitative expert, who was not involved in the previous stages of the assessment, for independent 'blind' coding of the transcripts. Feedback from the third analyst was discussed by the two primary analysts and incorporated into the coding scheme. The analysts used an iterative process to review their codes, discuss their interpretations of the manifest content, and harmonize the initial set of codes that were used for coding the remaining manuscripts. NVivo software (QSR International–2018, Version 12) was used for the final organization and coding of the transcripts. Using a consultative process between the two analysts, manifest categories of meaning units were grouped to reflect latent content that was later developed into cross-cutting themes. Throughout the process, the analysts exercised reflexivity regarding subjective interpretations and iteratively re-examined the transcripts to identify alternative interpretations until consensus was reached.

2.4. Ethical approval

The assessment was approved by the Sierra Leone Ethics and Scientific Review Committee (SLESRC-17052018), Columbia University Medical Centre Institutional Review Board (IRB-AAAR9031), and the Centre for Global Health at the U.S. Centres for Disease Control and Prevention (CGH-2018-184). All participants provided written informed consent.

2.5. Patient and public involvement

No patient involved.

3. Results

At the time of the interviews, half of the children had missed at least one scheduled vaccine dose. Four themes emerged from the interviews: Caregivers felt morally obligated to vaccinate their children because of the anticipated benefits (Table 1); vaccination was facilitated by trusted information exchange and social support, coupled with positive clinic experiences (Table 2); vaccination was hindered by practical constraints compounded by negative experiences linked to unfavourable health worker practices and adverse events following immunisation (Table 3); and lastly, caregivers desired stronger community engagement and better experiences at the vaccination clinic (Table 4). There were no notable differences in themes between slums and other urban communities.

3.1. Theme 1. Caregivers felt morally obligated to vaccinate their children and anticipated benefits to the child and the parent (Table 1)

3.1.1. Obligation to the child

Caregivers felt morally obligated to get their children vaccinated. In essence, vaccination was viewed as 'doing the right thing' for the child. Even caregivers who had missed scheduled vaccination felt a responsibility to try to get the child vaccinated.

> *"It is my duty to take my baby to the hospital for immunisation. It is my responsibility as [a] mother to ensure that my baby completes the rounds of immunisation without defaulting."* – Caregiver whose child had missed a scheduled vaccination

3.1.2. Wanting a 'strong and healthy baby'

Caregivers consistently expressed that immunisation has important health benefits to the child, and that missing scheduled vaccination would 'risk the baby's life.' In addition, they valued having a 'strong and healthy baby' and felt that completing the vaccination schedule will positively impact the baby's health.

> *"I think [the] vaccine is good for our children. It is important and it helps to build their immune system to keep them strong and healthy; it fights against many things in the body…"* – Caregiver whose child was fully vaccinated

3.1.3. Future benefits of vaccination for the parent

The notion that vaccinated children will be able to take care of the parent later in life emerged as a dimension of vaccination benefit to the parent.

> *"It is very difficult for me to be absent for immunisation or not to take my baby to the hospital when sick. Sometimes people think I'm mad but I'm not. I'm trying to bring up my children in a way that they will benefit me when I'm old."* – Caregiver whose child had missed a scheduled vaccination

3.2. Theme 2. Vaccination was facilitated by trusted information exchange and social support, coupled with positive clinic experiences (Table 2)

3.2.1. Diversity of immunisation reminders

Caregivers were exposed to numerous reminders and cues to vaccinate their children, including information gleaned from the immunisation cards, health workers, community campaigns, and family members. However, the child's immunisation card stood out as the most important reminder that caregivers and families relied on to remember the dates of the scheduled vaccination visits.

"I do remind myself because they [health workers] will write at the back of the immunisation card the date for the next visit. The immunisation card will tell you the date for the next visit. – Caregiver whose child had missed a scheduled vaccination

In addition, community outreach campaigns and announcements in the community were also viewed as helpful reminders to vaccinate.

"The health workers in this community and the CHWs are doing well as they do go round telling people not to forget to take their babies to the hospital for immunisation." – Caregiver whose child had missed a scheduled vaccination

3.2.2. Information access and trust

Immunisation information sources varied, but health workers were consistently cited as trusted sources of information. Nurses were more trusted than lay CHWs because nurses were viewed as more knowledgeable. While waiting in line before immunisation services, caregivers appreciated the 'health talk' they received from nurses who advised on health and immunisation.

"I trust them [nurses] because they are a team of qualified nurses … Before they come here, they know everything about the vaccines and any implications of the vaccines. They are able to explain more than the CHWs and other community workers in the area. The nurses will tell you more. There are things that the community workers do not know, and they refer you to the nurses." – Caregiver whose child was fully vaccinated

3.2.3. Getting fathers more involved

Fathers were rarely involved in taking their children to the vaccination clinic. We uncovered only two instances when fathers were actively involved. In those instances, the mothers felt supported, and their children were fully vaccinated. In one situation, a father that routinely accompanied the child to the vaccination clinic was celebrated by health workers and given the 'best father' award.

"There was [a] time when he [my husband] was given the best father award [at the clinic] because he is always with me at the hospital. That is the name I have also given to my husband. Even when the baby is crying, I will say 'best father' take your baby." – Caregiver whose child was fully vaccinated

3.2.4. Positive experiences with health workers

Positive experiences with health workers during vaccination visits encouraged caregivers to vaccinate their children. Positive experiences included a cordial relationship with the nurses and health workers.

They expressed that nurses took good care of their children, made them feel comfortable, and tried to build a good rapport. Some caregivers said they would voluntarily give small amounts of money to health workers as a token of their appreciation after vaccinating the child.

> *"...the nurses do encourage you and will make jokes so that you will laugh at the end of the day. There is a lot of fun [interactions], which made some of us forget about our stresses."* – Caregiver whose child was fully vaccinated

3.2.5. Post-vaccination information sharing

Upon returning home from the vaccination visit, caregivers often discussed the clinic experience with their spouses, families, and other caregivers in the community. In addition to information obtained from health workers at the clinic, caregivers also sought advice from other 'more experienced' caregivers in the community.

> *"Most times after immunisation, my baby will run a temperature, but the health workers always provide drugs to counter the fever. We have caregivers in this community with vast knowledge and since this is my first baby, I love to talk to them so that we can share our experiences which will be of advantage to me as I'm very new in the field [of parenting]."* –Caregiver whose child was fully vaccinated

3.3. Theme 3. Vaccination was hindered by practical constraints compounded by negative experiences linked to unfavourable health worker practices and adverse events following immunisation (Table 3)

3.3.1. Preparing for the journey and getting to the clinic

Caregivers commonly cited the need to juggle 'household duties' and other activities when planning the visit as a barrier, especially in the absence of fathers' involvement in taking the child to the clinic. In addition, mothers frequently depended on their children's fathers for financial support to cover the expenses related to the vaccination clinic visit. Some caregivers recounted needing to travel long distances to get to the vaccination clinic, which in some instances, took up to an hour on foot.

3.3.2. Inconveniences at the clinic

Caregivers anticipated various inconveniences at the vaccination visit. The prolonged time spent waiting for the child to be vaccinated emerged as a major inconvenience, which was more pronounced when seeking immunisation services at large health facilities, such as hospitals. Anticipating the long wait, caregivers usually tried to arrive early at the vaccination site with the hopes of getting seen first. The

vaccination visit was reportedly prolonged due to the range of activities involved with the child health visit including weighing the baby as part of growth monitoring and other health checks.

> *"It is painful if you waste much time at the health facility because you have other issues to attend to. To avoid that, that is why I always come early to the health facility."* – Caregiver whose child was fully vaccinated

3.3.3. Dissatisfaction with specific practices at the clinic

Caregivers complained about some of their experiences and interactions with health care workers during the vaccination visit. A key complaint was that health workers shout at caregivers and sometimes used vulgar language toward caregivers. In other instances, there were complaints that some health workers habitually arrive late to the vaccination session, which further prolonged the time caregivers spent waiting. In addition, systemically hidden costs generated substantial dissatisfaction. Caregivers said that they needed to "shake hands" with health workers at different times of the visit (e.g., first time registering the child to get a card, before entering the facility, and before weighing the baby). Shaking hands implied giving some money during the handshake. Money was used to 'fast-track' the child's vaccination.

> *"Sometimes if I don't want to spend much time at the hospital, I will shake the hand of the nurse so that they can fast track the immunisation of my baby. I will give them something like two thousand Leones or whatever I have with me at that moment… Health is wealth and they [health workers] don't need us but we do [need them]. The money we give is nothing compared to the health of our children… At the end of the day, we will grumble on our way home as the services are supposed to be free for our children, yet we are paying for it. The health workers are really trying, but the idea for them to take money from us is bad. And if you don't give them money, they will talk to you carelessly."* – Caregiver whose child was fully vaccinated

Money was also demanded as a form of 'punishment' to caregivers who missed their children's scheduled vaccination date.

> *"If you failed to take your baby to the hospital on [the] stipulated date, you will definitely have to pay some amount at the end of the day in the form of punishment. You must pay five thousand or more."* – Caregiver whose child was fully vaccinated

3.3.4. Adverse events following immunisation

Caregivers cited numerous instances when their children experienced vaccine side effects such as 'fever,' 'swelling at the injection site,' and the 'baby becoming lethargic.' Fever was the most common side effect, and the caregivers knew to administer fever-reducing medication as instructed by health workers.

When there was swelling at the injection site, a common practice among caregivers was to massage the swollen area, sometimes with an onion or a bar of soap in their effort to try to reduce the swelling.

> *"Sometimes my baby's leg becomes swollen... because some nurses are heavy-handed, and I meet several nurses when I visit the hospital. Sometimes the leg gets swollen, and they treat him. I have to rub the leg to avoid swelling… I use soap to rub off the swelling and I give Panadol to stop the fever… some people say you should not allow every nurse to administer [an]injection to the child. I should have a permanent nurse that gives injection to my child without swelling."* – Caregiver whose child missed a scheduled vaccination

In one rare situation, a caregiver had a prior child who experienced fever, convulsed, and died a few days after getting vaccinated. Therefore, the caregiver decided to not vaccinate subsequent children.

> *"After the immunisation, my baby started running temperature, I administered paracetamol as I was told by the health workers. The baby convulsed and that was the end of that baby. I don't want a repeat of that in my life. I have therefore decided not to take my babies for immunisation anymore"* – Caregiver whose child missed a scheduled vaccination

Besides passive acceptance of the BCG vaccine at the birth of the youngest child, this same caregiver actively refused all other vaccines despite encouragement by a family member to vaccinate the child.

> *"I'm not outrightly saying it was as a result of the immunisation [that my child died]; as every death is the work of God. But from what I have gathered so far, I have personally decided not to take my baby to the health facility to be immunized. It is not that I'm tired of going to the health facility or because of the distance or money. I do get a lot of pressure from my aunt to take my baby to the health facility for immunisation, but the thing is that I just don't trust the system and what immunisation does.* – Caregiver whose child missed a scheduled vaccination

From the perspective of this same caregiver, the vaccinated child died but the unvaccinated children survived and thrived, which was cited as a reason for refusing vaccination.

> *"I believe in exclusive breastfeeding, sometimes for two years and a half and sometimes [only] two years. My baby is now two years seven months old and doing well like any of those children that are on immunisation or have completed…Just as I was saying, sometimes my heart will tell me to take the baby for immunisation but after thinking of the past experience, I would decide not to. I'm now used to that… The simple fact here is that, since the other children are doing well without immunisation, I will not take [the baby] to the health facility for immunisation and that is all."* – Caregiver whose child missed a scheduled vaccination

3.4. Theme 4: Caregivers desired stronger community engagement and better experiences at the vaccination clinic (Table 4)

Implementing community outreach campaigns for immunisation at regular intervals with a focus on defaulters was recommended by participants to improve vaccination outcomes. In addition, caregivers wanted health workers and community leaders to be involved in immunisation promotion along with the CHWs. They wanted the vaccination clinic experience to improve and become more conducive to caregivers, including shorter wait time at the clinic and more positive interactions with health workers. Lastly, caregivers wanted health workers to stop demanding money from them, though they may not mind giving money as a token of appreciation when they could afford it.

> *"In addition, you should engage the Chiefs, because in each area we have Chiefs to spread out this message. You could educate them so that they in turn can educate those in the community. Let us have Town Criers go around disseminating the messages. It would be nice for them to allocate people in the health centre who move from house to house to educate the breastfeeding mothers because some of us are stubborn to come onboard."* – Caregiver whose child was fully vaccinated

4. Discussion

Our qualitative analysis highlighted several important themes. In the backdrop of anticipated benefits to both the child and parent, vaccination intention was motivated by a feeling of moral duty to 'do the right thing.' Timely and trusted exchange of information together with social support and positive experiences at the vaccination clinic were important facilitators of vaccination. In contrast, vaccination was discouraged by negative interactions with health workers at the clinic, the occurrence and fear of vaccine side effects, multitude of 'hidden' costs, juggling vaccination with other responsibilities, and inconveniences, such as long traveling time to the clinic and long delays at the clinic. Nevertheless, caregivers were resilient in devising ways to try to get their children vaccinated. Lastly, caregivers wanted the vaccination experience to improve, and they desired stronger community engagement to help optimize vaccination outcomes. However, systemic issues, such as informal payments, overcrowding in health facilities, and the reported overburdened health workers may require interventions at the health systems level. These themes from Sierra Leone provide in-depth insights regarding the motivations, facilitators, and barriers of vaccination in an urban LMIC setting.

Moral values may shape vaccination attitudes.[24] Philosophical arguments regarding the morality of vaccination have been heavily debated.[25-28] Caregivers in our sample largely viewed vaccination via a moral lens encompassing parental duty to do the right thing for the child. In one situation, however, we found that the desire to 'do the right thing' can also translate into vaccination refusal in the backdrop of other past refusals, observing 'healthy unvaccinated' children, and having distrust of the health system. Quantitative research from high-income countries has shown that parents with unvaccinated children were more likely to perceive their children to be at low risk of vaccine-preventable diseases and were more likely to perceive low vaccine effectiveness and safety compared to parents with vaccinated children.[29] Our findings suggest that childhood immunisation communication efforts may resonate more strongly with caregivers when vaccination is framed around parental responsibilities to do the right thing for the child and the anticipated future benefits to parents.

Across the interviews, there was an apparent tension in the relationship between caregivers and health workers. Caregivers often expressed their appreciation of health workers and empathized with the challenging context in which they do their work. Health workers were strongly viewed as authoritative sources of trusted information regarding immunisation and the child's health, which is consistent with findings from high-income countries[30-32] and LMICs.[33 34] Our findings on the role of monetary exchange in vaccination exemplify the complex relationship between caregivers and health workers in low-resource urban communities in Sierra Leone. Some caregivers voluntarily gave money to health workers as a 'token of appreciation' while others begrudgingly gave money because they viewed it as a condition for receiving good quality service from health workers. Interventions at the health systems level are necessary to help discourage informal payments to health workers—a practice that may perpetuate vaccination inequities among poor caregivers who are unable to meet monetary expectations.

Our findings also illuminate the need for interventions at the household and family level. We uncovered that fathers were rarely involved in taking their children to the vaccination clinic but were often engaged in the decision-making processes. In the few instances when fathers were involved in taking their children to the clinic, the mothers felt supported, and their children were fully vaccinated. A study in Nigeria found that paternal involvement in immunisation was greater in rural settings compared to urban settings.[35] In urban areas, the same study found that paternal involvement was greater among educated fathers compared to uneducated fathers. In a separate study in Ghana, the involvement of educated fathers in the vaccination decision was associated with timelier vaccination uptake compared to the involvement of uneducated fathers in the decision.[36] More broadly, shifting from a mother-child dyad to a family triad in the care of children has proven to have positive effects on paediatric health outcomes across diverse

contexts.[37] Additional assessments and interventions are needed to explore and evaluate culturally appropriate ways to enhance the involvement of fathers in childhood immunisation in Sierra Leone and other similar LMIC settings.

Existing evidence suggests that vaccine safety concerns, often linked to adverse events following immunisation (AEFI), contribute to vaccine hesitancy.[38 39] Serious AEFIs may be 'triggering events' for derailing vaccine confidence and prompting active refusal among certain caregivers and their communities—especially when the serious AEFI is perceived to be linked to the vaccine or the vaccination process.[40] Together with prior evidence, these findings emphasize the need for robust AEFI surveillance and investigations[41] to identify, counsel, and follow-up with caregivers whose children experience AEFI, and therefore, are potentially at risk of missing subsequent vaccination. Health workers and CHWs may benefit from periodic in-service training on how to effectively communicate vaccine safety and address concerns about AEFIs.[42]

4.1. Limitations

There were several limitations to our assessment. First, it is possible that some nuanced meaning may have been lost when translating the audio recordings from Krio to English. Second, we only identified one caregiver who routinely and actively refused all vaccines for her child after experiencing a serious AEFI, which may reflect the overall rarity of zero-dose unvaccinated children in Sierra Leone (approximately 3%).[43] This was the only caregiver with a child that experienced a serious AEFI in our sample, which limits our ability to have a rich understanding of such experience among caregivers more broadly and the potential linkages to vaccination refusal. Although such experiences of serious AEFI are rare, they may have the tendency to get publicized in the community, which may negatively influence vaccination decisions among other caregivers. Taken together, our results call for additional qualitative assessments to get a deeper understanding of vaccination refusal within the Sierra Leonean context and other low-resource LMIC settings. Sampling strategies may therefore need to be adapted accordingly to focus on caregivers who actively refuse vaccination for their children. Lastly, our findings reflected gender dimensions that may be based on sociocultural norms in Sierra Leonean society but may also be due to sampling bias because the caregivers we conveniently recruited were mostly stay-at-home mothers.

5. Conclusions

As the COVID-19 pandemic disrupts childhood immunisation globally,[44] especially in LMICs, our assessment provides a foundational understanding of the challenges that caregivers encounter in urban settings in Sierra Leone. It also sheds light on opportunities to improve vaccination outcomes in urban

poor settings, which is a global immunisation priority. The findings show that health system interventions, community engagement, and vaccination outreach may need to be tailored to for urban settings. Vaccine communication efforts may resonate more strongly with caregivers when vaccination is framed both around parental responsibilities to do the right thing for the child and the future benefits to the parent.

Competing interests

None declared.

Data availability

All data relevant to the study are included in the article or uploaded as supplementary information.

Contributors

MFJ, RS, MT, TS, and ML designed the assessment. MFJ, PP, SK, and KW analysed the data. MJF, PK, RS, SK, MT, KW, TS, and ML contributed to the interpretation of the results. MFJ, PP and SK drafted the manuscript. RS, MT, KW, TS, and ML contributed to revising the manuscript. All authors reviewed and approved the final manuscript.

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Disclaimer

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Table 1. Thematic area on the motivation to get the child vaccinated–Western Area Urban, Sierra Leone, 2018

Meaning unit	Category	Theme
Responsibility to ensure full vaccination	Obligation to the child	Caregivers felt morally obligated to vaccinate their children and anticipated benefits to the child and the parent
Obligation to do the right thing		
Immunisation as a requirement		
Immunisation is important for baby's health	Anticipated benefits	
Wanting 'strong baby'		
'Health is wealth'		
Defaulting on vaccination risks baby's life		
Vaccination benefits the parent later in life		

Table 2. Thematic area on enablers of vaccination–Western Area Urban, Sierra Leone, 2018

Meaning unit	Category	Theme
Immunisation card is important	Diversity of immunisation reminders	Vaccination was facilitated by trusted information exchange and social support coupled with positive experiences
Campaign as reminder		
Reminders by health workers at vaccination visit		
Husband as reminder		
Immunisation card as reminder		
Other family member as reminder		
Nurses should lead	Information access and trust	
Nurses more trusted than CHWs		
Same information from different sources		
Immunisation promotion through radio and tv		
Immunisation promotion by health workers		
Immunisation promotion through leaders		
Immunisation promotion by NGOs		
Mothers take the child to the clinic	Getting fathers more involved	
Fathers rarely involved		
Father received an award for involvement		
Cordial relationship with nurses	Positive experiences with health worker	
Good care by nurses		
HWs encourage seeking care at HF		
Giving money to health worker as token of appreciation		
Husband asking about the visit	Post-vaccination information sharing	
Informing husband of next visit		
Telling husband about visit expenses		
Immunisation is a "learning process"		
Sharing experiences with neighbours or friends		
Other family members asking about the visit		

Table 3. Thematic area on vaccination barriers–Western Area Urban, Sierra Leone, 2018

Meaning unit	Category	Theme
Asking husband for money	Preparing for the journey and getting to the clinic	Vaccination was hindered by practical constraints compounded by negative experiences linked to unfavourable health worker practices and adverse events following immunisation
Juggling different household duties		
Competing priorities		
Time taken to get to the clinic		
Wasting time at the clinic	Inconveniences at the clinic	
Rush to arrive first and seen first		
Crowding at the clinic		
Very long wait at larger health facilities		
Spent a day and nothing happened		
Not respecting caregivers	Dissatisfaction with specific practices at the clinic	
Shouting at caregivers		
Wasting caregiver's time		
Paying for the card		
Paying for free drugs		
Paying for weighing		
Payment as punishment		
Bad care without payment		
Health workers should stop demanding money		
Health worker don't appreciate less than Le 2000		
Health workers withholding free drugs		
Baby crying throughout the night	Adverse events following immunisation	
Baby gets 'lazy' for few hours		
Fever in baby		
Swelling at injection site		
Side effects only for some vaccines		
Rub onion on swollen injection site		
Avoiding abnormalities from vaccine		
Afraid of vaccine side effects		

Table 4. Thematic area on recommendations to improve childhood immunisation services– Western Area Urban, Sierra Leone, 2018

Meaning unit	Category	Theme
Continue campaigns at repeated intervals	Improving vaccination processes and systems	Caregivers want improved vaccination processes, systems, and engagement
Do not rely on campaigns alone		
Provision of incentives for caregivers		
Concentrate on defaulters		
Compensation/incentives for nurses		
Being considerate towards health workers		
Employ more staff		
Stop demanding money		
Promote consequences of not vaccinating	Engaging communities to boost vaccine confidence	
Peer-to-peer promotion of immunisation		
Inform about importance of immunisation		
Address 'stubborn' caregivers		
Engage caregivers who do not want injections		

COREQ (COnsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
Personal characteristics			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	
Occupation	3	What was their occupation at the time of the study?	
Gender	4	Was the researcher male or female?	
Experience and training	5	What experience or training did the researcher have?	
Relationship with participants			
Relationship established	6	Was a relationship established prior to study commencement?	
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	
Interviewer characteristics	8	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	
Domain 2: Study design			
Theoretical framework			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	
Participant selection			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	
Sample size	12	How many participants were in the study?	
Non-participation	13	How many people refused to participate or dropped out? Reasons?	
Setting			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	
Data collection			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	
Repeat interviews	18	Were repeat inter views carried out? If yes, how many?	
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	
Field notes	20	Were field notes made during and/or after the inter view or focus group?	
Duration	21	What was the duration of the inter views or focus group?	
Data saturation	22	Was data saturation discussed?	
Transcripts returned	23	Were transcripts returned to participants for comment and/or	

Topic	Item No.	Guide Questions/Description	Reported on Page No.
		correction?	
Domain 3: analysis and findings			
Data analysis			
Number of data coders	24	How many data coders coded the data?	
Description of the coding tree	25	Did authors provide a description of the coding tree?	
Derivation of themes	26	Were themes identified in advance or derived from the data?	
Software	27	What software, if applicable, was used to manage the data?	
Participant checking	28	Did participants provide feedback on the findings?	
Reporting			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	
Data and findings consistent	30	Was there consistency between the data presented and the findings?	
Clarity of major themes	31	Were major themes clearly presented in the findings?	
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

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TITLE PAGE

Title

Qualitative assessment of caregiver experiences when navigating childhood immunisation in urban communities in Sierra Leone

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ABSTRACT

Objective: To gain in-depth understanding of the caregiver experience when navigating urban immunisation services for their children.

Design: An exploratory qualitative assessment comprising 16 in-depth interviews using an interpretative phenomenology approach.

Setting: Caregivers were purposively recruited from slums (n=8) and other urban communities (n=8) in the capital city of Sierra Leone.

Participants: Caregivers of children ages 6 to 36 months old who were fully vaccinated (n=8) or under-vaccinated (n=8).

Results: Emotional enablers of vaccination were evident in caregivers' sense of parental obligation to their children while also anticipating reciprocal benefits in children's ability to take care of the parents later in life. Practical enablers were found in the diversity of immunization reminders, information access, information trust, getting fathers more involved, positive experiences with health workers, and post-vaccination information sharing in the community. Underlying barriers to childhood vaccination were due to practical constraints such as overcrowding and long waiting times at the clinic, feeling disrespected by health workers, expecting to give money to health workers for free services, and fear of serious vaccine side effects. To improve vaccination outcomes, caregivers desired more convenient and positive clinic experiences and deeper community engagement.

Conclusions: Health system interventions, community engagement, and vaccination outreach need to be tailored to for urban settings. Vaccine communication efforts may resonate more strongly with caregivers when vaccination is framed both around parental responsibilities to do the right thing for the child and the future benefits to the parent.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- This qualitative assessment describes the caregiver experience in navigating childhood immunisation services in urban settings in a low-income country to gain insights for improving vaccination outcomes.

- The sample comprised of caregivers of fully vaccinated and under-vaccinated children who were purposively recruited to help understand how the two outcomes may be shaped by differences in the caregiver experiences.

- Our sample only comprised one caregiver with a prior child that had experienced a serious vaccine side effect and whose current child had never been vaccinated due to fear of similar side effects.

- The rarity of experiencing serious side effects among children in our sample limits the ability to have a rich understanding of such experiences.

1. Introduction

There have been efforts to understand urban immunisation challenges in low- and middle-income countries (LMICs), including in urban slums and informal settlements.[1] Assessment of immunisation barriers in urban areas in LMICs identified a range of practical and social issues, such as population mobility, inaccurate denominators of children due to out-of-date population estimates and poorly defined geographic catchment areas, the lack of trust in the health system among vulnerable groups, overburdened health facilities, and weak community engagement and outreach.[2]

In Sierra Leone, the 2014-2016 Ebola epidemic disrupted the delivery of essential health services, including immunisation services, especially in urban areas.[3 4] Barriers that affected routine health services included the fear of contracting Ebola in health facilities, stigmatization of health workers, and shifting of resources to the epidemic.[5] As the Ebola epidemic waned, measles outbreaks became more frequent due to the decline in vaccination.[6] In the aftermath of the Ebola epidemic, the Government of Sierra Leone and its partners made major investments to rebuild health systems and restore public confidence in the health system.[7 8] However, challenges in access to and the uptake of immunisation services persist, including in urban areas.[9]

The United Nations Children's Fund (UNICEF) and partners developed the Caregiver Journey Framework to guide countries in understanding the experiences, processes, and structures that shape how caregivers seek and receive health services for their children, including essential immunisation.[10] In 2018, we operationalized the Caregiver Journey Framework through a qualitative approach in the Western Area Urban district (WAU) in Sierra Leone. Implementation experiences from operationalizing the framework in the context of urban immunization has been described elsewhere.[11] The framework was operationalized into several domains to understand decision-making and preparation for vaccination visits, making the journey to clinics, experiences during vaccination visits, and post-vaccination experiences. Building on these domains, we aimed to describe the real-world experiences of caregivers of vaccine-eligible children as they navigate urban immunisation services in Sierra Leone to identify vaccination enablers and barriers.

2. Methods

We aimed to understand how household dynamics, social factors, and formal healthcare delivery systems influence childhood immunisation uptake via the lens of primary caregivers of vaccine-eligible children in urban settings in Sierra Leone. Hence, we developed the Immunisation Caregiver Journey Interviews

(ICJI) approach[11] based on the Caregiver Journey Framework using principles of interpretative phenomenology,[12 13] which focuses on elucidating the essence of common experiences to explain, interpret, and make sense of a phenomenon.[14] We used a phenomenological approach to explore the lifeworld of caregivers in how they navigate childhood immunisation for their children repeatedly in low-resource, urban settings.[11] A semi-structured ICJI guide was used to explore the following domains: Decision-making and preparation, making the journey, experiences during vaccination visit, post-vaccination experiences, intentions to return, and perceptions of immunisation promotion activities in the community.

2.1. Setting

The WAU district in Sierra Leone comprises most of the capital city of Freetown with approximately 1.2 million inhabitants.[15] The district was heavily affected by the Ebola epidemic, partly due to high population movements and crowded housing conditions.[16] On average, there is less than one medical doctor per 10,000 population.[17] The Government of Sierra Leone introduced the Free Health Care Initiative in 2010 to remove cost barriers for essential health services for pregnant and lactating mothers and under-five children.[18] Childhood immunisation services are delivered through the Expanded Program on Immunisation using fixed sites that are supplemented by community outreach services to be conducted five times monthly.[19] Each catchment community has 10 community health workers (CHWs) who support the promotion of health services on a voluntary basis.[20] A coverage survey in 2019 estimated 86% coverage for three doses of diphtheria-pertussis-tetanus (DPT) vaccine in slums and 92% coverage in non-slum urban areas in the WAU district. However, coverage of the second dose of measles-containing vaccine was very low in the district (33% in slums and 29% in non-slum urban areas).[9]

2.2. Sampling and data collection

The sample size for this qualitative assessment was guided by an approach that focuses on *qualitative information power*.[21] The concept of information power posits that researchers should determine the sample size in a qualitative assessment based on the aim (narrow versus broad), sample specificity (targeting specific group versus multiple groups), theoretical underpinning (application of theory or no theory), quality of dialogue (weak or strong), and analysis strategy (within-case only or cross-case). Sample size burden increases when the aim is broad, multiple groups are targeted in the sample, the assessment is theory-driven, the quality of the dialogue is weak, and transcripts are analysed using cross-case analysis. In our assessment, the aim was narrow, the sample targeted a specific group, we applied theory to guide the assessment, the transcripts contained rich information, and we conducted both within-case and cross-case analyses. Against these considerations, we interviewed 16 caregivers and

progressively reviewed debrief notes from the interviews to assess information power. In analysing the transcripts, we concluded that we reached saturation with the 16 interviews and likely could have stopped interviewing after the 12th interview.

We purposively recruited the caregivers from eight communities in the WAU district, four of which were slums and four were other urban areas in the district to maximize variation in the sample. Within each community, two caregivers of children ages 6-36 months were selected to capture a breadth of caregiver experiences of caregivers with vaccine eligible children—one whose child was fully vaccinated for age and another whose child had missed at least one scheduled vaccination visit. CHWs supported data collection teams in visiting households to identify and recruit eligible caregivers in the selected communities. Snowball sampling was used as a secondary sampling strategy when the first identified caregiver declined to interview but knew of other caregivers in the community with vaccine-eligible children or when CHWs were only successful in identifying just one eligible caregiver. In this form of snowball sampling, a previously visited household with an eligible child would point data collectors to other households with potentially eligible children (i.e., vaccine eligible children). Data collectors visited such households to screen for eligibility. This process continued until two caregivers of eligible children were successfully recruited and interviewed from a particular community. Interviews were conducted on the same of day of recruitment after obtaining informed consent from the caregiver.

We recruited data collectors (interviewers and notetakers) who were fluent in English and the predominant local language in the WAU district (Krio). The data collectors had post-secondary educational training in social sciences and were experienced in conducting qualitative data collection in Sierra Leone. Two behavioural scientists trained the facilitators for a week on the assessment protocol. One of the trainers was from Sierra Leone and had experience conducting social science research in Sierra Leone. During the training, the English version of the guide was translated into Krio by locally hired staff together with the facilitators and trainer. The data collectors were trained on how to probe on the spot to obtain additional pertinent information from caregivers. Data collection occurred in August–September 2018. All interviews were audio-recorded with permission from participants; they were then transcribed and translated into English by the local team. Interviews lasted about an hour on average and were conducted in the vicinity of the homes of the caregivers. Data collection teams were trained on choosing suitable interview locations to enable caregivers to speak freely. The facilitators conducted debriefing sessions immediately after each interview to make note of key experiences and observations. The debriefing notes were not part of the formal analysis. However, during the field work, the debriefing notes were used to progressively assess data saturation and to identify key insights emerging from the

interviews. We used the insights from the debrief notes to develop a preliminary report that was mostly in a descriptive, narrative form. The de-identified preliminary report was shared with the Sierra Leone Ministry of Health and Sanitation. We have previously documented practical lessons learned from implementing the assessment in Sierra Leone.[11]

2.3. Data analysis

Two analysts (one male, one female) read all transcripts and created analytic memos and then analysed the transcripts using both within-case and cross-case analysis. In the within-case analysis, we developed a narrative profile for each caregiver to bring key aspects of their lived experiences to the foreground. In the initial part of the cross-case analysis, each analyst coded three different transcripts (six total), using an inductive approach to identify and interpret meaning units within the text. To gain alternative interpretations of the coded meaning units, three of the coded transcripts were shared with a third qualitative expert, who was not involved in the previous stages of the assessment, for independent 'blind' coding of the transcripts. Feedback from the third analyst was discussed by the two primary analysts and incorporated into the coding scheme. The analysts used an iterative process to review their codes, discuss their interpretations of the manifest content, and harmonize the initial set of codes that were used for coding the remaining manuscripts. NVivo software (QSR International–2018, Version 12) was used for the final organization and coding of the transcripts. Manifest categories of meaning units were grouped to reflect latent content that was developed into cross-cutting themes via a consultative process. Throughout the process, the analysts exercised reflexivity regarding subjective interpretations and iteratively re-examined the transcripts to identify alternative interpretations until consensus was reached with additional inputs from the co-authors.

2.4. Ethical approval

The assessment was approved by the Sierra Leone Ethics and Scientific Review Committee (SLESRC-17052018), Columbia University Medical Centre Institutional Review Board (IRB-AAAR9031), and the Centre for Global Health at the U.S. Centres for Disease Control and Prevention (CGH-2018-184). All participants provided written informed consent.

2.5. Patient and public involvement

No patient involved.

3. Results

All respondents were the biological mothers of the sampled children except for one female guardian. The median age was nine months for the children included in the assessment. At the time of the interviews, half of the children had missed at least one scheduled vaccine dose. Three themes emerged from the interviews around vaccination enablers (Table 1), vaccination barriers (Table 2) and direct recommendation to improve vaccination uptake (Table 3). There were no notable differences in themes between slums and other urban communities.

3.1. Enablers of childhood vaccination (Table 1)

Our analysis identified emotional and practical enablers related to childhood vaccination. Emotional enablers were evident in how caregivers portrayed their parental obligation to their children, wanting to do the right thing for their children's health, and anticipating reciprocal benefits in children's ability to take care of the parents later in life. Practical enablers were the diversity of immunization reminders, information access, information trust, getting fathers more involved, positive experiences with health workers, and post-vaccination information sharing at the community level.

3.1.1. Parental responsibility

A sense of parental responsibility was a major motivating factor for caregivers to seek vaccination services for their children. Caregivers viewed vaccination as 'doing the right thing' for their children. Even caregivers who had missed scheduled vaccination visits felt responsible for getting their children caught up with their scheduled vaccine doses, which often required deprioritizing other income-generating activities.

> *"It is my duty to take my baby to the hospital for immunisation. It is my responsibility as [a] mother to ensure that my baby completes the rounds of immunisation without defaulting."* – Caregiver whose child had missed a scheduled vaccination

3.1.2. Wanting a strong and healthy baby

In addition to the affective responses regarding a sense of duty to the child, appreciating the overall health benefits of vaccination to their children was another major driving force in motivating caregivers to seek vaccination services. Caregivers consistently expressed that immunisation has essential health benefits to the child and that missing scheduled vaccination would 'risk the baby's life.' Moreover, they valued having a 'strong and healthy baby' and felt that completing the vaccination schedule would positively impact the baby's health.

"I think [the] vaccine is good for our children. It is important and it helps to build their immune system to keep them strong and healthy; it fights against many things in the body…" – Caregiver whose child was fully vaccinated

3.1.3. Parental anticipation of reciprocal benefit

Perceptions of vaccination benefits went beyond the direct health benefits to children and extended into domains of benefit to the parent. The notion that vaccinated children will be healthier and in turn live longer and be able to take care of their parents later in life emerged as a dimension of vaccination benefit to the parent. The duality of vaccination benefit is likely grounded in the cultural context of parents expecting reciprocal care from their children when the parents can no longer care for themselves.

"It is very difficult for me to be absent for immunisation or not to take my baby to the hospital when sick. Sometimes people think I'm mad but I'm not. I'm trying to bring up my children in a way that they will benefit me when I'm old." – Caregiver whose child had missed a scheduled vaccination

3.1.4. Diversity of immunisation reminders

Caregivers were exposed to numerous reminders and cues to vaccinate their children, including information from the immunisation cards, health workers, community campaigns, and family members. However, the child's immunisation card stood out as the most important reminder that caregivers and families relied on to remember the dates of the scheduled vaccination visits.

"I do remind myself because they [health workers] will write at the back of the immunisation card the date for the next visit. The immunisation card will tell you the date for the next visit. – Caregiver whose child had missed a scheduled vaccination

In addition, community outreach campaigns and announcements in the community were also viewed as helpful reminders to vaccinate.

"The health workers in this community and the CHWs are doing well as they do go round telling people not to forget to take their babies to the hospital for immunisation." – Caregiver whose child had missed a scheduled vaccination

3.1.5. Information access and information trust

Immunisation information sources varied, but caregivers consistently cited health workers as trusted sources of information. Nurses were more trusted than lay CHWs because caregivers viewed nurses as

more knowledgeable. While waiting in line before immunisation services, most caregivers appreciated the 'health talk' they received from nurses who advised on health and immunisation.

> *"I trust them [nurses] because they are a team of qualified nurses … Before they come here, they know everything about the vaccines and any implications of the vaccines. They are able to explain more than the CHWs and other community workers in the area. The nurses will tell you more. There are things that the community workers do not know, and they refer you to the nurses.*" – Caregiver whose child was fully vaccinated

3.1.6. Getting fathers more involved

Mothers desired greater involvement by the child's fathers in supporting their children's vaccination. In most instances, fathers were rarely involved in taking their children to the vaccination clinic. We uncovered only two instances when fathers actively supported their children's vaccination visits. In those instances, the mothers felt supported, and their children were fully vaccinated. In one situation, a father that routinely accompanied the child to the vaccination clinic was celebrated by health workers and given the 'best father' award.

> *"There was [a] time when he [my husband] was given the best father award [at the clinic] because he is always with me at the hospital. That is the name I have also given to my husband. Even when the baby is crying, I will say 'best father' take your baby."* – Caregiver whose child was fully vaccinated

3.1.7. Positive experiences with health workers

During vaccination visits, positive experiences with health workers encouraged caregivers to vaccinate their children. Positive experiences included having a cordial relationship with the health workers. In particular, caregivers expressed that the nurses took good care of their children, made them feel comfortable, and tried to build a good rapport. Some caregivers said they would voluntarily give small amounts of money to health workers as a token of their appreciation after vaccinating the child.

> *"...the nurses do encourage you and will make jokes so that you will laugh at the end of the day. There is a lot of fun [interactions], which made some of us forget about our stresses."* – Caregiver whose child was fully vaccinated

3.1.8. Post-vaccination information sharing

Information exchange at the community level with trusted community members strengthened caregiver confidence in childhood vaccination. Upon returning home from the vaccination visit, caregivers often discussed the clinic experience with their spouses, families, and other caregivers in the community. In

addition to information obtained from health workers at the clinic, caregivers also sought advice from other 'more experienced' caregivers in the community.

> *"Most times after immunisation, my baby will run a temperature, but the health workers always provide drugs to counter the fever. We have caregivers in this community with vast knowledge and since this is my first baby, I love to talk to them so that we can share our experiences which will be of advantage to me as I'm very new in the field [of parenting]."* –Caregiver whose child was fully vaccinated

3.2. Theme 2. Barriers related to childhood vaccination (Table 2)

Practical constraints, negative experiences with health workers, and safety concerns were the underlying barriers to childhood vaccination. Practical constraints included challenges faced when preparing for and getting to the vaccination clinic and inconveniences encountered at the clinic, such as overcrowding and long waiting times. Negative experiences among caregivers included feeling disrespected by health workers while simultaneously expecting to give money to health workers for services that are supposed to be free of charge. Finally, vaccine side effects led to concerns and fears about vaccine safety.

3.2.1. Preparing for the journey and getting to the clinic

Caregivers commonly cited the need to juggle 'household duties' and other income-generating activities when planning the visit as a barrier, especially in the absence of fathers' involvement in taking the child to the clinic. In addition, mothers frequently depended on their children's fathers for financial support to cover the expenses related to the vaccination clinic visit. Some caregivers recounted needing to travel long distances up to an hour by foot to get to the vaccination clinic, especially when they could not afford public transportation.

3.2.2. Inconveniences at the clinic

Caregivers anticipated various inconveniences at the vaccination visit. The prolonged time spent waiting for the child to be vaccinated emerged as a substantial inconvenience that was more pronounced when seeking immunisation services, especially in larger facilities. Anticipating the long wait, caregivers usually tried to arrive early at the vaccination site to get seen first. The range of activities involved with the child health visit prolonged the visit, including weighing the baby as part of growth monitoring and other health checks.

> *"It is painful if you waste much time at the health facility because you have other issues to attend to. To avoid that, that is why I always come early to the health facility."* – Caregiver whose child was fully vaccinated

3.2.3. Feeling disrespected by health workers

Caregivers often felt disrespected by health workers during the vaccination visit. A key complaint was that health workers shouted at caregivers and sometimes used vulgar language toward caregivers. In other instances, they complained that some health workers habitually arrived late to the vaccination session, which further prolonged the time caregivers spent waiting.

3.2.4. Monetary expectations

Systemically hidden costs generated substantial dissatisfaction among caregivers. Caregivers needed to "shake hands" with health workers at different times of the visit (e.g., first time registering the child to get a card, before entering the facility, and before weighing the baby). Shaking hands implied giving some money during the handshake. Caregivers used the money to 'fast-track' their children's vaccination. The expectations around monetary exchange discouraged caregivers who could not afford to shake hands with health workers.

> *"Sometimes if I don't want to spend much time at the hospital, I will shake the hand of the nurse so that they can fast track the immunisation of my baby. I will give them something like two thousand Leones or whatever I have with me at that moment… Health is wealth and they [health workers] don't need us but we do [need them]. The money we give is nothing compared to the health of our children… At the end of the day, we will grumble on our way home as the services are supposed to be free for our children, yet we are paying for it. The health workers are really trying, but the idea for them to take money from us is bad. And if you don't give them money, they will talk to you carelessly."* – Caregiver whose child was fully vaccinated

In a separate domain of monetary exchange, health workers demanded money as a form of 'punishment' to caregivers who missed their children's scheduled vaccination appointments.

> *"If you failed to take your baby to the hospital on [the] stipulated date, you will definitely have to pay some amount at the end of the day in the form of punishment. You must pay five thousand or more."* – Caregiver whose child was fully vaccinated

3.2.5. Vaccine side effects

Caregivers cited numerous instances when their children experienced vaccine side effects such as 'fever,' 'swelling at the injection site,' and the 'baby becoming lethargic.' Fever was the most common side effect, and the caregivers knew to administer fever-reducing medication as instructed by health workers.

When there was swelling at the injection site, a common practice among caregivers was to massage the swollen area, sometimes with an onion or a bar of soap to try to reduce the swelling.

> *"Sometimes my baby's leg becomes swollen... because some nurses are heavy-handed, and I meet several nurses when I visit the hospital. Sometimes the leg gets swollen, and they treat him. I have to rub the leg to avoid swelling… I use soap to rub off the swelling and I give Panadol to stop the fever… some people say you should not allow every nurse to administer [an]injection to the child. I should have a permanent nurse that gives injection to my child without swelling."* – Caregiver whose child missed a scheduled vaccination

In one rare situation, a caregiver had a prior child who experienced fever, convulsed, and died a few days after getting vaccinated. Therefore, the caregiver decided to not vaccinate subsequent children.

> *"After the immunisation, my baby started running temperature, I administered paracetamol as I was told by the health workers. The baby convulsed and that was the end of that baby. I don't want a repeat of that in my life. I have therefore decided not to take my babies for immunisation anymore"* – Caregiver whose child missed a scheduled vaccination

Besides passive acceptance of the BCG vaccine at the birth of the youngest child, this same caregiver actively refused all other vaccines despite encouragement by a family member to vaccinate the child.

> *"I'm not outrightly saying it was as a result of the immunisation [that my child died]; as every death is the work of God. But from what I have gathered so far, I have personally decided not to take my baby to the health facility to be immunized. It is not that I'm tired of going to the health facility or because of the distance or money. I do get a lot of pressure from my aunt to take my baby to the health facility for immunisation, but the thing is that I just don't trust the system and what immunisation does.* – Caregiver whose child missed a scheduled vaccination

From the perspective of this same caregiver, the vaccinated child died but the unvaccinated children survived and thrived, which was cited as a reason for refusing vaccination.

> *"I believe in exclusive breastfeeding, sometimes for two years and a half and sometimes [only] two years. My baby is now two years seven months old and doing well like any of those children that are on immunisation or have completed…Just as I was saying, sometimes my heart will tell me to take the baby for immunisation but after thinking of the past experience, I would decide not to. I'm now used to that… The simple fact here is that, since the other children are doing well without immunisation, I will not take [the baby] to the health facility for immunisation and that is all."* – Caregiver whose child missed a scheduled vaccination

3.3. Recommendations to improve childhood vaccination (Table 3)

The direct recommendations provided by caregivers were categorized into (1) improving vaccination process and systems and (2) engaging communities to boost vaccine confidence. Implementing community outreach campaigns for immunisation at regular intervals with a focus on defaulters was recommended by participants to improve vaccination outcomes. In addition, caregivers wanted health workers and community leaders to be involved in immunisation promotion along with the CHWs. They wanted the vaccination clinic experience to improve and become more conducive to caregivers, including shorter wait time at the clinic and more positive interactions with health workers. Lastly, caregivers wanted health workers to stop demanding money from them, though they may not mind giving money, out of free-will, as a token of appreciation when they could afford it.

> *"In addition, you should engage the Chiefs, because in each area we have Chiefs to spread out this message. You could educate them so that they in turn can educate those in the community. Let us have Town Criers go around disseminating the messages. It would be nice for them to allocate people in the health centre who move from house to house to educate the breastfeeding mothers because some of us are stubborn to come onboard."* – Caregiver whose child was fully vaccinated

4. Discussion

Our qualitative analysis highlighted several important themes. In the backdrop of anticipated benefits to both the child and parent, vaccination intention was motivated by a feeling of parental responsibility to 'do the right thing.' Timely and trusted exchange of information together with social support and positive experiences at the vaccination clinic were important facilitators of vaccination. In contrast, vaccination was discouraged by negative interactions with health workers at the clinic, the occurrence and fear of vaccine side effects, multitude of 'hidden' costs, juggling vaccination with other responsibilities, and inconveniences, such as long traveling time to the clinic and long delays at the clinic. Nevertheless, caregivers were resilient in devising ways to try to get their children vaccinated such as walking on foot up to an hour to get to the clinic when they could not afford public transportation. Lastly, caregivers wanted the vaccination experience to improve, and they desired stronger community engagement to help optimize vaccination outcomes. However, systemic issues, such as informal payments, overcrowding in health facilities, and the reported overburdened health workers may require interventions at the health systems level. These themes from Sierra Leone provide in-depth insights regarding the motivations, facilitators, and barriers of vaccination in an urban LMIC setting.

Moral values may shape vaccination attitudes.[22] Philosophical arguments regarding the morality of vaccination have been heavily debated.[23-26] Caregivers in our sample largely viewed vaccination via a moral lens encompassing parental duty to do the right thing for the child. In one situation, however, we found that the desire to 'do the right thing' may also translate into vaccination refusal in the backdrop of other past refusals, observing 'healthy unvaccinated' children, and having distrust of the health system. Quantitative research from high-income countries has shown that parents with unvaccinated children were more likely to perceive their children to be at low risk of vaccine-preventable diseases and were more likely to perceive low vaccine effectiveness and safety compared to parents with vaccinated children.[27] Our findings suggest that childhood immunisation communication efforts may resonate more strongly with caregivers when vaccination is framed around parental responsibilities to do the right thing for the child and the anticipated future benefits to parents. However, additional research is necessary to generate a better understanding of the morality of childhood vaccination in the Sierra Leonean context.

Across the interviews, there was an apparent tension in the relationship between caregivers and health workers. Caregivers often expressed their appreciation of health workers and empathized with the challenging context in which they do their work. Health workers were strongly viewed as authoritative sources of trusted information regarding immunisation and the child's health, which is consistent with findings from high-income countries[28-30] and LMICs.[31 32] Our findings on the role of monetary exchange in vaccination exemplify the complex relationship between caregivers and health workers in low-resource urban communities in Sierra Leone. Some caregivers voluntarily gave money to health workers as a 'token of appreciation' while others begrudgingly gave money because they viewed it as a condition for receiving good quality service from health workers. Interventions at the health systems level are necessary to help discourage informal payments to health workers—a practice that may perpetuate vaccination inequities among poor caregivers who are unable to meet monetary expectations.

Our findings also illuminate the need for interventions at the household and family level. Fathers were rarely involved in taking their children to the vaccination clinic but were often engaged in the decision-making processes. In the few instances when fathers were involved in taking their children to the clinic, the mothers felt supported, and their children were fully vaccinated. A study in Nigeria found that paternal involvement in immunisation was greater in rural settings compared to urban settings.[33] In urban areas, the same study found that paternal involvement was greater among educated fathers compared to uneducated fathers. In a separate study in Ghana, the involvement of educated fathers in the vaccination decision was associated with timelier vaccination uptake compared to the involvement of uneducated

fathers in the decision.[34] More broadly, shifting from a mother-child dyad to a family triad in the care of children has proven to have positive effects on paediatric health outcomes across diverse contexts.[35] Additional assessments and interventions are needed to explore and evaluate culturally appropriate ways to enhance the involvement of fathers in childhood immunisation in Sierra Leone and other similar LMIC settings.

Existing evidence suggests that vaccine safety concerns, often linked to adverse events following immunisation (AEFI), contribute to vaccine hesitancy.[36 37] Serious AEFIs may be 'triggering events' for derailing vaccine confidence and prompting active refusal among certain caregivers and their communities—especially when the serious AEFI is perceived to be linked to the vaccine or the vaccination process.[38] Together with prior evidence, these findings emphasize the need for robust AEFI surveillance and investigations[39] to identify, counsel, and follow-up with caregivers whose children experience AEFI, and therefore, are potentially at risk of missing subsequent vaccination. Health workers and CHWs may benefit from periodic in-service training on how to effectively communicate vaccine safety and address concerns about AEFIs.[40]

4.1. Limitations

There were several limitations to our assessment. First, it is possible that some nuanced meaning may have been lost when translating the audio recordings from Krio to English—especially since the transcripts were not back-translated from English to Krio due to resource constraints. Second, we only identified one caregiver who routinely and actively refused all vaccines for her child after experiencing a serious AEFI, which may reflect the overall rarity of zero-dose unvaccinated children in Sierra Leone (approximately 3%).[41] This was the only caregiver with a child that experienced a serious AEFI in our sample, which limits our ability to have a rich understanding of such experience among caregivers more broadly and the potential linkages to vaccination refusal. Although such experiences of serious AEFI are rare, they may have the tendency to get publicized in the community, which may negatively influence vaccination decisions among other caregivers. Taken together, our results call for additional qualitative assessments to get a deeper understanding of vaccination refusal within the Sierra Leonean context and other low-resource LMIC settings. Sampling strategies may therefore need to be adapted accordingly to focus on caregivers who actively refuse vaccination for their children. Lastly, our findings reflected gender dimensions that may be based on sociocultural norms in Sierra Leonean society but may also be due to sampling bias because the caregivers we conveniently recruited were mostly stay-at-home mothers.

5. Conclusions

As the COVID-19 pandemic disrupts childhood immunisation globally,[42] especially in LMICs, our assessment provides a foundational understanding of the challenges that caregivers encounter in urban settings in Sierra Leone. It also sheds light on opportunities to improve vaccination outcomes in urban poor settings, which is a global immunisation priority. The findings show that health system interventions, community engagement, and vaccination outreach may need to be tailored to for urban settings. Vaccine communication efforts may resonate more strongly with caregivers when vaccination is framed both around parental responsibilities to do the right thing for the child and the future benefits to the parent.

Competing interests

None declared.

Data availability

All data relevant to the study are included in the article or uploaded as supplementary information.

Contributors

MFJ, RS, MT, TS, and ML designed the assessment. MFJ, PP, SK, and KW analysed the data. MJF, PP, RS, SK, MT, KW, TS, and ML contributed to the interpretation of the results. MFJ, PP and SK drafted the manuscript. RS, MT, KW, TS, and ML contributed to revising the manuscript. All authors reviewed and approved the final manuscript.

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Table 1. Enablers of childhood vaccination–Western Area Urban, Sierra Leone, 2018

Meaning unit	Category	Sub-themes	Theme
Responsibility to ensure full vaccination	Parental responsibility	Emotional enablers of childhood vaccination	Enablers of childhood vaccination
Obligation to do the right thing			
Immunisation as a requirement			
Immunisation is important for baby's health	Wanting a 'strong and healthy baby'		
Wanting 'strong baby'			
'Health is wealth'			
Defaulting on vaccination risks baby's life			
Vaccination benefits the parent later in life	Parental anticipation of reciprocal benefit		
Taking care of parents when old			
Immunisation card is important	Diversity of immunisation reminders	Practical enablers of childhood vaccination	
Campaign as reminder			
Reminders by health workers at vaccination visit			
Husband as reminder			
Immunisation card as reminder			
Other family member as reminder			
Nurses should lead	Information access and information trust		
Nurses more trusted than CHWs			
Same information from different sources			
Immunisation promotion through radio/tv			
Immunisation promotion by health workers			
Immunisation promotion through leaders			
Immunisation promotion by NGOs			
Mothers take the child to the clinic	Getting fathers more involved		
Fathers rarely involved			
Father received an award for involvement			
Cordial relationship with nurses	Positive experiences with health worker		
Good care by nurses			
HWs encourage seeking care at HF			
Giving money to health worker as token of appreciation			
Husband asking about the visit	Post-vaccination information sharing		
Informing husband of next visit			
Telling husband about visit expenses			
Immunisation is a "learning process"			
Sharing experiences with neighbours or friends			
Other family members asking about the visit			

Table 2. Barriers related to childhood vaccination–Western Area Urban, Sierra Leone, 2018

Meaning unit	Category	Sub-themes	Themes
Asking husband for money	Preparing for the journey and getting to the clinic	Practical constraints	Barriers related to childhood vaccination
Juggling different household duties			
Competing priorities			
Time taken to get to the clinic			
Wasting time at the clinic	Inconveniences at the clinic		
Rush to arrive first and seen first			
Crowding at the clinic			
Very long wait at larger health facilities			
Spent a day and nothing happened			
Wasting caregiver's time			
Not respecting caregivers	Feeling disrespected by health workers	Negative experiences with health workers	
Shouting at caregivers			
Paying for the card	Monetary expectations		
Paying for free drugs			
Paying for weighing			
Payment as punishment			
Bad care without payment			
Health workers should stop demanding money			
Health worker don't appreciate less than Le 2000			
Health workers withholding free drugs			
Baby crying throughout the night	Vaccine side effects	Safety concerns	
Baby gets 'lazy' for few hours			
Fever in baby			
Swelling at injection site			
Side effects only for some vaccines			
Rub onion on swollen injection site			
Avoiding abnormalities from vaccine			
Afraid of vaccine side effects			

Table 3. Recommendations to improve childhood vaccination– Western Area Urban, Sierra Leone, 2018

Meaning unit	Category	Sub-theme	Theme
Continue campaigns at repeated intervals	Improving vaccination processes and systems	Caregivers want improved vaccination processes, systems, and engagement	Recommendations to improve childhood vaccination
Do not rely on campaigns alone			
Provision of incentives for caregivers			
Concentrate on defaulters			
Compensation/incentives for nurses			
Being considerate towards health workers			
Employ more staff			
Stop demanding money			
Promote consequences of not vaccinating	Engaging communities to		
Peer-to-peer promotion of immunisation			

Inform about importance of immunisation	boost vaccine confidence		
Address ‘stubborn’ caregivers			
Engage caregivers who do not want injections			

COREQ (COnsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
Personal characteristics			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	
Occupation	3	What was their occupation at the time of the study?	
Gender	4	Was the researcher male or female?	
Experience and training	5	What experience or training did the researcher have?	
Relationship with participants			
Relationship established	6	Was a relationship established prior to study commencement?	
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	
Interviewer characteristics	8	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	
Domain 2: Study design			
Theoretical framework			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	
Participant selection			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	
Sample size	12	How many participants were in the study?	
Non-participation	13	How many people refused to participate or dropped out? Reasons?	
Setting			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	
Data collection			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	
Repeat interviews	18	Were repeat inter views carried out? If yes, how many?	
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	
Field notes	20	Were field notes made during and/or after the inter view or focus group?	
Duration	21	What was the duration of the inter views or focus group?	
Data saturation	22	Was data saturation discussed?	
Transcripts returned	23	Were transcripts returned to participants for comment and/or	

Topic	Item No.	Guide Questions/Description	Reported on Page No.
		correction?	
Domain 3: analysis and findings			
Data analysis			
Number of data coders	24	How many data coders coded the data?	
Description of the coding tree	25	Did authors provide a description of the coding tree?	
Derivation of themes	26	Were themes identified in advance or derived from the data?	
Software	27	What software, if applicable, was used to manage the data?	
Participant checking	28	Did participants provide feedback on the findings?	
Reporting			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	
Data and findings consistent	30	Was there consistency between the data presented and the findings?	
Clarity of major themes	31	Were major themes clearly presented in the findings?	
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

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TITLE PAGE

Title

Qualitative assessment of caregiver experiences when navigating childhood immunisation in urban communities in Sierra Leone

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ABSTRACT

Objective: To gain in-depth understanding of the caregiver experience when navigating urban immunisation services for their children.

Design: An exploratory qualitative assessment comprising 16 in-depth interviews using an interpretative phenomenology approach.

Setting: Caregivers were purposively recruited from slums (n=8) and other urban communities (n=8) in the capital city of Sierra Leone.

Participants: Caregivers of children ages 6 to 36 months old who were fully vaccinated (n=8) or under-vaccinated (n=8).

Results: Emotional enablers of vaccination were evident in caregivers' sense of parental obligation to their children while also anticipating reciprocal benefits in children's ability to take care of the parents later in life. Practical enablers were found in the diversity of immunization reminders, information access, information trust, getting fathers more involved, positive experiences with health workers, and post-vaccination information sharing in the community. Underlying barriers to childhood vaccination were due to practical constraints such as overcrowding and long waiting times at the clinic, feeling disrespected by health workers, expecting to give money to health workers for free services, and fear of serious vaccine side effects. To improve vaccination outcomes, caregivers desired more convenient and positive clinic experiences and deeper community engagement.

Conclusions: Health system interventions, community engagement, and vaccination outreach need to be tailored to for urban settings. Vaccine communication efforts may resonate more strongly with caregivers when vaccination is framed both around parental responsibilities to do the right thing for the child and the future benefits to the parent.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- This qualitative assessment describes the caregiver experience in navigating childhood immunisation services in urban settings in a low-income country to gain insights for improving vaccination outcomes.

- The sample comprised of caregivers of fully vaccinated and under-vaccinated children who were purposively recruited to help understand how the two outcomes may be shaped by differences in the caregiver experiences.

- The rarity of experiencing serious side effects among children in our sample limits the ability to have a rich understanding of such experiences on subsequent vaccination uptake.

1. Introduction

There have been efforts to understand urban immunisation challenges in low- and middle-income countries (LMICs), including in urban slums and informal settlements.[1] Assessment of immunisation barriers in urban areas in LMICs identified a range of practical and social issues, such as population mobility, inaccurate denominators of children due to out-of-date population estimates and poorly defined geographic catchment areas, the lack of trust in the health system among vulnerable groups, overburdened health facilities, and weak community engagement and outreach.[2]

In Sierra Leone, the 2014-2016 Ebola epidemic disrupted the delivery of essential health services, including immunisation services, especially in urban areas.[3 4] Barriers that affected routine health services included the fear of contracting Ebola in health facilities, stigmatization of health workers, and shifting of resources to the epidemic.[5] As the Ebola epidemic waned, measles outbreaks became more frequent due to the decline in measles vaccination.[6] In the aftermath of the Ebola epidemic, the Government of Sierra Leone and its partners made major investments to rebuild health systems and restore public confidence in the health system.[7 8] However, challenges in access to and the uptake of immunisation services persist, including in urban areas.[9]

The United Nations Children's Fund (UNICEF) and partners developed the Caregiver Journey Framework to guide countries in understanding the experiences, processes, and structures that shape how caregivers seek and receive health services for their children, including essential immunisation.[10] In 2018, we operationalized the Caregiver Journey Framework through a qualitative approach in the Western Area Urban district (WAU) in Sierra Leone. Implementation experiences from operationalizing the framework in the context of urban immunization has been described elsewhere.[11] The framework was operationalized into several domains to understand decision-making and preparation for vaccination visits, making the journey to clinics, experiences during vaccination visits, and post-vaccination experiences. Building on these domains, we aimed to describe the real-world experiences of caregivers of vaccine-eligible children as they navigate urban immunisation services in Sierra Leone to identify vaccination enablers and barriers.

2. Methods

We aimed to understand how household dynamics, social factors, and formal healthcare delivery systems influence childhood immunisation uptake via the lens of primary caregivers of vaccine-eligible children in urban settings in Sierra Leone. Hence, we developed the Immunisation Caregiver Journey Interviews

(ICJI) approach[11] based on the Caregiver Journey Framework using principles of interpretative phenomenology,[12 13] which focuses on elucidating the essence of common experiences to explain, interpret, and make sense of a phenomenon.[14] We used a phenomenological approach to explore the lifeworld of caregivers in how they navigate childhood immunisation for their children repeatedly in low-resource, urban settings.[11] A semi-structured ICJI guide was used to explore the following domains: Decision-making and preparation, making the journey, experiences during vaccination visit, post-vaccination experiences, intentions to return, and perceptions of immunisation promotion activities in the community.

2.1. Setting

The WAU district in Sierra Leone comprises most of the capital city of Freetown with approximately 1.2 million inhabitants.[15] The district was heavily affected by the Ebola epidemic, partly due to high population movements and crowded housing conditions.[16] On average, there is less than one medical doctor per 10,000 population.[17] The Government of Sierra Leone introduced the Free Health Care Initiative in 2010 to remove cost barriers for essential health services for pregnant and lactating mothers and under-five children.[18] Childhood immunisation services are delivered through the Expanded Program on Immunisation using fixed sites that are supplemented by community outreach services to be conducted five times monthly.[19] Each catchment community has 10 community health workers (CHWs) who support the promotion of health services on a voluntary basis.[20] A coverage survey in 2019 estimated 86% coverage for three doses of diphtheria-pertussis-tetanus (DPT) vaccine in slums and 92% coverage in non-slum urban areas in the WAU district. However, coverage of the second dose of measles-containing vaccine was very low in the district (33% in slums and 29% in non-slum urban areas).[9]

2.2. Sampling and data collection

The sample size for this qualitative assessment was guided by an approach that focuses on *qualitative information power*.[21] The concept of information power posits that researchers should determine the sample size in a qualitative assessment based on the aim (narrow versus broad), sample specificity (targeting specific group versus multiple groups), theoretical underpinning (application of theory or no theory), quality of dialogue (weak or strong), and analysis strategy (within-case only or cross-case). Sample size burden increases when the aim is broad, multiple groups are targeted in the sample, the assessment is theory-driven, the quality of the dialogue is weak, and transcripts are analysed using cross-case analysis. In our assessment, the aim was narrow, the sample targeted a specific group, we applied theory to guide the assessment, the transcripts contained rich information, and we conducted both within-case and cross-case analyses. Against these considerations, we interviewed 16 caregivers and

progressively reviewed debrief notes from the interviews to assess information power. In analysing the transcripts, we concluded that we reached saturation with the 16 interviews and likely could have stopped interviewing after the 12th interview.

We purposively recruited the caregivers from eight communities in the WAU district, four of which were slums and four were other urban areas in the district to maximize variation in the sample. Within each community, two caregivers of children ages 6-36 months were selected to capture a breadth of experiences of caregivers with vaccine eligible children—one whose child was fully vaccinated for age and another whose child had missed at least one scheduled vaccination visit. CHWs supported data collection teams in visiting households to identify and recruit eligible caregivers in the selected communities. Snowball sampling was used as a secondary sampling strategy when the first identified caregiver declined to interview but knew of other caregivers in the community with vaccine-eligible children or when CHWs were only successful in identifying just one eligible caregiver. In this form of snowball sampling, a previously visited household with an eligible child would point data collectors to other households with potentially eligible children (i.e., vaccine eligible children). Data collectors visited such households to screen for eligibility. This process continued until two caregivers of eligible children were successfully recruited and interviewed from a particular community. Interviews were conducted on the same of day of recruitment after obtaining informed consent from the caregiver.

We recruited data collectors (interviewers and notetakers) who were fluent in English and the predominant local language in the WAU district (Krio). The data collectors had post-secondary educational training in social sciences and were experienced in conducting qualitative data collection in Sierra Leone. Two behavioural scientists trained the facilitators for a week on the assessment protocol. One of the trainers was from Sierra Leone and had experience conducting social science research in Sierra Leone. During the training, the English version of the guide was translated into Krio by locally hired staff together with the facilitators and trainer. The data collectors were trained on how to probe on the spot to obtain additional pertinent information from caregivers. Data collection occurred in August–September 2018. All interviews were audio-recorded with permission from participants; they were then transcribed and translated into English by the local team. Interviews lasted about an hour on average and were conducted in the vicinity of the homes of the caregivers. Data collection teams were trained on choosing suitable interview locations to enable caregivers to speak freely. The facilitators conducted debriefing sessions immediately after each interview to make note of key experiences and observations. The debriefing notes were not part of the formal analysis. However, during the field work, the debriefing notes were used to progressively assess data saturation and to identify key insights emerging from the

interviews. We used the insights from the debrief notes to develop a preliminary report that was mostly in a descriptive, narrative form. The de-identified preliminary report was shared with the Sierra Leone Ministry of Health and Sanitation. We have previously documented practical lessons learned from implementing the assessment in Sierra Leone.[11]

2.3. Data analysis

Two analysts (one male, one female) read all transcripts and created analytic memos and then analysed the transcripts using both within-case and cross-case analysis. In the within-case analysis, we developed a narrative profile for each caregiver to bring key aspects of their lived experiences to the foreground. In the initial part of the cross-case analysis, each analyst coded three different transcripts (six total), using an inductive approach to identify and interpret meaning units within the text. To gain alternative interpretations of the coded meaning units, three of the coded transcripts were shared with a third qualitative expert, who was not involved in the previous stages of the assessment, for independent 'blind' coding of the transcripts. Feedback from the third analyst was discussed by the two primary analysts and incorporated into the coding scheme. The analysts used an iterative process to review their codes, discuss their interpretations of the manifest content, and harmonize the initial set of codes that were used for coding the remaining manuscripts. NVivo software (QSR International–2018, Version 12) was used for the final organization and coding of the transcripts. Manifest categories of meaning units were grouped to reflect latent content that was developed into cross-cutting themes via a consultative process. Throughout the process, the analysts exercised reflexivity regarding subjective interpretations and iteratively re-examined the transcripts to identify alternative interpretations until consensus was reached with additional inputs from the co-authors.

2.4. Ethical approval

The assessment was approved by the Sierra Leone Ethics and Scientific Review Committee (SLESRC-17052018), Columbia University Medical Centre Institutional Review Board (IRB-AAAR9031), and the Centre for Global Health at the U.S. Centres for Disease Control and Prevention (CGH-2018-184). All participants provided written informed consent.

2.5. Patient and public involvement

No patient involved.

3. Results

All respondents were the biological mothers of the sampled children except for one female guardian. The median age was nine months for the children included in the assessment. At the time of the interviews, half of the children had missed at least one scheduled vaccine dose. Three themes emerged from the interviews around vaccination enablers (Table 1), vaccination barriers (Table 2) and direct recommendation to improve vaccination uptake (Table 3). There were no notable differences in themes between slums and other urban communities.

3.1. Enablers of childhood vaccination (Table 1)

Our analysis identified emotional and practical enablers related to childhood vaccination. Emotional enablers were evident in how caregivers portrayed their parental obligation to their children, wanting to do the right thing for their children's health, and anticipating reciprocal benefits in children's ability to take care of the parents later in life. Practical enablers were the diversity of immunization reminders, information access, information trust, getting fathers more involved, positive experiences with health workers, and post-vaccination information sharing at the community level.

3.1.1. Parental responsibility

A sense of parental responsibility was a major motivating factor for caregivers to seek vaccination services for their children. Caregivers viewed vaccination as 'doing the right thing' for their children. Even caregivers who had missed scheduled vaccination visits felt responsible for getting their children caught up with their scheduled vaccine doses, which often required deprioritizing other income-generating activities.

> *"It is my duty to take my baby to the hospital for immunisation. It is my responsibility as [a] mother to ensure that my baby completes the rounds of immunisation without defaulting."* – Caregiver whose child had missed a scheduled vaccination

3.1.2. Wanting a strong and healthy baby

In addition to the affective responses regarding a sense of duty to the child, appreciating the overall health benefits of vaccination to their children was another major driving force in motivating caregivers to seek vaccination services. Caregivers consistently expressed that immunisation has essential health benefits to the child and that missing scheduled vaccination would 'risk the baby's life.' Moreover, they valued having a 'strong and healthy baby' and felt that completing the vaccination schedule would positively impact the baby's health.

"I think [the] vaccine is good for our children. It is important and it helps to build their immune system to keep them strong and healthy; it fights against many things in the body…" – Caregiver whose child was fully vaccinated

3.1.3. Parental anticipation of reciprocal benefit

Perceptions of vaccination benefits went beyond the direct health benefits to children and extended into domains of benefit to the parent. The notion that vaccinated children will be healthier and in turn live longer and be able to take care of their parents later in life emerged as a dimension of vaccination benefit to the parent. This duality of vaccination benefit was grounded in the cultural context of parents expecting reciprocal care from their children when the parents can no longer care for themselves.

"It is very difficult for me to be absent for immunisation or not to take my baby to the hospital when sick. Sometimes people think I'm mad but I'm not. I'm trying to bring up my children in a way that they will benefit me when I'm old." – Caregiver whose child had missed a scheduled vaccination

3.1.4. Diversity of immunisation reminders

Caregivers were exposed to numerous reminders and cues to vaccinate their children, including information from the immunisation cards, health workers, community campaigns, and family members. However, the child's immunisation card stood out as the most important reminder that caregivers and families relied on to remember the dates of the scheduled vaccination visits.

"I do remind myself because they [health workers] will write at the back of the immunisation card the date for the next visit. The immunisation card will tell you the date for the next visit. – Caregiver whose child had missed a scheduled vaccination

In addition, community outreach campaigns and announcements in the community were also viewed as helpful reminders to vaccinate.

"The health workers in this community and the CHWs are doing well as they do go round telling people not to forget to take their babies to the hospital for immunisation." – Caregiver whose child had missed a scheduled vaccination

3.1.5. Information access and information trust

Immunisation information sources varied, but caregivers consistently cited health workers as trusted sources of information. Nurses were more trusted than lay CHWs because caregivers viewed nurses as

more knowledgeable. While waiting in line before immunisation services, most caregivers appreciated the 'health talk' they received from nurses who advised on health and immunisation.

> *"I trust them [nurses] because they are a team of qualified nurses … Before they come here, they know everything about the vaccines and any implications of the vaccines. They are able to explain more than the CHWs and other community workers in the area. The nurses will tell you more. There are things that the community workers do not know, and they refer you to the nurses.*" – Caregiver whose child was fully vaccinated

3.1.6. Getting fathers more involved

Mothers desired greater involvement by the child's fathers in supporting their children's vaccination. In most instances, fathers were rarely involved in taking their children to the vaccination clinic. We uncovered only two instances when fathers actively supported their children's vaccination visits. In those instances, the mothers felt supported, and their children were fully vaccinated. In one situation, a father that routinely accompanied the child to the vaccination clinic was celebrated by health workers and given the 'best father' award.

> *"There was [a] time when he [my husband] was given the best father award [at the clinic] because he is always with me at the hospital. That is the name I have also given to my husband. Even when the baby is crying, I will say 'best father' take your baby."* – Caregiver whose child was fully vaccinated

3.1.7. Positive experiences with health workers

During vaccination visits, positive experiences with health workers encouraged caregivers to vaccinate their children. Positive experiences included having a cordial relationship with the health workers. In particular, caregivers expressed that the nurses took good care of their children, made them feel comfortable, and tried to build a good rapport. Some caregivers said they would voluntarily give small amounts of money to health workers as a token of their appreciation after vaccinating the child.

> *"...the nurses do encourage you and will make jokes so that you will laugh at the end of the day. There is a lot of fun [interactions], which made some of us forget about our stresses."* – Caregiver whose child was fully vaccinated

3.1.8. Post-vaccination information sharing

Information exchange at the community level with trusted community members strengthened caregiver confidence in childhood vaccination. Upon returning home from the vaccination visit, caregivers often discussed the clinic experience with their spouses, families, and other caregivers in the community. In

addition to information obtained from health workers at the clinic, caregivers also sought advice from other 'more experienced' caregivers in the community.

> *"Most times after immunisation, my baby will run a temperature, but the health workers always provide drugs to counter the fever. We have caregivers in this community with vast knowledge and since this is my first baby, I love to talk to them so that we can share our experiences which will be of advantage to me as I'm very new in the field [of parenting]."* –Caregiver whose child was fully vaccinated

3.2. Barriers related to childhood vaccination (Table 2)

Practical constraints, negative experiences with health workers, and safety concerns were the underlying barriers to childhood vaccination. Practical constraints included challenges faced when preparing for and getting to the vaccination clinic and inconveniences encountered at the clinic, such as overcrowding and long waiting times. Negative experiences among caregivers included feeling disrespected by health workers while simultaneously expecting to give money to health workers for services that are supposed to be free of charge. Finally, vaccine side effects led to concerns and fears about vaccine safety.

3.2.1. Preparing for the journey and getting to the clinic

Caregivers commonly cited the need to juggle 'household duties' and other income-generating activities when planning the visit as a barrier, especially in the absence of fathers' involvement in taking the child to the clinic. In addition, mothers frequently depended on their children's fathers for financial support to cover the expenses related to the vaccination clinic visit. Some caregivers recounted needing to travel long distances up to an hour by foot to get to the vaccination clinic, especially when they could not afford public transportation.

3.2.2. Inconveniences at the clinic

Caregivers anticipated various inconveniences at the vaccination visit. The prolonged time spent waiting for the child to be vaccinated emerged as a substantial inconvenience that was more pronounced when seeking immunisation services, especially in larger facilities. Anticipating the long wait, caregivers usually tried to arrive early at the vaccination site to get seen first. The range of activities involved with the child health visit prolonged the visit, including weighing the baby as part of growth monitoring and other health checks.

> *"It is painful if you waste much time at the health facility because you have other issues to attend to. To avoid that, that is why I always come early to the health facility."* – Caregiver whose child was fully vaccinated

3.2.3. Feeling disrespected by health workers

Caregivers often felt disrespected by health workers during the vaccination visit. A key complaint was that health workers shouted at caregivers and sometimes used vulgar language toward caregivers. In other instances, they complained that some health workers habitually arrived late to the vaccination session, which further prolonged the time caregivers spent waiting.

3.2.4. Monetary expectations

Systemically hidden costs generated substantial dissatisfaction among caregivers. Caregivers needed to "shake hands" with health workers at different times of the visit (e.g., first time registering the child to get a card, before entering the facility, and before weighing the baby). Shaking hands implied giving some money during the handshake. Caregivers used the money to 'fast-track' their children's vaccination. The expectations around monetary exchange discouraged caregivers who could not afford to shake hands with health workers.

> *"Sometimes if I don't want to spend much time at the hospital, I will shake the hand of the nurse so that they can fast track the immunisation of my baby. I will give them something like two thousand Leones or whatever I have with me at that moment… Health is wealth and they [health workers] don't need us but we do [need them]. The money we give is nothing compared to the health of our children… At the end of the day, we will grumble on our way home as the services are supposed to be free for our children, yet we are paying for it. The health workers are really trying, but the idea for them to take money from us is bad. And if you don't give them money, they will talk to you carelessly."* – Caregiver whose child was fully vaccinated

In a separate domain of monetary exchange, health workers demanded money as a form of 'punishment' to caregivers who missed their children's scheduled vaccination appointments.

> *"If you failed to take your baby to the hospital on [the] stipulated date, you will definitely have to pay some amount at the end of the day in the form of punishment. You must pay five thousand or more."* – Caregiver whose child was fully vaccinated

3.2.5. Vaccine side effects

Caregivers cited numerous instances when their children experienced vaccine side effects such as 'fever,' 'swelling at the injection site,' and the 'baby becoming lethargic.' Fever was the most common side effect, and the caregivers knew to administer fever-reducing medication as instructed by health workers.

When there was swelling at the injection site, a common practice among caregivers was to massage the swollen area, sometimes with an onion or a bar of soap to try to reduce the swelling.

> *"Sometimes my baby's leg becomes swollen... because some nurses are heavy-handed, and I meet several nurses when I visit the hospital. Sometimes the leg gets swollen, and they treat him. I have to rub the leg to avoid swelling… I use soap to rub off the swelling and I give Panadol to stop the fever… some people say you should not allow every nurse to administer [an]injection to the child. I should have a permanent nurse that gives injection to my child without swelling."* – Caregiver whose child missed a scheduled vaccination

In one rare situation, a caregiver had a prior child who experienced fever, convulsed, and died a few days after getting vaccinated. Therefore, the caregiver decided to not vaccinate subsequent children.

> *"After the immunisation, my baby started running temperature, I administered paracetamol as I was told by the health workers. The baby convulsed and that was the end of that baby. I don't want a repeat of that in my life. I have therefore decided not to take my babies for immunisation anymore"* – Caregiver whose child missed a scheduled vaccination

Besides passive acceptance of the BCG vaccine at the birth of the youngest child, this same caregiver actively refused all other vaccines despite encouragement by a family member to vaccinate the child.

> *"I'm not outrightly saying it was as a result of the immunisation [that my child died]; as every death is the work of God. But from what I have gathered so far, I have personally decided not to take my baby to the health facility to be immunized. It is not that I'm tired of going to the health facility or because of the distance or money. I do get a lot of pressure from my aunt to take my baby to the health facility for immunisation, but the thing is that I just don't trust the system and what immunisation does.* – Caregiver whose child missed a scheduled vaccination

From the perspective of this same caregiver, the vaccinated child died but the unvaccinated children survived and thrived, which was cited as a reason for refusing vaccination.

> *"I believe in exclusive breastfeeding, sometimes for two years and a half and sometimes [only] two years. My baby is now two years seven months old and doing well like any of those children that are on immunisation or have completed…Just as I was saying, sometimes my heart will tell me to take the baby for immunisation but after thinking of the past experience, I would decide not to. I'm now used to that… The simple fact here is that, since the other children are doing well without immunisation, I will not take [the baby] to the health facility for immunisation and that is all."* – Caregiver whose child missed a scheduled vaccination

3.3. Recommendations to improve childhood vaccination (Table 3)

The direct recommendations provided by caregivers were categorized into (1) improving vaccination process and systems and (2) engaging communities to boost vaccine confidence. Implementing community outreach campaigns for immunisation at regular intervals with a focus on defaulters was recommended by participants to improve vaccination outcomes. In addition, caregivers wanted health workers and community leaders to be involved in immunisation promotion along with the CHWs. They wanted the vaccination clinic experience to improve and become more conducive to caregivers, including shorter wait time at the clinic and more positive interactions with health workers. Lastly, caregivers wanted health workers to stop demanding money from them, though they may not mind giving money, out of free-will, as a token of appreciation when they could afford it.

> *"In addition, you should engage the Chiefs, because in each area we have Chiefs to spread out this message. You could educate them so that they in turn can educate those in the community. Let us have Town Criers go around disseminating the messages. It would be nice for them to allocate people in the health centre who move from house to house to educate the breastfeeding mothers because some of us are stubborn to come onboard."* – Caregiver whose child was fully vaccinated

4. Discussion

Our qualitative analysis highlighted several important themes. In the backdrop of anticipated benefits to both the child and parent, vaccination intention was motivated by a feeling of parental responsibility to 'do the right thing.' Timely and trusted exchange of information together with social support and positive experiences at the vaccination clinic were important facilitators of vaccination. In contrast, vaccination was discouraged by negative interactions with health workers at the clinic, the occurrence and fear of vaccine side effects, multitude of 'hidden' costs, juggling vaccination with other responsibilities, and inconveniences, such as long traveling time to the clinic and long delays at the clinic. Nevertheless, caregivers were resilient in devising ways to try to get their children vaccinated such as walking on foot up to an hour to get to the clinic when they could not afford public transportation. Lastly, caregivers wanted the vaccination experience to improve, and they desired stronger community engagement to help optimize vaccination outcomes. However, systemic issues, such as informal payments, overcrowding in health facilities, and the reported overburdened health workers may require interventions at the health systems level. These themes from Sierra Leone provide in-depth insights regarding the motivations, facilitators, and barriers of vaccination in an urban LMIC setting.

Moral values may shape vaccination attitudes.[22] Philosophical arguments regarding the morality of vaccination have been heavily debated.[23-26] Caregivers in our sample largely viewed vaccination via a moral lens encompassing parental duty to do the right thing for the child. In one situation, however, we found that the desire to 'do the right thing' may also translate into vaccination refusal in the backdrop of other past refusals, observing 'healthy unvaccinated' children, and having distrust of the health system. Quantitative research from high-income countries has shown that parents with unvaccinated children were more likely to perceive their children to be at low risk of vaccine-preventable diseases and were more likely to perceive low vaccine effectiveness and safety compared to parents with vaccinated children.[27] Our findings suggest that childhood immunisation communication efforts may resonate more strongly with caregivers when vaccination is framed around parental responsibilities to do the right thing for the child and the anticipated future benefits to parents. However, additional research is necessary to generate a better understanding of the morality of childhood vaccination in the Sierra Leonean context.

Across the interviews, there was an apparent tension in the relationship between caregivers and health workers. Caregivers often expressed their appreciation of health workers and empathized with the challenging context in which they do their work. Health workers were strongly viewed as authoritative sources of trusted information regarding immunisation and the child's health, which is consistent with findings from high-income countries[28-30] and LMICs.[31 32] Our findings on the role of monetary exchange in vaccination exemplify the complex relationship between caregivers and health workers in low-resource urban communities in Sierra Leone. Some caregivers voluntarily gave money to health workers as a 'token of appreciation' while others begrudgingly gave money because they viewed it as a condition for receiving good quality service from health workers. Interventions at the health systems level are necessary to help discourage informal payments to health workers—a practice that may perpetuate vaccination inequities among poor caregivers who are unable to meet monetary expectations.

Our findings also illuminate the need for interventions at the household and family level. Fathers were rarely involved in taking their children to the vaccination clinic but were often engaged in the decision-making processes. In the few instances when fathers were involved in taking their children to the clinic, the mothers felt supported, and their children were fully vaccinated. A study in Nigeria found that paternal involvement in immunisation was greater in rural settings compared to urban settings.[33] In urban areas, the same study found that paternal involvement was greater among educated fathers compared to uneducated fathers. In a separate study in Ghana, the involvement of educated fathers in the vaccination decision was associated with timelier vaccination uptake compared to the involvement of uneducated

fathers in the decision.[34] More broadly, shifting from a mother-child dyad to a family triad in the care of children has proven to have positive effects on paediatric health outcomes across diverse contexts.[35] Additional assessments and interventions are needed to explore and evaluate culturally appropriate ways to enhance the involvement of fathers in childhood immunisation in Sierra Leone and other similar LMIC settings.

Existing evidence suggests that vaccine safety concerns, often linked to adverse events following immunisation (AEFI), contribute to vaccine hesitancy.[36 37] Serious AEFIs may be 'triggering events' for derailing vaccine confidence and prompting active refusal among certain caregivers and their communities—especially when the serious AEFI is perceived to be linked to the vaccine or the vaccination process.[38] Together with prior evidence, these findings emphasize the need for robust AEFI surveillance and investigations[39] to identify, counsel, and follow-up with caregivers whose children experience AEFI, and therefore, are potentially at risk of missing subsequent vaccination. Health workers and CHWs may benefit from periodic in-service training on how to effectively communicate vaccine safety and address concerns about AEFIs.[40]

4.1. Limitations

There were several limitations to our assessment. First, it is possible that some nuanced meaning may have been lost when translating the audio recordings from Krio to English—especially since the transcripts were not back-translated from English to Krio due to resource constraints. Second, we only identified one caregiver who routinely and actively refused all vaccines for her child after experiencing a serious AEFI, which may reflect the overall rarity of zero-dose unvaccinated children in Sierra Leone (approximately 3%).[41] This was the only caregiver with a child that experienced a serious AEFI in our sample, which limits our ability to have a rich understanding of such experience among caregivers more broadly and the potential linkages to vaccination refusal. Although such experiences of serious AEFI are rare, they may have the tendency to get publicized in the community, which may negatively influence vaccination decisions among other caregivers. Taken together, our results call for additional qualitative assessments to get a deeper understanding of vaccination refusal within the Sierra Leonean context and other low-resource LMIC settings. Sampling strategies may therefore need to be adapted accordingly to focus on caregivers who actively refuse vaccination for their children. Lastly, our findings reflected gender dimensions that may be based on sociocultural norms in Sierra Leonean society but may also be due to sampling bias because the caregivers we conveniently recruited were mostly stay-at-home mothers.

5. Conclusions

As the COVID-19 pandemic disrupts childhood immunisation globally,[42] especially in LMICs, our assessment provides a foundational understanding of the challenges that caregivers encounter in urban settings in Sierra Leone. It also sheds light on opportunities to improve vaccination outcomes in urban poor settings, which is a global immunisation priority. The findings show that health system interventions, community engagement, and vaccination outreach may need to be tailored to for urban settings. Vaccine communication efforts may resonate more strongly with caregivers when vaccination is framed both around parental responsibilities to do the right thing for the child and the future benefits to the parent.

Competing interests

None declared.

Data availability

All data relevant to the study are included in the article or uploaded as supplementary information.

Contributors

MFJ, RS, MT, TS, and ML designed the assessment. MFJ, PP, SK, and KW analysed the data. MJF, PP, RS, SK, MT, KW, TS, and ML contributed to the interpretation of the results. MFJ, PP and SK drafted the manuscript. RS, MT, KW, TS, and ML contributed to revising the manuscript. All authors reviewed and approved the final manuscript.

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Disclaimer

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Table 1. Enablers of childhood vaccination–Western Area Urban, Sierra Leone, 2018

Meaning unit	Category	Sub-themes	Theme
Responsibility to ensure full vaccination	Parental responsibility	Emotional enablers of childhood vaccination	Enablers of childhood vaccination
Obligation to do the right thing			
Immunisation as a requirement			
Immunisation is important for baby's health	Wanting a 'strong and healthy baby'		
Wanting 'strong baby'			
'Health is wealth'			
Defaulting on vaccination risks baby's life			
Vaccination benefits the parent later in life	Parental anticipation of reciprocal benefit		
Taking care of parents when old			
Immunisation card is important	Diversity of immunisation reminders	Practical enablers of childhood vaccination	
Campaign as reminder			
Reminders by health workers at vaccination visit			
Husband as reminder			
Immunisation card as reminder			
Other family member as reminder			
Nurses should lead	Information access and information trust		
Nurses more trusted than CHWs			
Same information from different sources			
Immunisation promotion through radio/tv			
Immunisation promotion by health workers			
Immunisation promotion through leaders			
Immunisation promotion by NGOs			
Mothers take the child to the clinic	Getting fathers more involved		
Fathers rarely involved			
Father received an award for involvement			
Cordial relationship with nurses	Positive experiences with health worker		
Good care by nurses			
HWs encourage seeking care at HF			
Giving money to health worker as token of appreciation			
Husband asking about the visit	Post-vaccination information sharing		
Informing husband of next visit			
Telling husband about visit expenses			
Immunisation is a "learning process"			
Sharing experiences with neighbours or friends			
Other family members asking about the visit			

Table 2. Barriers related to childhood vaccination–Western Area Urban, Sierra Leone, 2018

Meaning unit	Category	Sub-themes	Themes
Asking husband for money	Preparing for the journey and getting to the clinic	Practical constraints	Barriers related to childhood vaccination
Juggling different household duties			
Competing priorities			
Time taken to get to the clinic			
Wasting time at the clinic	Inconveniences at the clinic		
Rush to arrive first and seen first			
Crowding at the clinic			
Very long wait at larger health facilities			
Spent a day and nothing happened			
Wasting caregiver's time			
Not respecting caregivers	Feeling disrespected by health workers	Negative experiences with health workers	
Shouting at caregivers			
Paying for the card	Monetary expectations		
Paying for free drugs			
Paying for weighing			
Payment as punishment			
Bad care without payment			
Health workers should stop demanding money			
Health worker don't appreciate less than Le 2000			
Health workers withholding free drugs			
Baby crying throughout the night	Vaccine side effects	Safety concerns	
Baby gets 'lazy' for few hours			
Fever in baby			
Swelling at injection site			
Side effects only for some vaccines			
Rub onion on swollen injection site			
Avoiding abnormalities from vaccine			
Afraid of vaccine side effects			

Table 3. Recommendations to improve childhood vaccination– Western Area Urban, Sierra Leone, 2018

Meaning unit	Category	Sub-theme	Theme
Continue campaigns at repeated intervals	Improving vaccination processes and systems	Caregivers want improved vaccination processes, systems, and engagement	Recommendations to improve childhood vaccination
Do not rely on campaigns alone			
Provision of incentives for caregivers			
Concentrate on defaulters			
Compensation/incentives for nurses			
Being considerate towards health workers			
Employ more staff			
Stop demanding money			
Promote consequences of not vaccinating	Engaging communities to		
Peer-to-peer promotion of immunisation			

Inform about importance of immunisation	boost vaccine confidence		
Address ‘stubborn’ caregivers			
Engage caregivers who do not want injections			

COREQ (COnsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
Personal characteristics			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	
Occupation	3	What was their occupation at the time of the study?	
Gender	4	Was the researcher male or female?	
Experience and training	5	What experience or training did the researcher have?	
Relationship with participants			
Relationship established	6	Was a relationship established prior to study commencement?	
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	
Interviewer characteristics	8	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	
Domain 2: Study design			
Theoretical framework			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	
Participant selection			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	
Sample size	12	How many participants were in the study?	
Non-participation	13	How many people refused to participate or dropped out? Reasons?	
Setting			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	
Data collection			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	
Repeat interviews	18	Were repeat inter views carried out? If yes, how many?	
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	
Field notes	20	Were field notes made during and/or after the inter view or focus group?	
Duration	21	What was the duration of the inter views or focus group?	
Data saturation	22	Was data saturation discussed?	
Transcripts returned	23	Were transcripts returned to participants for comment and/or	

Topic	Item No.	Guide Questions/Description	Reported on Page No.
		correction?	
Domain 3: analysis and findings			
Data analysis			
Number of data coders	24	How many data coders coded the data?	
Description of the coding tree	25	Did authors provide a description of the coding tree?	
Derivation of themes	26	Were themes identified in advance or derived from the data?	
Software	27	What software, if applicable, was used to manage the data?	
Participant checking	28	Did participants provide feedback on the findings?	
Reporting			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	
Data and findings consistent	30	Was there consistency between the data presented and the findings?	
Clarity of major themes	31	Were major themes clearly presented in the findings?	
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

Once you have completed this checklist, please save a copy and upload it as part of your submission. DO NOT include this checklist as part of the main manuscript document. It must be uploaded as a separate file.