POLICY BRIEF

SEPTEMBER 2022

Reaching zero-dose children for routine immunization in underserved settings of Ethiopia: Evaluation using mixed method study designs

Context to the study

According to the WHO/UNICEF 2021 global estimate, more than 18 million children are zero-dose. Almost all zero-dose children live in low- and middle-income countries, especially in the African and South-East Asian regions. Ethiopia is the fourth leading contributor to the global total number of zero-dose children. Nearly half of these missed children live in hard-to-reach/remote, conflict-affected, and under-served areas. Most importantly, there are substantial variations among and within regions in relation to vaccine access, utilization, quality, and equity problems, which continue to be persistent challenges.

Summary of findings

The overall prevalence of zero-dose and under-immunized children in the underserved and special settings populations was 33.7% and 62.8%, respectively. Developing and pastoralist regions, IDPs, and conflict-affected areas had the highest prevalence of zero-dose children. The overall Penta-1 to Penta-3 vaccination dropout rate among children aged 12-35 months was 43.5%. The leading reasons for the zero-dose, under-immunized, and dropout rates were absence of vaccination services in the area (47.0%), failure of health workers to visit the village (44.6%), closure of vaccination sites (21.8%), vaccine stockouts (20.5%), and maternal/caregivers' domestic workload (18.5%). These findings were supported by the qualitative part of the study where participants noted issues such as the closure of health facilities, inaccessible and/or a lack of functional health posts, unavailability of HEWs on duty, staff turnover, lack of staff motivation, and service provision only on selected days or hours of the week. Failure of districts to submit vaccine requests on a regular basis led to vaccine shortages. Both open and close vial wastage were common since the existing system did not systematically monitor the extent of vaccine wastage. In terms of gender disparity, unfortunately, women were not adequately empowered, and male engagement was typically required to secure permission and money for transportation for women to bring their infants to the vaccination centres. The support of men in the vaccination program was low and vaccinating children was primarily considered the mother and other female caregivers' duty. Nearly one-tenth of the participants reported that there was no health facility in their kebele and, in 53.2% of the cases, the nearest health facilities were not within 30 minutes' walking distance. Small-scale resistance due to religious beliefs, cultural norms, misconceptions, and fear of vaccine side effects have been reported in some regions of Ethiopia. Although active resistance to childhood routine vaccination has not been reported across the regions, self-initiated demand is not common in rural areas due to lack of awareness and absence of sustained SBCC interventions.

Introduction

Globally, according to WHO/UNICEF national immunization estimate in 2021 the number of children missing out on any vaccination "zero-dose children" is about 18 million. Almost all zero-dose children live in low- and middle-income countries, especially in the African and South-East Asian regions of the world. Despite significant progress in increasing the number of infants immunized in Ethiopia, the country is the fourth leading contributor to the global total of zero-dose children (WHO/UNICEF, 2021). In Ethiopia, significant regional variations of zero-dose and under-immunization children were observed. For example, a subgroup meta-analysis by regions indicated that the lowest proportion of immunized children were in Somali and Afar regions (21%) and the highest were in the Amhara region (89%) (Nour et al., 2020). Gavi is now launching a global movement to bring an end to this inequity, making reaching zero-dose children with immunization a key priority for the next five years. The initiative's goal is to reduce the number of zero-dose children by 25% by 2025 and by 50% by 2030, which will also mark the closing of the sustainable development goals. Therefore, identifying the immunization coverage to work in remote and hard-to-reach, conflict, and special settings is crucial. It will also require a focus on gender as one key barrier stopping children from receiving vaccines. The zero-dose project evaluation results serve as an input to inform immunization program planning and implementation targeting zero-dose and under-immunized children in 2022 and beyond. More importantly, the evaluation answered critical questions that will ultimately inform the plan to reach zero-dose and under-immunized children, aligned with IA2030, as well as the Gavi 5.0 strategy based on the Ethiopian context.

Study design and settings

We conducted a mixed method study (qualitative and quantitative cross-sectional coverage survey) with sequential triangulation in an underserved setting population of Ethiopia from December 2021 to June 2022. Study settings included pastoralist, semi-pastoralist, and emerging regions, newly established regions and hard-to-reach areas in agrarian regions, conflict-affected areas, urban slums, internally displaced peoples, and refugee camps in Ethiopia.

The quantitative method was implemented based on WHO recommendations (WHO, 2015). The study population consisted of mothers and caregivers with children between the ages of 12-35 months and they were included in the study using a stratified sampling approach. Data was collected using pretested tools prepared in different local languages. The health facility survey was implemented in primary health care facilities that provided vaccination service to the nearby population. Experienced enumerators and supervisors collected survey data and analysed it using SPSS. Vaccination coverage

was estimated using a weighted analysis approach. Data was collected using the CommCare digital data capture method. The qualitative study used both supply and demand side barriers to immunization program including gender-related constraints. Participants for the qualitative part included key informants from the MoH, RHBs, and PFSA hubs, immunization focal persons from core partner organizations, and key informants from ZHDs, WoHOs, and public health facilities, implementing partners, caregivers, and influential community members. Both key informant interviews and focus group discussions were used to collect the data. Data collectors were experienced university academic staffs, senior PhD students, and other health professionals who knew the local context and had immense professional experiences in qualitative data collection. The qualitative data were analyzed based on a thematic approach.

Key Research Findings: A total of 3,646 children between the ages of 12-35 months were included in the analysis with a response rate of 97.7%. The sample had slightly more boys (54.4%) than girls. Close to half (50.7%) of the respondents were between 12–23 months of age.

The overall pooled prevalence of zero-dose and under-immunized children in hard-to-reach and underserved settings of Ethiopia were 33.7% and 62.8%, respectively (Figure 1). Developing regions (Afar, Somali, Gambella, and Benishangul Gumuz) had the highest prevalence of zero-dose children (53.9%). On the other hand, the lowest prevalence of zero-dose (6.2%) and under-immunized children (14.7%) were found in urban slums in Ethiopia. In total, 69% of children received BCG vaccine and, while 66.3% of children received Penta-1, only 37.2% of them got the last Penta dose which was extremely low according to the expected coverage from WHO in 2019.

Among the eight population domains studied, Penta-1 and Penta-3 coverage rates (93.8% and 85.3%, respectively) were higher in urban slums. Conversely, Penta-1 and Penta-3 rates in developing regions were 46.1% and 19.8%, respectively, and newly-formed regions were 62.2% and 36.8%, respectively. These finding were supported by the qualitative results where key informants mentioned that dropouts from the vaccination program were a major problem. This issue was more pressing in developing and pastoralist regions, IDPs, and conflict-affected communities. From the quantitative results, the leading reasons for zero-dose, under-immunized children, and dropout rate were reported as an absence of vaccination service in the locality (47.0%), failure of health workers to visit the village (44.6%), closure of vaccination site (21.8%), absence of vaccine (20.5%), and domestic workload (18.5%). Low service integration led to high rates of missed opportunities during family planning service provision (25.0%), distribution of bed nets (24.7), and during sick childcare (21.4%). These findings were supported by the qualitative part of the supply and demand side barrier analysis. Participants shared that frontline heath workers sometimes failed to provide basic information, including appointment dates, to caregivers leading to the dropouts and irregular schedules of outreach sessions across the different settings, and they also mentioned that a systematic approach had not been instated to trace defaulters. In addition, other important qualitative results mentioned the closure of health facilities, inaccessibility, lack of functionality of health posts in emerging regions, unavailability of HEWs on duty, lack of a skilled workforce, staff turnover, suboptimal staff motivation,

and the provision of the service only in selected days or hours of the week. Failure of districts to submit vaccine requests on a regular basis frequently caused artificial vaccine shortages. The other major challenges to the outreach modality were budget shortages and schedule irregularities. Regarding vaccine wastage, the existing systems did not systematically monitor the extent of the problem and both open and close vial wastage appeared to be common. In terms of gender disparity, the zero-dose, under-immunization, and dropout rates declined with women's increasing power in household decision-making.

Though the existing national guidelines promote horizonal integration of EPI with other Maternal and Child Health (MCH) services, in practice the connection with services like sick childcare, nutritional screening, vitamin A supplementation and family planning services are not significant. For instance, in Somali and Afar regions, mobile teams give priority to nutrition and emergency response than immunization. The commonest missed opportunities were reported during family planning and sick childcare services provision.

With the existing Ethiopian health policy, primary hospitals are expected to support the vaccination program in their locale through providing static service and sometimes organizing outreach sessions. However, other than Afar and Somali regional hospitals, most hospitals assume EPI is the duty of health posts and health centers and is limited to link hospital-born infants with health centers or health posts.

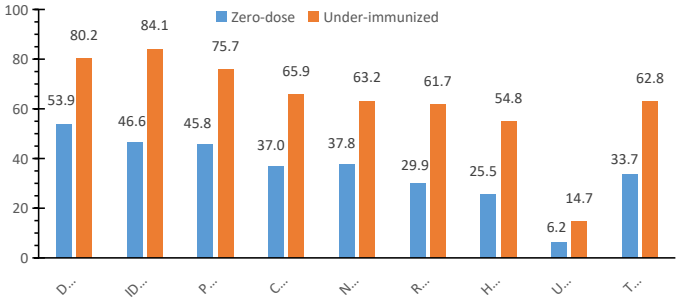

Figure 1: Prevalence of zero-dose and under-immunized children in remote, underserved, and special settings in Ethiopia, June 2022.

So far, the health system has done little to engage private health institutions in EPI. However, some health facilities in Addis Ababa, Dire Dawa, Harari, and urban areas of Oromia have been supported to provide the service. In this regard, the major blockade is the facilities' inability to purchase prequalified refrigerators.

The Ethiopian government is modestly co-financing the national vaccination programs; however, the program remains donor-dependent which has posed a threat to its sustainability. In many settings, partners are covering operational costs. Decisionmakers

frequently complain that budget shortages are a major barrier for implementing EPI problem. Shortage of finance to cover per diems, purchase kerosene, and organize review meetings and trainings have been commonly reported at all levels.

The information from top and low-level mangers regarding monitoring, evaluation and learning practices is also divergent. According to top level managers, in most regions and at all levels, EPI is regularly monitored through organizing annual or semi-annual review meetings, Performance Monitoring Teams (PMT), and integrated supportive supervisions. Feedback is also given to districts and PHCU based on their performance. However, the information that this study received from health workers suggested such efforts are weak and irregular due to a scarcity of resources, lack of commitment, and conflicting engagements of managers.

With regards to gender disparity, boys and girls appear to have equal access to vaccination services. Though son preference is common in many communities, it has limited implications to vaccination services. However, the study has identified other relevant gender-related blockages. Women's domestic workload was noted as a major cause for vaccination dropout. The prevalence of zero-dose and under-immunized children and dropout rates also declined with women's increasing power in household decision-making. Households that allocate resources by engaging both partners had better vaccination outcomes. On the other hand, when women were not adequately empowered, they usually needed to secure permission and money for transportation from their husbands to bring their infants to the vaccination centers. Culturally, taking children to vaccination services is considered to be the duty of the mothers. Even health workers show a similar stereotyping which may discourage fathers from caring for their children. Usually, vaccinators interact only with the mothers, despite women have limited decision-making power and control over resources. More importantly, the health system does not take gender into consideration while planning, implementing, and evaluating vaccination programs.

In households where women had better access to information about what was happening in the community, including healthcare, the zero-dose, under-immunization, and dropout rates were lower. Similarly, households in which there was a dialogue among family members on health issues including immunization were reported to have better vaccination outcomes.

Small-scale resistance due to religious beliefs, cultural norms, misconceptions, and fear of vaccine side effects have been reported in some regions of Ethiopia. Even though SBCC activities are commonly incorporated in the annual plan of the woreda health offices, they are not yet frequently translated into practice. Therefore, regular and diverse Social Behavioral Change Communication (SBCC) to promote vaccination is rare. In addition, interpersonal communications through the WDA/HDA network, house-to-house visits by HEWs, community conversations, and pregnant women's forums are also losing momentum. Finally, self-initiated demand is not common in rural areas due to a lack of awareness and an absence of sustained SBCC interventions.

Policy Recommendations

The zero-dose evaluation survey findings showed that vaccination service is delivered through a mix of static, mobile, outreach, and campaign-based strategies. However, regular implementation of these strategies is lacking due to the factors mentioned above. Presented below are lessons learned from other countries' experiences and selected key strategies suggested to implement in underserved setting populations in Ethiopia to improve immunization coverage in those specific settings.

- Strengthen and organize outreach services and/or targeted PIRI to hard-to-reach and remote areas using drone technology as a means of vaccination logistic delivery strategies.
    - For rural and remote communities, embracing drone technologies for healthcare service delivery may be an effective means to access healthcare services.
    - One of the benefits of using drones is their ability to improve the time of reach to those hard-to-reach and remote areas to provide immunization services due to their ability to fly above roadways, water, and forested areas, and to quickly reach the upper levels of high-rise buildings.
- Organize outreach services and/or targeted PIRI for slum areas in city administrations (regional capitals and other major cities).
- Integrate and strengthen mobile outreach teams in the pastoralist regions, developing zones, and conflict-affected areas.
- Advocate and organize regular "catch-up" vaccination campaigns (e.g., in the form of Child Health Days) in conflict-affected areas.
- Regularly reach conflict-affected areas and IDP centers by integrating vaccination services with emergency relief and food aid programs. Coordination with agencies involved in humanitarian relief activities would be indispensable.
- Establish temporary health posts/clinics and community health agents' network at IDPs to help make vaccination services accessible to IDPs.
- Utilize religious institutions, including mosques and churches, as useful access points to reach populations cut off from health facilities in conflict settings.
- Extend opening hours of immunization services to meet parents' needs e.g., evening/weekend sessions in the city administrations (regional capitals and other major cities).
- Support the capacity building of healthcare workers (HEWs, HC staff, sub-city health office) to develop plans to identify and reach underserved populations.

- Devise a HEW control mechanism while they are on duty to ensure their regular availability, such as weekly or monthly activity reports.
- Strengthen human resources management using electronic signatures, like biodata signatures, and link them with the finance department.
- Bolster leadership and management to improve the responsibility, accountability, and performance of HEWs and other healthcare workers.
- Improve immunization service delivery set-up (waiting and vaccination area) across targeted health facilities in each selected woreda by providing on-the-job training, experience sharing, including joint monitoring and learning visits, supervision, feedback, and advocacy.
- Empower women to reduce zero-dose, under-immunized children, and dropout rates.
- Plan to establish a men development army to promote the engagement of men in MCH services.
- Organize familiarization workshops/trainings on the updated catch-up policy to RHBs and lower levels.
- Communicate to mothers/caretakers the importance of vaccination cards to get services for their children all the time.
- Support the use of electronic registration for vaccinated children to have a better information system.
- Ensure the systems produce essential data for monitoring and accountability, both from an administrative standpoint (to higher hierarchical levels) and to the beneficiary population in general.
- Just as immunization information systems are designed to provide relevant information related to the distinct management areas of the EPI, an electronic immunization registry (EIR), which is part of the immunization information system, provides information on immunization regarding the program's target populations.

As a cross-cutting issue service integration, creating and strengthening the linkage between vaccination and productive SafetyNet program (PSNP) has the potential to improve coverage in PSNP-beneficiary populations. Specifically, PSNP coverage is higher in Somali and Afar regions, which have the highest rates of zero-dose children. Integration between PSNP and vaccination programs can be established through creating conditional cash/food aid transfer system. i.e., eligible households would only receive PSNP supports on the condition that they have vaccinated their children, as recommended by the national immunization schedule. Vaccination programs can also be integrated with nutritional screenings and other maternal and child health services.

References

Gavi (2021a). Reaching zero-dose children. Accessed from: https://www.gavi.org/our-alliance/strategy/phase-5-2021-2025/equity-goal/zero-dose-children-missed-communities on 27 Nov, 2021.

Gavi (2021b). The zero-dose child: explained. Accessed from: https://www.gavi.org/vaccineswork/zero-dose-child-explained on 27 Nov 2021.

Gavi (2021c). Routine immunization worldwide holds firm despite the pandemic. Accessed from: https://www.gavi.org/our-alliance/strategy/phase-5-2021-2025/equity-goal/zero-dose-children-missed-communities on 27 Nov, 2021

Central Statistical Agency (CSA) [Ethiopia] and ICF. 2016. Ethiopia Demographic and Health Survey (2016). Addis Ababa, Ethiopia, and Rockville, Maryland, USA: CSA and ICF

Ethiopian Public Health Institute (EPHI) [Ethiopia] and ICF. 2019. Ethiopia Mini Demographic and Health Survey 2019: Key Indicators. Rockville, Maryland, USA: EPHI and ICF.

Geweniger A, Abbas KM (2020). Childhood vaccination coverage and equity impact in Ethiopia by socioeconomic, geographic, maternal, and child characteristics. Vaccine; 38(20): 3627-3638.

Flemons K, Baylis B, Khan AZ et al. The use of drones for the delivery of diagnostic test kits and medical supplies to remote First Nations communities during Covid-19, American Journal of Infection Control, Volume 50, Issue 8, 2022.

Hiebert B, Nouvet E, Jeyabalan V. The Application of Drones in Healthcare and Health-Related Services in North America: A Scoping Review. Drones 2020, 4, 30; doi:10.3390/drones4030030

UNICEF, Gavi (2018). Guidance on the use of geospatial data and technologies in immunization programs. New York, NY; UNICEF.

UNICEF (2021). Immunization data. Accessed from: https://data.unicef.org/topic/child-health/immunization/ on 27 Nov 2021.

World Health Organization (WHO) (2015). Vaccination coverage cluster surveys: Reference manual Version 3. Geneva; WHO.

World Health Organization (WHO) (2021a). Immunization coverage. Accessed from: https://www.who.int/news-room/fact-sheets/detail/immunization-coverage on 27 Nov 2021.

World Health Organization (WHO) (2022). Immunization Agenda 2030: A global strategy to leave no one behind. Geneva; WHO.

This brief was produced by

Project HOPE zero-dose project team members

Please reference the paper as

Project HOPE, Ministry of Health [Ethiopia] and Amref Health Africa (2022). Reaching zero-dose and under-immunized children in remote and underserved settings of Ethiopia: Evaluation. Addis Ababa, Ethiopia (Unpublished report).

Acknowledgements and funding

Project HOPE - The People-to-People Health Foundation, Inc., Ministry of Health (MoH) and Amerf Health Africa are grateful for the generous financial support they received from Bill & Melinda Gates Foundations to implement this study. Project HOPE acknowledges its prime partner (Amerf Health Africa) and local implementing partners (Beza Posterity Development Organization, Love in Action Ethiopia, and Mothers and Children Multisectoral Development Organization) for realizing the study. We also appreciate the organizations that contributed towards refining and validating the study including, but not limited to, regional health bureaus, GAVI – the Vaccine Alliance, Ethiopia country offices of UNCEF, WHO and CDC.

Address:

Project HOPE, Ethiopia country Office

Office:

+251 (116) 62 – 2123 Mobile: +251 (902) 09-03-07

MOENCO Road

P.O. Box: 45

Addis Ababa, Ethiopia