Strategies to revitalize immunization service provision in urban settings of Ethiopia

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Abstract

Background: Improving routine immunization in the urban population is an essential element to address immunization coverage and equity. In rural areas, deliberate efforts are made to reach the populations using adapted strategies such as outreaches while specificities of urban populations are generally not considered in immunization programs of Ethiopia.

Aim: To explore the barriers and alternative strategies for immunization service provision in urban settings of Ethiopia.

Methods: A qualitative study with a phenomenological study design was conducted in selected cities of Addis Ababa, Dire Dawa and Mekele from June to August 2020. Data was collected at different levels of the health system and the community by using a piloted interview guide. Thirty-five key informants and nine in-depth interviews were conducted. Audio-records of interviews were transcribed verbatim, coded and thematic analysis was performed using Open code version 4.02. software.

Results: Our finding revealed that the routine immunization service provision strategy in Addis Ababa, Dire Dawa and Mekele cities was a static approach. Service inaccessibility, poor defaulter tracking mechanisms, substandard service in private facilities, shortage of supplies, and lack of training were the main barriers. We explored alternative strategies to revitalize the Expanded Program on Immunization (EPI) including, expanding services to marginalized populations, outreach/home to home service provision, expanding services to private health facilities, and inter-facility linkage through digitalization.

Conclusions: The existing immunization service provision strategies in urban settings are not adequate to reach all children. Immunization service inaccessibility and substandard services were the main barriers hindering service provision. Program managers should expand routine service access to marginalized populations through outreach services, by strengthening the public-private partnership, and integrating technological innovations (like digitalization of the EPI program and application of mHealth reminders) to facilitate inter-facility linkage. [*Ethiop. J. Health Dev.* 2021; 35(SI-3):98-110]

Keywords: Immunization, Vaccination, Urban, Revitalize, Private Facility, Ethiopia

Background

Vaccine-preventable diseases (VPDs) are among the major causes in children under-five years of age mortality and morbidity rates (1). According to the world health organization (WHO), childhood vaccination is one of the most successful public health interventions to prevent illness and death from vaccine-preventable diseases with an estimated three million deaths globally each year. (2–4). Though there are lots of investments on the immunization program, VPDs remain a major health problem among children in developing countries, including Ethiopia (5–10).

Worldwide in 2019, 85% of children received three doses of diphtheria-tetanus-pertussis (DTP3) vaccine. (11). On the other hand, an estimated 19.4 million infants worldwide were not able to access routine immunization services of which around 60% of these children live in 10 countries, including Ethiopia (12). In Ethiopia, the routine childhood vaccination service is being rendered free of charge in all public health facilities and some private health facilities with static, outreach and mobile strategies (3). The 2016 EDHS report revealed a vaccination coverage of 39% with a steady rise in vaccination coverage over time (8).

The world is urbanizing rapidly and the number of people living in urban areas continues to grow. By 2050, 66% of the world's population will be urban dwellers where 90% of this increase will occur in Africa and Asia (13,14). According to the Ethiopian Central Statistics Agency, the urban population in Ethiopia is increasing rapidly with a growing rate of 3.8% a year. These trends are particularly important for national immunization programs, as vaccine-preventable diseases have a higher potential for transmission in densely populated urban areas. The population groups most often under-immunized are those in slum areas, illegal squatter settlements, and newly expanding peri-urban zones. These areas are also densely populated, environmentally poor, and have few public services. (13,14).

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The urban environment may also increase the risk of infection from communicable diseases, including vaccine-preventable diseases, particularly since unique barriers to the delivery of routine immunization services are present in urban areas. The concentration of a large number of unimmunized children creates risks for outbreaks of vaccine-preventable diseases among those who are already victims of circumstance which can spread to the rest of the population quickly (13–16). Hence, it is imperative to employ strategies today to ensure that all children, no matter where they live or who they are, can lead healthy and productive lives, free from vaccine-preventable diseases (17).

Although urban populations have more service provision points compared to rural populations, the urban population has limited access to health care for economic, social, and cultural reasons. Difficulty in accessing immunization services in terms of distance, costs, and time can still be the main barrier in some parts of urban areas. Part of the limitation of an urban strategy is that, due to greater concentration of resources and overall better accessibility of services and health outcomes in urban areas, there is a tendency to concentrate on strategy development and on rural models. Besides, vaccine programs designed for a general population may not be as effective in urban slums, which are characterized by a lack of essential infrastructure (especially for the slummy and out skirted areas) and services not being adapted to urban population, with constraints, such as, limited access to basic health services, if they are available at all (14,17).

Unless urgent action is taken to address urban health inequalities, countries will not achieve sustainable development goal targets. To unmask the full extent of urban health inequities, it is important to disaggregate health and health determinants data within cities. Although immunization coverage rates are usually higher in urban areas than in rural areas, evidence shows that the largest number of unimmunized and under-immunized children often reside in urban slums in many contexts (13–15,17,18). However, due to a lack of disaggregated data, this equity gap in immunization coverage among the urban poor is often masked by an increase in overall urban coverage (15,16).

In Ethiopia, despite high administrative coverage, a reemergence of vaccine preventable diseases was reported due to inappropriate time of vaccination, and drop outs from vaccination with a high number of unvaccinated children (8,19,20). Evidence also showed that only a few studies have assessed interventions designed explicitly for the unique challenges facing immunization programs in the urban areas (3,21). In the past, EPI has directed its efforts principally to rural areas, while urban immunization activities have been delivered mainly through a passive strategy, dependent on user demand and uptake. The urban population is highly differentiated, due to poor coverage and high incidence of VPDs, which continue to exist (17, 18).

Immunization service provision strategies should also be designed in collaboration with different stakeholders, considering the local context. In Ethiopia, there is no urban immunization strategy defined at the national level. Hence, the extent of immunization service provision and differential existing strategies and implementation barriers for the routine immunization programs in an urban setting is not well documented. Therefore, the objective of this study is to assess the existing urban immunization provision strategies, barriers and alternative strategies for better access and quality immunization service provisions in Ethiopia.

Methodology

Study design and setting: This is part of an implementation science research that employed a qualitative phenomenological study design. Three urban centres were purposively selected based on their population size and representativeness. Addis Ababa and Diredawa, which are the two city administrations in Ethiopia, and Mekele town which is the capital of the Tigray region. Regarding health institutions, Addis Ababa city administration has 134 private primary clinics, 437 private medium clinics, 265 private speciality clinics, and 117 government health centers, 12 public hospitals, and 28 private hospitals Similarly, Dire Dawa city administration has two hospitals, 15 health centers and 36 health posts. Mekelle city also has four public hospitals and 10 health centers. Population size ranges from an estimated 4,794,000 in Addis Ababa, 506,639 in Diredawa to 310,436 in Mekele city. The cities had an estimated 647,190; 68,396 and 41,908 respectively, of children under five.

Study population, sample size and sampling methods: For this study, different participant groups were included to address the study objectives with different perspectives of stakeholders at each level. The first study group encompasses EPI decision-makers, which includes directors and EPI focal personnel of FMOH and the three city administrations. The second population group includes health facility level EPI managers from public and private health facilities. The third study population includes NGO representatives who were supporting EPI programs and the fourth one with community representatives, mainly caregivers of vaccinated children.

For this study, we included a total of 44 study participants. Thirty-five participants for key informant interviews and nine participants for in-depth interviews were selected purposively based on their positions and experience to the immunization service among four categories of respondents. Though the sample size was determined initially, we were open to adding additional participants for the interviews based on the saturation of information. Since there were no emerging codes and themes from the last two interviews, we used the predetermined sample size.

Different study participants were recruited to achieve maximum variation aimed at capturing a range of experiences and demographics. For the key informant interviews, health workers assigned in EPI units or decision-makers working as heads of health organizations for at least 6 months were eligible for this study. For the in-depth interview caregivers were eligible for this study if they had a vaccinated child. The

participants were selected from four categories of respondents: 6 from decision-makers' level, 18 from the public health facilities, 7 from the private health facility, 4 from NGO, and 9 caregivers from the community. (Table 1).

Table 1. **Study population and sample size for the study**

Cities	KII				IDI
	Decision-makers on EPI	Public HF	Private HF	NGOs supporting EPI	Caregivers of children
Addis Ababa	2	6	3	2	3
Mekele	2	6	2	1	3
Diredawa	2	6	2	1	3
Total	6	18	7	4	9

Data collection instruments: After defining the research objectives and reviewing relevant literatures on the domain, a semi-structured interview guide was adapted for the different study populations (for each of the four participant groups) in English, and later the final version was translated into Amharic language for data collection. The data collection tool was pre-tested for relevance and understanding before actual data collection and revision could be undertaken.

Data collection methods: Data collectors and supervisors were recruited and trained. The research team members conducted one to one interview with four groups of participants. Study participants were asked questions regarding the current immunization service provision strategies, existing challenges, and alternative strategies that could improve service provision in urban settings.

The interviews were tape-recorded and there was a designated note-taker to make sure that we have summarized the ideas during the interview sessions. During interviews probing questions were forwarded to participants to have an in-dept exploration of the issues. Each of the key informant interviews and in-depth interviews on average took 35 minutes. Interviews were conducted between June and August 2020.

Data processing: Initially, audio-recordings of interviews were transcribed verbatim and translated into English. Then the translated data was cross-checked with the audio file to ensure its proper transcription and translation. Finally, we used the thematic analysis approach to analyse the qualitative data. The research team read the translated data repeatedly before entering it into Open code version 4.02 software to have a clear understanding and to facilitate the data analysis process.

Data analysis: As part of the data analysis, line by line coding was conducted inductively to identify codes and themes. Accordingly, networks between codes, themes, and quotations were formed based on the objectives of the study. The final analysis was conducted based on major themes using open code version 4.02 software.

Ensuring trustworthiness: The trustworthiness of the findings was assured by collecting credible information through IDI and KII via the principal investigator and experienced data collectors. For this, different domains of participants were selected to capture a range of experiences that provide adequate information about the immunization service provision. In addition, point of information saturation was ensured to answer the research questions. The interviews were also supported by pilot tested interview guides. Analytic credibility was also ensured by presenting quotations to demonstrate the participant's own description of experiences and thoughts. Regarding reflexivity, the researchers had a neutral stand.

Ethical considerations: Ethical approval for this research was obtained from the Institutional Ethical Review Board of the University of Gondar. Also, support letters were obtained from respective bodies in the health system structures of the cities. The participants of the research were given comprehensive information about the objectives and procedures of the study and informed consent was obtained from each study participant. Interviews were conducted at locations and times that were convenient for the key stakeholders and that ensured their privacy and confidentiality.

Electronic data files with unique study identifiers were coded and hard copy data files with unique study identifiers were securely stored in locked cabinets in a limited access area. Only the research team members had access to the data.

Results

The results for this study are organized into five major themes: participant characteristics, the status of immunization service provision in an urban setting, barriers for effective implementation, immunization service provision at private health facilities, and alternative strategies to revitalize the immunization program in an urban setting.

Participant characteristics

A total of 44 study participants (35 for KII and 9 for IDI) were included for this study. The IDI participant's average age was 31 years which ranged from 25 years to 39 years. The IDI respondent's educational background ranged from Grade 5 to BSc degree. Regarding key informants, the average age was 40 years that ranged from 30 years to 57 years. In terms of educational background, the key informants had a minimum of a diploma and a maximum of Master's degree. Regarding work experience, the key informants had an average of 8 years' experience in immunization service provision.

Current status of immunization services in an urban setting

Existing service provision strategies: At the national level, the federal ministry of health of Ethiopia recommends different immunization provision strategies (static, outreach, and mobile) across different regions of the country. In this study, it was reported that the routine immunization service provision strategy for the three urban cities is a static approach with some health facilities providing outreach and home to home vaccination services that are conducted on a scheduled basis especially during vaccination campaigns.

EPI focal person from AA RHB also complimented that;

"Currently we provide vaccination with a static approach or at the health centre level. We have health centres and hospitals which provide vaccination service. But in rare scenarios, there might be a situation in which we provide outreach vaccination service, but we do not use this route regularly."

EPI focal person at HC from Mekele also reported that;

"We use the static approach with routine service. When we say we provide it as routine service, there is vaccination service five days a week from Monday to Friday."

In terms of service provision, majority of the public health facilities and only few private health facilities are currently providing immunization services at urban settings.

A RHB expert from Dire-Dawa reported that

"All public health facilities including few private institutions found in the urban parts of the administration are rendering the immunization service on regular bases. However, the strategy of immunizing all eligible children at every opportunity is not being implemented properly, for example the urban health extension workers are not providing the immunization service in community. Clients overcrowding at some health facilities are becoming evident waiting for the service for long time."

In this study, respondents mentioned different defaulter tracking strategies which are currently implemented at the catchment health facilities. Among the existing defaulter tracking strategies, using tickler boxes, phone calls, using health extension workers, and using the existing community structures are mentioned by study participants.

A health center head from Dire-Dawa reported that;

"Currently we are working to reach defaulter children through their contact address. Besides that if we cannot reach them through phone calls or if they fail to come once we call them, we provide a list of defaulter children to health extension workers and they will pick them through home to home visit. Moreover, since our family health team enters to the community three times per week with health extension workers, we try to reach defaulter children with them too."

A sub-city health office head from Addis Ababa supplemented that;

"We used multiple options to trace defaulters. Currently, we have 15 health centers. In all these health centers, all EPI services are given in a good way. We do default tracking for those defaulters in two ways. Most of them have tickler box. For those who have no tickler box, those defaulters were monthly checked from their registration book and asked why the children default the vaccine and told to come at the health facility for getting the service."

NGO representative also reported that;

"Almost every health centers have a box for default tracing. We perform this defaulter tracing through the cell phone address of users. As a challenge, sometimes the phone address of users is not registered and even registered; it may not be function during our call."

Adequacy of existing strategies

Regarding the adequacy of existing vaccination service provision strategies, most respondents agreed that the existing static service provision approach is not adequate for an urban setting and demand additional innovative approaches to reach all the eligible children at the community level. The respondents emphasized that residents in the outskirts of urban settings and urban slums demand tailored strategies in addition to the existing vaccination provision strategies.

A caregiver from Addis Ababa mentioned that;

"I do not think the current service is adequate. Its accessibility is not as satisfactory, even many mothers who bring for vaccination to health centers are returning to their home without vaccinating their child. Health care workers complain as they do not have all required vaccines including vitamin A supplementation. Therefore, I do not think it is accessible for all children."

An expert from NGO also complimented that;

"…But as a challenge if we give vaccination service through static approach only, there are many individuals who cannot bring their child for vaccination to static vaccination centers. Those who have low economic status and illiterate individuals might have the challenge to take their child to a health facility for vaccination. Therefore, we cannot achieve universal access to vaccination service will not be achievable by using static strategy only."

Immunization service provision in private health facilities

Availability of vaccination services in private HF: The global immunization community is increasingly urging countries to engage more closely with the private sector in coordinating, planning, and monitoring immunization activities, particularly to reduce inequalities in the availability of services between geographic areas and population groups and increase the overall coverage of immunization services. In the study setting, the immunization service provision at private health facilities is reported to be sub-standard.

A health center head from Mekele replied that,

" …the role private sector on immunization is very poor, they mainly focus on providing curative services rather than working on disease prevention strategies like vaccination."

A RHB expert from Dire-Dawa also mentioned that;

"*Currently, most of the private health facilities in our city administration are not providing vaccination. For example, currently out of 15 private facilities that have a potential capability of providing the service, only four of them provide the service. Because as I said earlier, there is a problem with the supply of cold chain equipment."*

An expert from NGO also complimented that;

"I think their [private health facilities] contribution is very low. In 2018 study which was conducted on service availability and readiness, private sectors contribution on vaccination services is less than two percent. If we ensure them to provide vaccination service with regulation, many middle classes and upper-class individuals will go to private health facilities, and they will get vaccination service from there. Due to that we can reduce the overburden from public health facilities. In related to that quality of service at public health facilities also will be improved."

Public-private partnership in immunization service provision

Ensuring effective public-private collaboration is crucial to improving access and quality of health services in developing countries. This study found that the public-private partnership in immunization service provision is generally weak in the urban settings of Ethiopia. The public-private partnership varied across different towns with better achievement in Addis Ababa.

A focal person from a private hospital in Dire-Dawa mentioned that;

"I work at least for three years in this hospital. I saw no supportive supervision from government bodies. We provide service with our effort. Give alone to support and monitor, no one tells us to update on the EPI program."

A RHB expert from Dire-Dawa also reported that;

"Public facilities have weak performance in terms of strengthening organizational ties with the nearby private facilities. To ensure equitable delivery of vaccination services for all community living in the city, we must support them by providing a WHO (PQS) recommended refrigerators and availing other EPI consumables. Otherwise, many of the private health facilities are not interested to buy standard refrigerators and offering the service. But if their problem is solved, they can work."

On the other hand, a health worker from a private facility in Addis Ababa replied.

"Health centers give huge support to private health facilities like by providing free vaccines, sometimes even they serve us in special cases if there is a shortage of vaccine at health center level too. Moreover, we sign a memorandum of understanding with health centers to work with cooperation on child vaccination and other issues. If we experience challenges either from our side or from the government side, they show us great support. There is a higher understanding between us."

Barriers for immunization service provision in an urban setting

Barriers in public health facilities: *I*n this study, the barriers for effective immunization service provision at public health facilities were summarized in four sub-themes: Service interruption and inaccessibility, increased workload and unfriendly service provision, poor defaulter tracking mechanisms, and catchment population denominator issues.

Immunization service inaccessibility

Improved access to health facilities or health services does not necessarily translate into uptake of immunization services. In this study, the lack of effective strategies that reach those marginalized groups of urban populations was among the main hindering factors for immunization service provision in urban areas. Also, inability of caregivers to get routine services on working days was reported as a barrier for service provision in an urban setting.

A sub-city health office head from Addis Ababa elaborated that;

"The challenges are as it is an urban setting; there are different population subgroups. As it is known there are health centers, hospitals, and private health facilities in Yeka sub-city. The community settlement style is not conducive to give service. The people also move from one sub-city to the other and even to rural areas. The urban plans are near to sub-city, but some areas cannot be reached to give service."

NGO representative complimented that;

"… It [static approach] allows clients to obtain EPI services from their usual health facilities. But, getting the service for clients with low income is difficult because the clients have their work from Monday to Friday for earning the income that could hinder them to go to a health facility for immunization service. There are also buffer areas in Bole, Gullele, and Akaki sub-cities which are far from the health centre and reaching the service to these areas is a challenge."

Increased workload and unfriendly service provision

Increased workload among health workers providing the vaccination services and lengthy waiting periods at health facilities are mentioned as barriers for effective implementation of EPI services in public health facilities of urban areas. Also, the services provided at public health facilities were reported as unfriendly by some of the participants.

An expert from RHB of Mekele reported that;

"There is overcrowding in the health care system. Clients are also waiting for the immunization service too long time."

A caregiver from a private health facility in Addis Ababa complimented that;

"The waiting hours at public health facilities we spent until we get our service is very long. Clients prefer to go to private health services to be treated with dignity and respect. Personally, I never took children for vaccination to a public health facility. Though we pay at private health facilities, they serve with safety and respect."

A care giver from Addis Ababa also mentioned that;

"The way health care providers treat and serve us is not comfortable. I witness some disrespectful and uncaring behaviour on health care workers including nurses. Clients prefer to go to private health service to be treated with dignity and respect. At public health centres, they do not give satisfying and exciting service to their clients. The service we get here is very labour-intensive and unpleasant, they do not show welcoming face to us. They need to serve us well in a way it cannot hurt mothers and our children."

Poor defaulter tracking mechanisms

Defaulter tracking mechanisms are very crucial to track missed children from their vaccination schedules. In this study, the difficulty of tracking missed children was reported as one challenge for the effective implementation of immunization services in urban settings. Among the underlying causes for poor defaulter tracking, mobility, and frequent change in residential areas of clients were mentioned by study participants.

An expert from NGO mentioned that.

"As a challenge there are many defaulter children from vaccination program. As I told you previously those who have low economic status since they cannot leave their job for taking their child for vaccination, they will drop from the vaccination program. Moreover, individuals frequently change their residential area, and when they change residential areas, they might not know the vaccination centre in their new living area so they might miss or postpone vaccination schedules. Some individuals may permanently leave cities and go to rural areas or other regions, and they might not continue vaccination for their child in their new residential area."

A care giver from Addis Ababa replied that;

"I do not think as health care workers will trace defaulters. Even they do not take our contact address. In addition to that since they provide service for many children, I do not think they will do paperwork and search defaulter children from registration."

Catchment population denominator issues

Among the barriers for effective immunization service provision in an urban setting, respondents mentioned planning problems and denominator issues on the catchment population as challenges for low vaccination coverage. In this study, respondents indicated that urban health facilities didn't know their catchment population which results in a difficulty to assess vaccination coverage and trace those missed eligible children at the community level.

A health facility heads from Dire-Dawa reported that,

" ... One of the reason is there is gap on our plan, the plan is not based on the number of children we served."

An expert from NGO also reported that;

"One of the challenges for urban health facilities is that they do not know their catchment area population. So, health facilities need to identify their catchment area and marginalized parts of the population which will not be reached through the routine vaccination service. Then they need to design strategy to reach each child who lives in their residence."

Barriers in private health facilities

In urban settings, private health providers of immunization services have especially been critical in filling the gaps in public health facilities thus reducing inequalities in access and improving the quality of immunization services. However, vaccination service provision in private health facilities has been facing various challenges. In this study, it was reported that substandard immunization service provision, service fee, shortage of vaccines & supplies, lack of trained health workers, and poor reporting were among the main barriers which need special attention for effective implementation.

Substandard immunization services at private health facilities

For each private health facility, providing health service requires a certification license by fulfilling the minimum standard set by WHO/FMHO to provide the services. In this study, most private health facilities were not providing the immunization services since they didn't fulfil the FMOH/WHO standards. The service quality for those currently providing immunization services is substandard especially in maintaining the cold chain system. Regulatory policy and guidelines were suggested by respondents to ensure the minimum standard, of service delivery, during immunization service provision in private health facilities.

A sub-city health office head from Addis Ababa reported that;

"If these private health facilities can give quality services like government health facilities, they can give the services for those clients visiting them. They can give service if it is based on WHO/MOH standards. In the presence of many private health facilities, the services are sub-standards even with monitoring and support. It needs attention to fulfil logistics and capacitating frontline health care workers."

An expert from NGO supplemented that;

"Though many private health facilities request for providing vaccination service, those who get the chance do not work with expected standard and level. That is why we need to have a regulatory policies and guidelines. They need to be enforced to act up to the standard like public health facilities. Actually, they might not have assigned an individual to vaccination room even and they might not have trained manpower at all even."

Fee for vaccination service

Regarding service charge for immunization, most respondents have reported that the service charge for immunization services is costly at private health facilities. On the other hand, some respondents mentioned that the immunization services are provided free of charge at private health facilities. All respondents agreed that the immunization services provided at private health facilities should be free of charge or with minimal service charge since they get the necessary logistics for free from public health facilities.

A RHB expert from Mekele reported that;

"In terms of payment, here you can go to a private health facility with a fee if you have a fee. But since it is being provided free of charge by the government, it can be difficult for the small community to go there and pay for the service, as I told you before. Therefore, it can be used to pay for vaccines. If not, you can get vaccinated using a public health facility. Or it would be better if the private health facility provided the vaccine for free."

A caregiver from Addis Ababa also mentioned that;

"Those who can pay can get served at a private health facility. If they make their cost affordable, I think we prefer to use vaccination service there since they give it with better quality. Those who cannot pay will go to public health facilities and we face all the challenges and troubles since we cannot afford to use private health facilities."

On the other hand, a private hospital CEO from Mekele mentioned that;

"…Yes, we give immunization service as free service."

Poor cold chain system and shortage of supplies

The study participants mentioned that the cold chain system of private health facilities is suboptimal and there is a shortage of vaccines and supplies to provide vaccination service on a routine basis. The common problem mentioned was the lack of a standard refrigerator for the storage of vaccines and supplies to maintain the cold chain system. In this study, fulfilling supplies by the government, mainly a standard refrigerator and vaccines more specifically at private health facilities, is suggested for standard immunization service provision.

A RHB expert from Mekele mentioned that.

"Now, private health facilities in urban areas have not been vaccinating. They want to be vaccinated but there is a question in the cold chain system. This is because they cannot be issued unless you have the WHO specification recommended refrigerator. And many of them are not interested in buying a refrigerator. That means it costs a lot of money and is not being given away because it is difficult for them to buy it for themselves. But if their problem is solved, they can provide the service."

An expert from AA RHB also complimented that.

"…Besides that, there might be gaps in resource availability and fulfilment. Though there is an improvement in the distribution of refrigerators, there is a gap in ensuring the availability of refrigerator at service provision centers. Their [private health facilities] cold chain management is not good enough like government health facilities. If you look at government hospitals and health centers, we have trained personnel on EPI room, we have WHO standard refrigerator, and the mentorship system is also strong enough on public health facilities which is not the case in private health facilities."

A health worker at private hospital from Dire-Dawa also reported that;

"We do not experience as such exaggerated problem, but we do not have refrigerator given by the health bureau rather our hospital buys from its budget. We are using non-standard refrigerator which will be used at homes. Therefore, we want standard refrigerator from health bureau. Beside that we experience no other challenge. Moreover, we do not get trained on EPI program, we just give service arbitrarily and based on our previous knowledge. We provide the service to not dissatisfy our clients. If they train us, we can provide a better-quality service to our customers and we can minimize risks imposed on children while providing vaccines. It is challenging to provide vaccination based on the knowledge we get at college or university many years back."

Lack of trained health workers

Capacity building is one of the pillars of the immunization program. Enhancing professional knowledge and skills through training and competency exams ensures accurate knowledge transfer and directly supports particularly the quality of the vaccination program. In this study, it was reported that the capacity of health workers in private health facilities to provide immunization services is not adequate. Continuous capacity building both in public and private health facilities is suggested to improve the quality of immunization service provision in urban settings of Ethiopia.

An expert from AA RHB mentioned that;

"…Moreover, they [private health facilities] have also gaps on trained manpower since there is high rate of staff turnover, so we need to work hard in supporting them in this perspective too. EPI program is not easy for private health facilities like you see on public health facilities."

A focal person at a private hospital from Dire-Dawa complimented that;

"Clients are very happy for getting vaccination service here in private health facilities. But since we are not trained when we get challenges mostly, we consult health centres particularly, like when we get clients who interrupt their child's vaccination for up to six months. We interrupt providing the vaccine for such clients, then we will consult trained providers at the public health centres. If we were trained, we can provide the service with confidence."

Poor reporting

In this study, it was reported that the monitoring of private health facilities is not strong and the private

health facilities are not reported regularly to public health facilities for immunization services.

NGO representative reported that;

"For better service, there should be an appropriate communication channels in terms of reports. There is no monitoring activity done by governmental health systems on private setups. The report of private setups is not as such done by government facilities. There is no service linkage between private health facilities and government facilities in the same/nearby catchment areas."

Alternative strategies to revitalize the EPI program in an urban setting

Several interventions were either explicitly designed for urban areas or were effective in urban areas for specific reasons. In this study, four main alternative strategies were suggested to revitalize the immunization program in urban settings of Ethiopia with more emphasis on reaching the urban slums and marginalized populations residing in the outskirts of urban areas. These alternative strategies include expanding existing strategies to the marginalized populations, providing outreach/home to home service, expanding immunization services in private health facilities and supporting the immunization program with technological innovations.

Expanding existing approaches to the marginalized population

Strengthening the existing service provision strategies is recommended to improve the access and quality of immunization services in urban settings more particularly in reaching the marginalized group of the population. The suggestion was to expand static service provision hours and days beside the routine schedules set at the national level. The other suggestion is to expand health service outlets to peripheral and inaccessible areas of the urban residence to address the urban slum, who live in overcrowded conditions, internally displaced and those who live in the out skirts of the city for better access and quality of immunization services.

An expert from AA RHB reported that;

"One of the recommendations can be expanding health services to reach those who live on the outskirt of the city since many individuals start to live in those areas leaving from the center. We need to build health facilities in those areas to make them accessible."

An expert from NGO reported that;

"…the service is not sufficient due to the previously discussed challenges. So, to resolve these challenges we need to have two or three alternative strategies. The first thing we need to do is strengthen the static vaccination service provided at health facilities and ensure the availability of vaccination services each day. Besides that, some individuals cannot come on routine working hours, so we need to adjust service delivery times for such individuals like by extending service delivery until 1 PM local time. Or it might be necessary to provide vaccination service on Sunday since it is free time for many workers."

A care giver from Addis Ababa also supplemented that;

"It is better if they can expand vaccination service provision units. Moreover, it is better if they can ensure availability of vaccination service always, it will be good if they will not say we finish vaccines today. It is better if they remind us about our child's vaccination date."

Outreach service provision / Home to home services

Addressing those children living in inaccessible areas and those who demand special service delivery is crucial to improving immunization service access and quality. In this study, provision of outreach/home-to-home services by public health facilities are suggested as an alternative strategy to augment the existing approach of immunization service provision in urban settings. The study participants also mentioned that before starting outreach services, adequate preparation must be made to maintain the cold chain of vaccines and to organize and facilitate the programs as routine programs.

A caregiver from Mekele replied that;

"I do not think it is a sufficient approach. For example, the health center where I took my child for vaccination provide vaccination service beyond its capacity. So, for the future, it needs to expand the vaccination service delivery to outreach sites rather than providing child vaccination at the health center level alone. We will be excited if they provide service home to home. This can improve the accessibility of the vaccination service."

A health facility heads from Dire-Dawa complimented that;

"For urban area vaccination service need to be given throughout a week at health facility level. And if it is possible, to use an outreach strategy beside what we used for campaign. At health facility we vaccinate children who seek and come to get vaccination service but if we enter to community, we can reach children we do not get the chance to come to health facility by providing service at their provenance."

An expert from sub city health office in Addis Ababa reported that;

"In urban areas, the primary option and short-term solution are using the outreach service. For long term solution, it is better to establish mini-health posts. When giving vaccination through an outreach program, health caretakers need to go away from their health facility holding necessary vaccines with vaccine carrier in a way it keeps cold chain. This approach needs a higher level of facilitation, we need to fulfil transport to reach outreach sites, we need to have adequate cold boxes. Moreover, we need to adjust outreach sites to provide vaccination at the community level. If we resolve those challenges, we can reach those inaccessible children."

Expanding immunization services at private HF

Successful implementation and improvements in vaccine coverage rates at all levels require the optimization of the interaction between public and private health sectors. One of the recommended alternative strategies to improve immunization services

in urban settings is to strengthen immunization service provision at private health facilities. Besides, optimal service charges at private HF are recommended by participants and regulatory mechanisms are also suggested to control payment mechanisms in private health facilities. In line with this, developing and implementing a conducive public-private partnership policy and better support and follow-up for private health facilities is suggested as an alternative strategy. A continuous logistic supply and capacity building with the necessary support is also suggested as a precondition to providing suboptimal quality immunization services in private health facilities.

A private hospital CEO from Mekele replied that;

"Government need to give due emphasis to private health sector like they support government health facilities. They need to provide supportive supervision and monitoring like by providing updated national guidelines and others. Moreover, health care workers who work in private health facilities need to be beneficiaries of training whenever there is an update on the existing vaccination program. If we do not update their knowledge, they will tell you outdated information if you ask them, and they will not be interested to participate in such roles. If they cannot offer face-to-face training for our staff, they can give us guidelines or flyers whenever there is an update."

An EPI focal person at health center from Dire-Dawa reported that;

"In our area, the only alternative is those private sectors which provide vaccination service. In our catchment are clinics which provide vaccination service are Art, Eipto clinic, delta, and family guidance association clinic. These facilities need to support us in providing vaccination service. Government needs to work on expanding vaccination service to such private health facilities, so we can improve availability of service. Moreover, it will be more accessible for clients if they can get at private health facilities in their residential areas."

A health worker from a public facility from Addis Ababa supplemented that;

"To strengthen the public-private partnership in immunization first of the policy framework and guidelines need to be developed. Secondly, the government needs to provide capacity building training to private health facilities. Thirdly, they need to get resources from the public sector. Moreover, need assessment among private health facilities to provide vaccination service might be required. But once they initiate the service they should not be left alone, rather they need to be regulated for proper implementation and service provision. Particularly they should not request payment for the vaccines since they get free of charge from the government. Government needs to learn from previous initiations performed on TB and malaria."

Inter-facility linkage through digitalization

In addition to the existing defaulter tracking mechanisms, setting up inter-facility communication modalities was suggested by study participants. For this, digitalizing the registration system for the immunization program, and application of digital technologies for defaulter tracking are among the alternative strategies to revitalize the immunization service provision strategies in an urban setting.

An expert from AA RHB reported that;

"Unless we link health facilities with network and digitalized the system if a child got one round of vaccination in one health centre and he took the other rounds in other health centres we have no way we can trace and be sure whether that child gets vaccinated or not. Unless we upgrade our system, it will be difficult to reduce the dropout rate and protect children by fully vaccinating them.".

A RHB expert from Dire-Dawa also mentioned that;

"To minimize the dropout rate significantly, inter-facility communication linkage should be established through a new coordination mechanism that able to exchange relevant information about the status of a child while coming at every contact point of care service needs to be checked for vaccination within the same health facility or among health facilities."

An expert from NGO also reported that;

"Taking contact address of clients need to be taken as trend to reduce defaulters from vaccination. In addition, they need to modernize and update interaction between each health facilities."

Discussion

This study showed that the routine immunization provision strategy in urban settings of Ethiopia is a static approach. The engagement of private health facilities and public-private partnerships for the provision of immunization services was found to be suboptimal. Barriers to effective implementation of existing immunization strategies include service inaccessibility, substandard services in private facilities, and lack of trained health workers in private health facilities. The alternative strategies to revitalize the immunization program in urban settings include expanding existing service provision approaches, outreach/home to home service provision, expanding immunization services at private facilities, and inter-facility linkage through digitalization.

This study found that the routine immunization provision strategy in urban settings of Ethiopia is a static approach that is not adequate to reach all segments of the population. In a national survey conducted by Ethiopian Public Health Institute (EPHI), it was indicated that child immunization services availability at the national level was 81% and only 12% of facilities offered immunization services on a daily basis at the facility level (19). This study also found that outreach services are provided in urban settings occasionally which could be more feasible and more cost effective, if tailored for urban settings which is consistent with a national report which indicated that health facilities are providing outreach service in Ethiopia (19).

In this study expanding services to the marginalized populations of urban settings is recommended as an

alternative strategy for service provision. A study in Kenya also showed that hard-to-reach populations (living in remote areas) require multiple reaching strategies to reach every child with immunization (22). This indicates that health facilities should actively analyze and use routine immunization data and invest in community health strengthening systems to identify hard-to-reach areas to be targeted with outreaches to improve immunization coverage.

Expanding outreach and home to home services in urban setting were also suggested as alternative strategies for improving access to immunization services which is consistent with another study which indicated that expanding outreach services is one approach to increasing accessibility of urban immunization services (21). Outreach strategies that aimed to increase the utilization of vaccination services could leverage the density of communities in urban areas to rapidly reach many immunization defaulters and immunization-eligible children. Coverage can be rapidly improved through outreach immunization in low socioeconomic areas if existing opportunities are carefully utilized (23). Although managing many outreach sites is more complex than managing a few fixed sites, the combination of good micro-planning could contribute to a successful delivery system.

Research indicated that private providers have been critical in filling gaps in government services in hard-to-reach areas and among marginalized populations, thus reducing inequalities to access (24). However, the findings of this study revealed that the engagement of private health facilities in immunization service provision is poor. A review in developing countries also indicated that there is limited involvement of the private sector in the provision of immunization services (25). This study pointed out that private-sector immunization services were not as efficient or accountable as their public sector counterparts. Hence, expanding the immunization services at private health facilities is suggested as an alternative strategy to revitalize the immunization program in urban settings. The expansion of private providers in the delivery of primary health care and immunization services is also recommended as one option for improving the quality of services in developing countries (24,26).

Participants also mentioned that standard immunization service provision at private health facilities demand a regulatory system and agreements between the government and private providers. The importance of regulating and licensing private facilities and incorporating them into the immunization program is also stipulated in several studies (24–27). This could be achieved through potential mechanisms that can be introduced to engage the private sector including regulation of service quality and payment mechanisms. Under the public-private partnership agreements, the government provides the private facilities with free vaccines and standard refrigerators, along with data collection forms. In return, private providers are required to comply with the terms of the memorandum of understanding to ensure that quality standards are met.

Immunization programs in developing countries increasingly face challenges to ensure equitable delivery of services within cities where rapid urban growth can result in informal settlements, poor living conditions, and heterogeneous populations. In this study, various barriers were reported for immunization service provision in urban settings which is consistent with findings of a national review done on the immunization programs of Ethiopia (28). In this study, inaccessibility of peripheral and urban slum areas was mentioned as barriers for immunization service provision in an urban setting. In a study from Dili,Timor-Leste, the problem of access to services and information, particularly in the city periphery was reported as a barrier for urban immunization programs (29). Research also indicated inequalities driven by differences in place of residence and socioeconomic status persist among different communities hindering the achievement of sustained performance on immunization indicators (22,30). This shows that simple access to immunization services does not necessarily translate into uptake of services.

The study also identified poor cold chain systems and shortage of vaccines and supplies as one barrier for effective immunization service provision in an urban setting especially at private health facilities. This is consistent with a study in Timor-Leste which mentioned that key determinants of the success of vaccination efforts are adequate for the supply of vaccines (29). A study from Cambodia also reported that the private sector demonstrated a lack of quality of care and management in terms of vaccine management practices with the public sector (27).

This study also found that lengthy waiting periods and unfriendly service provision among public health facilities were one of the barriers mentioned by participants. A study in Kampala town, Uganda also showed that few health workers providing immunization services led to long queues and long waiting times at facilities which is more common at public facilities (31). This study also pointed out that the lack of training was one of the barriers to effective immunization service provision, especially in private health facilities. This is consistent with a previous review which found suboptimal immunization practices and knowledge levels among private sector providers (26). When providers have up-to-date information on changes in immunization theory, practice, and policy they can vaccinate safely and within their scope of practice. Evidence also recommend vaccinators should undergo training on immunization programs (32–35).

In this study, a lack of adequate defaulter tracking mechanism was one of the potential barriers for service provision in an urban settings which corroborates with the findings of another study (28). For defaulter tracking, participants suggested alternative strategies to digitalize the immunization service provision and integrate technological innovations like digitalization of the EPI information system and application of mHealth reminders which is in line with another study (18,28).

In this study, designing and implementing alternative strategies was indicated to revitalize the immunization service provision in an urban setting. Offering a package of essential health services to urban marginalized communities, not only addresses the inequality issues, as these populations usually lack access to other basic services, but also improves the demand for and uptake of the individual services. Our research also indicated that besides additional routine services, additional interventions that could improve immunization services should be designed in collaboration with marginalized communities of urban areas, considering the local context (18,21,23,31,33).

Our study has the following implications. Complex health system barriers to childhood immunization still exist in an urban setting; emphasizing that even in urban areas with great physical access there are hard to reach people. In urban areas, there are neglected segments of the population (slum areas, who live in the outskirts of the city and internally displaced people and those who live around urban areas) who demand tailored strategies to access the available health services. Designing additional strategies to address the identified potential barriers and make the services accessible to this group of population is important.

In urban settings, adjusting service delivery times by extending service provision hours could improve the accessibility of services to those in need. Besides, public-private partnership and integrated services would be the future strategies for maintaining equitable and accessible health services in the urban settings of Ethiopia. Though the public sector offers vaccination services to most of the population in Ethiopia, the private sector should not be neglected as it could potentially improve overall vaccination coverage. The government should also make private providers feel that they have ownership in the immunization service delivery system and are accountable to it by taking part in regular planning, training, review, and decision-making activities. To productively engage the private sector for immunization service delivery, several steps could be undertaken. This could start with a review of the private sector's contribution to immunization delivery, program monitoring, and a look into the quality-of-service delivery.

This study provides an insight for program managers and policymakers in designing and integrating additional strategies to strengthen access and quality of immunization services based on the identified potential barriers for the marginalized populations of urban settings.

Strengths and limitations of the study

This study has the following strengths and limitations. The study included a diverse sample of participants. To increase the transparency of the interpretation, coding categories are illustrated with quotations in the presentation of the results subsequently. Self-reported data is subject to social desirability bias and thus participants may have exaggerated their response. The researcher also acknowledges that data saturation is a disputable concept and novel themes may have emerged from further interviews.

Conclusion and recommendations

This study indicated that the existing immunization service provision strategy in urban settings of Ethiopia is a static approach which is not adequate to reach all eligible children. The engagement of private health facilities for the immunization service provision in the study settings was also poor. Immunization service inaccessibility, unfriendly services, work overload, poor defaulter tracking mechanisms, and catchment population denominator issues were the barriers for service provision at public health facilities. Substandard service provision, shortage of vaccines and logistics, service fees, lack of trained health workers, and poor reporting were the main barriers hindering service provision at private health facilities.

This study also identified alternative strategies to revitalize the immunization program in urban settings. Among the alternative strategies, expanding the existing immunization service provision strategies to the marginalized segment of the population, providing outreach/home to home services, expanding immunization services in private health facilities, and strengthening the inter-facility linkage, and modernizing the immunization program through digitalization are the main factors which need to be implemented.

Therefore, program managers should give due emphasis to reach the marginalized population of urban areas. Besides, addressing the identified barriers and tailoring the immunization service delivery strategies to fit the context and realities of growing urban immunization inequality will help close this equity gap. The government should also strengthen public-private partnerships and establish a system to monitor the quality standards of the immunization service provision by private health facilities. Moreover, the government should integrate the existing technological innovations and digitalize the immunization program.

Abbreviations

CSA: Central Statistical Agency; EDHS: Ethiopian Demographic and Health Survey; EPHI: Ethiopian Public Health Institute, EPI: Expanded Program on Immunization; FMoH: Federal Ministry of Health; NGO: Non-Governmental Organisation; VPD: Vaccine-Preventable Disease; WHO: World Health Organization

Declarations

Ethical approval and consent to participate

This was approved by the Institutional Review Board of the University of Gondar and received ethical clearance. Besides, study permission was obtained at each level of the health system. Finally, written informed consent was obtained from each study participant.

Availability of data and materials

Data will be available upon reasonable request from the corresponding author

Conflict of interest

All authors approved that they have no conflict of interest

Author Contributions

All authors made substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; took part in drafting the article or revising it critically for important intellectual content; agreed to submit to the current Journal; gave final approval of the version to be published; and agree to be accountable for all aspects of the work.

Acknowledgments

This study was supported by the Alliance for Health Policy and Systems Research (Alliance). The Alliance is able to conduct its work thanks to the commitment and support from a variety of funders. These include UNICEF and Gavi, the Vaccine Alliance contributing designated funding and support for this project, along with the Alliance's long-term core contributors from national governments and international institutions. For the full list of Alliance donors, please visit: https://ahpsr.who.int/about-us/funders. We are also grateful to data collectors, supervisors, study participants and all stakeholders who were involved in this study.

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