The Burden of Internal Conflict on Expanded Programs on Immunization in Northwest Ethiopia: Implementation Science Study

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Abstract

Background: Despite the rapid progress in immunization service delivery systems worldwide, populations in areas of conflict often have limited or no access to lifesaving vaccines. Hence, evidence generation and translation for context-specific strategies and tailored action would be important, before, during and after an acute humanitarian emergency.

Aim: To explore factors affecting immunization service delivery during and after conflict among internally displaced communities in Northwest Ethiopia.

Methods: Qualitative and quantitative (record review) methods were applied, phenomenological study design and in-depth interviews were applied to collect the lived experiences of participants in the affected areas. Transcribed and translated data were analyzed and thematized using open code software. A Twenty-four-month record review of quantitative data was analyzed descriptively using an excel sheet to develop immunization coverage trends for tracer antigens.

Results: We found that the immunization program had seriously deteriorated during and after the conflict in the study area. The monthly EPI service report in the affected areas showed a decline with the lowest records in December and January when the internal conflict was peak. Security problems, displacement of health workers, destruction of health infrastructures, mixing of the displaced community in the host community and poor coordination among stakeholders and partners, clients having other emergent needs and shortages of resources were important factors for immunization services.

Conclusion: Vaccination service delivery was found to have significantly declined in the study area. Security problems affected not only the service utilizers but also the service providers' wing as well. Coordination of stakeholders and strong leadership systems are crucial in maintaining optimum vaccination service delivery even at the time of conflict. [*Ethiop. J. Health Dev.* 2021; 35(SI-3):39-48]

Key words: Conflict, internally displaced, Immunization services

Background

Vaccination is one of the easiest and most affordable method of mitigating childhood morbidity, disability, and mortality (1-3). Because of this, provision of immunization services to all children is regarded as a priority of basic health services. However, a country's public health system, including immunization programs, can be easily devastated by armed conflicts (2, 4). Despite the rapid progress in vaccine development and immunization delivery systems worldwide, populations in areas of conflict often have limited or no access to lifesaving vaccines, leaving them at increased risk of morbidity and mortality related to vaccine-preventable disease (2, 5-7). More than 10 million children in developing countries die every year, due to ineffective interventions of immunization and other child survival interventions which would fight common and preventable childhood illnesses (2, 4-6, 8). In stable situations and environments, distance, care takers time, availability of supply, sex of the child, and socio-economic status are important determinants affecting equitable access to immunization services (9-11). In developing countries and conflict endemic areas, however, security and related factors are major contextual determinants of lower immunization coverage (2, 4, 7, 8, 12, 13). An internally displaced person (IDP) is someone who is forced to escape his or her home but remains within his or her country's borders (14).

According to the United Nations High Commissioner for Refugees (UNHCR), there were 59.5 million forcibly displaced persons worldwide by the end of 2014 (15). Shortages of vaccines, the risks associated with bringing children to vaccination sites, problems with maintenance of the cold chain, negligence of parents and health workers for immunization, computing priorities, and large numbers of wounded children are commonly mentioned barriers for child immunization during war and conflict (5-7, 16).

In Ethiopia, conflict and inter-communal violence escalated significantly and spread to new areas as of the year 2016 (17-19). It had the highest number of new

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internal displacements associated with the conflict with an estimated number of 2.9 million new displacements in 2018 (17, 18). Thousands of displaced people in central and western Gondar zones of Amhara Regional state have left in need of urgent humanitarian assistance (17, 20).

Hence, evidence generation and translation into action tailored and context-specific strategies would be important for before, during and after conflict interventions of health and humanitarian emergencies. Such studies are also important in understanding the effect of conflict on immunization within countries, as well as on strategies to mitigate the impacts of conflict (16, 21)

More than ninety thousand individuals and twenty one thousand households were displaced in Central and West Gondar zones of the Amhara regional state, northwest Ethiopia (22).

The conflict had occurred in the districts of Chilga 1, Chilga 2, East Dembia, Metema, Adagnagerchako and nearby areas of 80 specific displacement sites in 2019. Following this internal conflict, low immunization coverage was reported by different organizations, however, the immediate cause for this low EPI service delivery is not clearly identified and requires further research in order to inform future health interventions aimed at promoting vaccine uptake in areas affected by internal conflicts(20, 22).

Therefore, this study aimed to describe specific socio-political, organizational, health system and operational barriers that hinder EPI services implementation during and following internal conflicts in this area. Identifying the factors that affect the EPI services during and after humanitarian situations, will provide valuable information that will guide in developing new strategies and policies towards strengthening expanded programs on immunization and reducing vaccine-preventable disease outbreaks not only in the IDP sites but also in host and surrounding communities as well. Hence, this study aimed to assess the EPI service delivery performance and barriers for pre and post IDPs in central and west Gondar administrative zones in 2020. Specifically, to estimate the variation in EPI coverage pre-post and during the IDPs and to identify barriers for EPI service delivery in IDPs sites.

Methodology

Study design and setting

Both qualitative and quantitative approaches were utilized. A Phenomenological qualitative research design was applied to obtain data through in-depth interviews and key informant interviews. For quantitative data, document reviews were conducted from health facilities, over 24 months, to illustrate the trends of vaccination coverage.

The study setting was Northwest Ethiopia, where more than 80,000 people were internally displaced from the spate of violence in central and western Gondar zones of Amhara Regional state (20). The two administrative zones consisted of 22 districts, 12 hospitals, 93 health centers, 513 health posts in 492 kebeles, 223 static and 1,557 outreach EPI sites and a total population of 2,706,442 (23). According to the Central Statistical Agency of Ethiopia, from the total population in the two administrative zones, 96.8% speaks Amharic as their first language and 97.1% are followers of Ethiopian Orthodox Christians (24).

Out of the 22 districts in the two zones, the conflict covered six districts in central Gondar zone (Chilga 1, Chilga 2, Aykel city, Tikil dengay, East Dembia and West Dembia) and two districts from West Gondar zone (Metema and Adagnagerchako)(22).

Sample

For the quantitative document review, three districts from Central Gondar zone (Chilga 1, Chilga 2 and East Dembia) and one district from West Gondar zone (Adagnagerchako) were selected using the lottery method. A twenty-four-month record review of data was collected from four health centers (Ayimba, Negadiebahir, Chonchok, and Chandiba health center) and four health posts (Gana health post, Alengie health post, Kenawuta health post and Laza health posts).

A total of 28 participants were selected purposively from the four study districts which were affected by internal conflict September to December 2018 (Table 1).

Table 1: Key informant and in-depth interview participants

Participants	Number
Women with under one-year children (displaced)	4
Health Development Army woman	4
Women with under one-year children (none displaced)	4
Health Extension Workers	4
Health centre EPI focal person**s**	4
District health office EPI officer**s**	4
Zonal level health managers and experts	4
Total	**28**

One health center and one kebele (health post) were selected conveniently from the affected districts and health centers respectively. Participants included district and zonal EPI and public health emergency department officers and health center EPI focal personnel who were actively working during the conflict period. At the kebele level, health extension workers, and HDAs (Health Development Armies in Ethiopia) who were participating as community health promoters at the time, in the community; and women who had children who were under the age of one for EPI during the conflict period were selected from both displaced and non-

displaced groups in the affected areas and were included in the study. Participants were recruited based on their displacement status during the conflict period, eligibility criteria (had a child that needed to be vaccinated during the conflict) convenience, and willingness to participate.

Data Collection procedures

For the qualitative methods, an open-ended interview guide was used. Face to face interviews were implemented to collect the lived experiences and prospects of health administrators, service providers and clients during the period of internal conflict. The interview checklist was revised and enriched during data collectors training and a field pre-test was conducted. Interviews were held with displaced and non-displaced women in the affected areas, community health promoters (health development armies in Ethiopia), health extension workers, health center and district health offices and zonal health department coordinating bodies.

All participants were briefed about the purpose of the research and consented to participate in the in-depth interviews. All in-depth interviews were audio-recorded, and the facilitator took notes as needed. Interviews were conducted in Amharic, the local language, with trained moderators and note takers.

The quantitative document review comprised of 24 months of health facility-level monthly EPI service reports. This quantitative data was used to assess the expanded program for immunization (EPI) coverage differences before, during and after the internal conflicts.

We used monthly EPI record data from 4 health centers and 4 health posts. To describe the vaccination service coverage trend, 12 months report (September 2018 up to August 2019) was collected before the occurrence of the conflict and 12 months report (September 2019 up to August 2020) after the occurrence of the conflict, which constitutes to a total of 24 consecutive months, along with an overview of the affects, before, during and after the conflict. The record review was collected for the three-indicator vaccination (Penta-1, Penta-3 and Measles) records from the four health centers and four health post HMIS reports. Trained data collectors filled the registry checklists with data from HMIS (Health Management Information System) monthly EPI reports for health centers and a copy of EPI monthly report data for health posts.

Data management and Analysis

We used Open Code version 4.02 software for qualitative data analysis which followed inductive thematic analysis based on codes which emerged from the data. First, audios from interviews were transcribed and translated from Amharic to English before they were double checked for consistency and accuracy by the authors and other independent native speakers of Amharic. Sample transcripts were sent back to interviewees for validation and to ensure accuracy in the data generated before analysis. Following this, the authors independently reviewed the transcripts several times to become familiar with the content before the process of sorting, coding, and identifying of themes.

Cleaned data was imported into Open Code software and themes were developed based on an inductive and deductive process of issues that emerged from the interviews. Three of the authors initially developed themes independently and compared them with each other before deciding on which themes to include for the final report. This process ensured the mapping of themes and facilitated the application of relevant codes and themes. Following this process, a final list of codes and themes was derived and applied to the data. In presenting the data, some relevant verbatim quotes were reported to aid in the interpretation of the data.

For the quantitative monthly EPI data, we used an excel sheet for cleaning, developing percentages from the target and to develop trend lines for each antigen and facility.

Ethical approval

A proposal of this study was approved by the Institutional Review Board (IRB) of the University of Gondar. A permission letter was obtained from the central Gondar health department and respective district health offices. All study participants provided written informed consent. Three of the participants were unable to read and write and they utilized a fingerprint after a witness read the written informed consent for them.

Results

Respondents' Characteristics

A total of 28 respondents (20 female and 8 male) participated in the in-depth interviews. Twelve were women from the community (4 Health Development Armies, 4 internally displaced women and 4 non-displaced women), eight were facility-level health workers (4 health extension workers and 4 health center EPI focal persons) and 8 were decision makers (4 district EPI officers and 4 zonal level health managers). All the female in-depth interview participants were from the rural community and the majority had no formal level of education. All of them were also married and had a mean age of 29.5 years. Service provider, key informant interview participants, had a mean age of 28.5 years and average years of experience was 9.9 years (ranged from 3 to 15 years).

The burden of the internal conflict on immunization

Despite variations in the magnitude and duration of vaccination service interruptions, providers and health managers at different levels and facilities agreed that EPI services were seriously affected for several months during and after the internal conflict and displacement.

Women who were part of the displacement were concerned about other urgent issues like, families affected, their destroyed resources and the basic and urgent needs to be provided than the vaccinations that were missed. The magnitude of immunization dropout varies among the different districts and health facilities. Despite the variations for its cause, the EPI program had deteriorated due to various factors. In some areas, security was the main reason for women not taking their

children to immunizations sites, in other areas, the facility was not functional either because the providers were displaced or the supplies were not available, or the facility was damaged in some cases.

A 48-year-old zonal health department expert who was actively participating during the conflict described the situation and its intensity as.

> *"The monthly EPI service report was dramatically reduced during the conflict for several months as of the start of the conflict. In some of the districts, the monthly EPI report was decreased as much by 50% as compared to pre-conflict normal condition reports and some health facilities didn't report at all."*

A 35-year-old district EPI focal person added.

> *"We have about 30 health posts in our district and from these, 14(46.7 percent health posts) were closed for several months and almost all vaccination outreach sites were inaccessible for the EPI services".*

Displaced women and family's encountered life-threatening conditions and the vaccination and related services were not priority at all during and after their displacement.

29-year-old lactating women who was displaced for one year and returned back to her former residence told her story as follows;

> *"When the situation is worsened (17), we left our home and residence to save our live and travelled for more than 8 hours distance same day. At that time, I was nearly 7 months pregnant and arrived to my parents' in-law residence. There, we lived for a year until we returned to our residence. I gave birth at my husbands' family home. My mother-in-law cared me in my post-partum period. My child didn't get any vaccine until now. You see! What I heard at that time is 'many of the health workers were left the health center due to fear of insecurity'. I have confirmed this from my neighbor who frequently visited the health center for serious health problem. Later, after 9 months things were improved but I totally become hopeless on the vaccination. Because the child was starting to walk by himself and I forgot all about it (1).*

The quantitative findings from the monthly EPI service report supports the above reflection which indicate many more children missed vaccinations during conflict. The 24 months (month to month) EPI service report aggregated from 4 health centers and 4 health posts showed a decline as of July and August 2018, lowest in the month of December and January and reversed as of February 2019 across different health facilities. (See fig. 1)

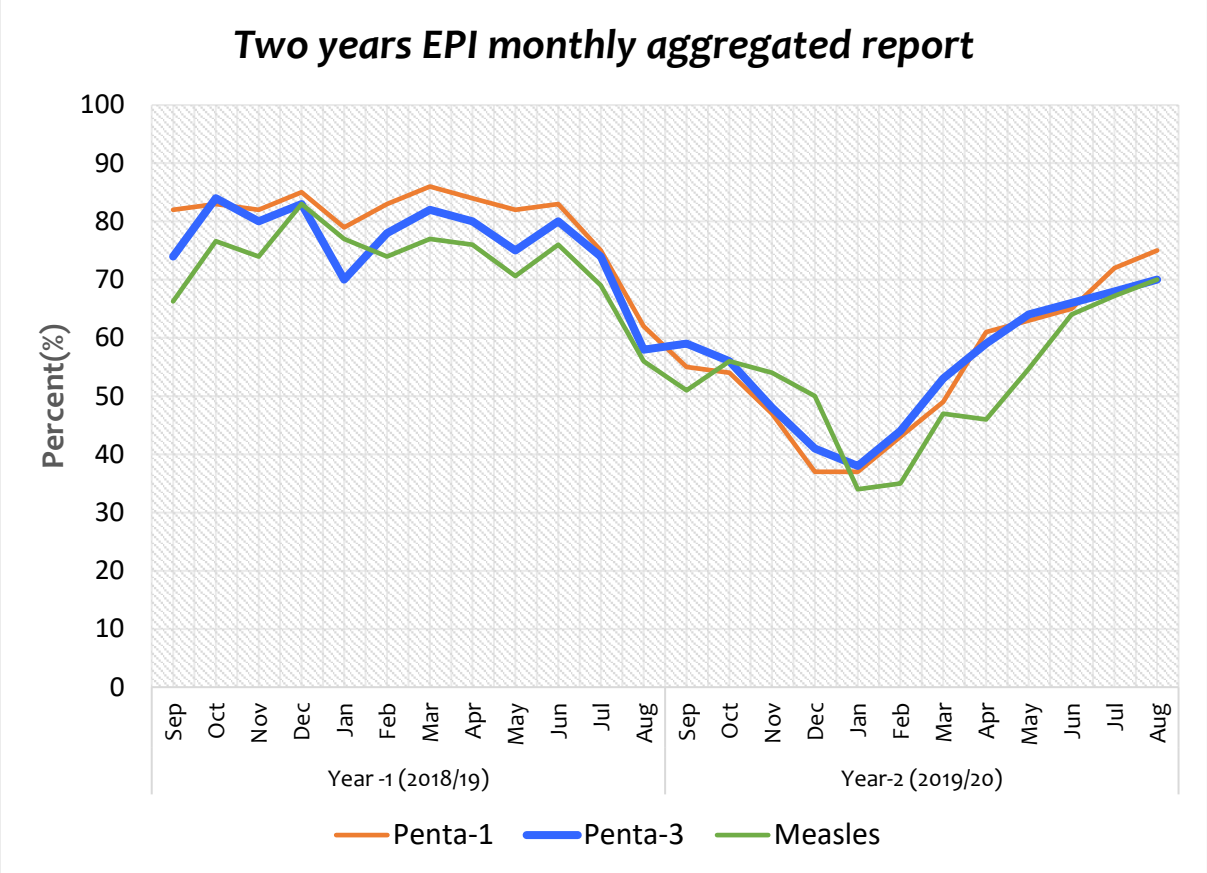

Fig. 1 Two years EPI monthly HMIS aggregated report (Penta-1, Penta-3 and Measles) in the study areas of health facilities

Barriers to immunization service during and after the internal conflict

Politics and Security related factors: Almost all key informant interview participants boldly underline that the most critical barrier to access immunization was security issues. Women/caregivers/ were scared to take their children to health facilities and vaccination cites. Due to bad violence by armed groups, important medical supplies were transported with military convoy from the zonal health department to the district and main health centers. In some of the health facilities the route was totally blocked, and supply delivery was interrupted for several weeks. Many health workers were displaced because of their fear in terms of security, and some had not returned till date of data collection.

A 48-year-old zonal health management team lead explained that security was the root cause for many of the services interruptions:

> *"Due to violence, some health facilities burned and looted. Many supplies and equipment were pillaged in some of the health facilities were burned and looted. Because of the mal functioning of the health infrastructures like electricity, refrigerator and cold chain system, immunization supplies were affected. In some of the health facilities there was serious shortage of supplies and logistics to fully start the health services even after slight stability of the situation"*

A 32-year-old district EPI and nutrition officer who was actively engaged in the then situation also mentioned.

> *"As the conflict was ethnic based and instigated with wrong propaganda the community lacked trust on the service providers and security persons. On the other hand, several health workers were part of the displacement and because of the security issues, some of them couldn't get back to the duty station. Majority of the health workers were requesting guarantee for this life-threatening situation."*

A 52-year-old senior health expert from zonal health department describe the situation in different way as follows:

> *"…the service report declined even before actual incidence of the conflict, the reason we investigated latter was that there was internally circulated rumor of conflict among the community. There was serious politically instigated propaganda to initiate the conflict that restricted movement of community due fear of the security situation."*

Management related factors

Majority of the participants highlighted poor coordination, delay in decision making and mishandling of the humanitarian situation. The internally displaced community who were integrated in the host community were unable to access vaccination and related services. There was no active surveillance in the community and the efforts required for tracing dropouts was also not satisfactory. There were no adequate contingent resources for this emergency and the overall budget shortage was also one of the serious challenges.

A 42-year-old man, public health emergency management officer, reflected his idea irritably as follows.

> *"In the then conflict and internal displacement period, we faced, poor coordination among the different stakeholders, shortage and late delivery of supplies. You know, there was no contingency budget to operate such type of emergency response. Because of this, we couldn't provide immediate response for the affected community."*

A 37-year-old district EPI and nutrition officer who was actively engaged in the then situation also mentioned as follows.

> *"The IDP camp faced shortage of supplies in the first months, different volunteer community members and organizations provide support that survived their live. Later, the government mobilized resource from different sources and provided better services, including deworming, vaccination, food and other basic services until they are demobilized from the IDP camp." Then, people who were admitted/joined/ to the IDP camp had better immunization services whereas those sheltered within the host community were left unvaccinated in many areas. There was no supplementary campaign for vaccination and deworming for the host community and no assessment was conducted to understand vaccination and other service status."*

A 33-year-old female health center EPI focal personnel also described.

> *"Many health facilities were not working in our catchment area. This was because of displacement of health workers, damage of the health facilities and shortage of supplies. For example, Laza health post was destroyed during the conflict and not reconstructed yet. Therefore, children in that health post catchment didn't get basic health services including immunization."*
>
> *In addition to this, the district or zone officials did not yet recruit/replace/ health providers who left due to conflict, we have critical shortage health workers in the health center as well as in health posts."*

Similarly, 30 years old health extension worker (community health provider) who served for 14 years in the community:

> *"Many children and women missed vaccination because of the conflict. I think it is leadership problem at least they could have conduct campaign, resolve security related issues, substitute displaced health workers and construct damaged health facilities."*

Health facility related barriers

Most in-depth interview participants revealed that facility readiness and services availability during the internal conflict were affected, and the health services delivery were interrupted.

Almost all respondents agreed on the major drawbacks and failures of EPI services. A considerable number of health workers were displaced from the health facilities, some health facilities were damaged, thus provision of essential health services was interrupted. Key informant interview participants reported that women who were sheltered in the host community did not access immunization and any other health services during the conflict period for several months.

A 46-year-old zonal health department officer reported.

> *"Some health facilities were damaged and/or robbed during the conflict, and others were closed due to displacement of the health workers as a result health service provision was interrupted. While some others were destroyed and need reconstruction. For example, in Chilga woreda almost all health facilities in the rural kebeles were closed for several months."*

A 42-year-old female rural community health promoter (in Ethiopia; member of Health development army) said the following.

> *"Before the internal conflict, in Anker-Adeza kebelle, there was regular meeting schedule with health extension workers every 27th day of the month and we used to discuss about the pregnant women and every 16th day, about children vaccination schedules. We had a very good vaccination service at that time. However, during and even after the conflict, the health post was closed, HEWs were displaced and we couldn't get vaccination services for long time. Leave alone the vaccination, we are* even assisting births at the home."

Checklist based facility audit reports also showed that health centers and health posts had interrupted services for a minimum of one month (Chonchok health center) to a maximum of more than one year (Laza health center) (see Table 2).

Table 2: EPI service and trained manpower availability of the selected health facilities *during the survey in the post conflict period.*

District	Health facility	EPI service dysfunctional month	No of vaccine carriers available		No of trained EPI focal persons available		No of health extension workers available	
			Before	After *	Before*	After *	Before	After*
E/Dembia	Ayimba HC	02	03	03	02	01	-	-
	Gana HP	06	02	0	-	-	02	01
Negadiebahir	Negadiebahir HC	03	02	02	02	01	-	-
	Alengie HP	04	02	02	-	-	02	01
Chilga-01	Chonchok(HC)	01	02	02	02	01	-	-
	Kenawuta(HP)	05	02	0	-	-	02	01
Chilga-02	Chandiba (HC)	02	03	02	02	0	-	-
	Laza (HP)	12+	02	0	-	-	02	0

- During data collection period

Factors related to the IDP camp management

During this internal conflict period, more than twenty thousand displaced people were sheltered at different camps for a period of 6 to 9 months. Most in-depth interview participants reported that, the IDP camps were very far, up to 85 kilometers from the residence of displaced communities.

However, only one-fourth of the displaced people had access to this camp settlement out of more than 80,000 people who were displaced and dissolved in the community. The majority were sheltered along with the host community. Those who settled with the host community had no access to health and related services including vaccinations, the reason mentioned was lack of community based active surveillance in the affected area. This segment of the population was not accessible for any health-related services including vaccination.

The zonal health officer who participated in the key informant interview replied to this.

> *"IDP vaccination was started very late after we mobilize resources for basic services like food and shelter. Hence, many IDPs fled to the camp without adequate preparation. The camps were full and occupy beyond its capacity. Lack of experience and coordination led to poor management of people, camps and resources, measles and diarrheal related outbreaks irrupted after a while. Then we are forced to give measles vaccination, deworming and vitamin A supplementation for all children less than 15 years in the camp"*

34-year-old lactating women remembered the condition and reported as.

> *"We came from Metema (190 km) with the*

support of military conveys and admitted in the camp. The situation in the camp was very tough. No safe latrine, no water and hygiene facilities and latter my child becomes sick, I took to the health center, and he gets better for days, but because condition in the camp was not safe, he also developed cough and diarrhea after a week. In general life in the camp was very hard for us."

Client related barriers

Primary needs for women and households, were basic and immediate needs like food, shelter, their assets and ensuring security.

One key informant who served as a team member at the district rapid response team recalled the condition as.

"The majority of the IDPs joined the host community than the IDP camp. However, they come to camp to request food and nonfood supplies; but they didn't bring their children for vaccination and related health services. May be vaccination service was not immediate priority during that time.

Rural HDA woman mentioned why caregivers didn't take their children for vaccination.

"When they came back to their home, many children have missed vaccination hence the age of children become above one year old that means out of target for immunization service. Many caregivers perceive that the child's age is above nine months they assume it is meaningless to go for vaccination. Many of the community networks were not functioning to mobilize community for immunization and health and nutrition services"

Other priority needs of clients

Displaced women experienced several catastrophic situations during the conflict period including death of family members, loss of all household assets, burnt houses and displacement.

Thus, their primary need during this period was securing food, clothing, shelter, security and restoring their properties and in some cases recovery from tragedy and sorrow resulting from the death of family members and damage of their lifelong assets. During such situations, vaccination and other related services were not priority issues as they are severely affected economically, socially, mentally, and psychologically.

A 30-year-old woman who lost her husband and displaced to the host community and stayed there for several months remembered the tragedy story as:

"We displaced from where we have lived for long period of time and owned many assets. My husband was killed in the conflict, and I traveled to my uncle's house to save my two children. There, I stayed with my two little children. I couldn't get any IDP camp in the surrounding. But latter, just after months, I heard about the place. Because I was asylum at my uncle's home, and I didn't think for any other services than the food and shelter. I was in mourn of my husband's death and worried about how to grow my children without father and any resource. I have forgotten to vaccinate my little child, who was nearly three months when we displaced."

In summary, the EPI service delivery in the study area was affected by several factors. The following conceptual map is developed after a thorough framework analysis of the qualitative wing (Fig. 2)

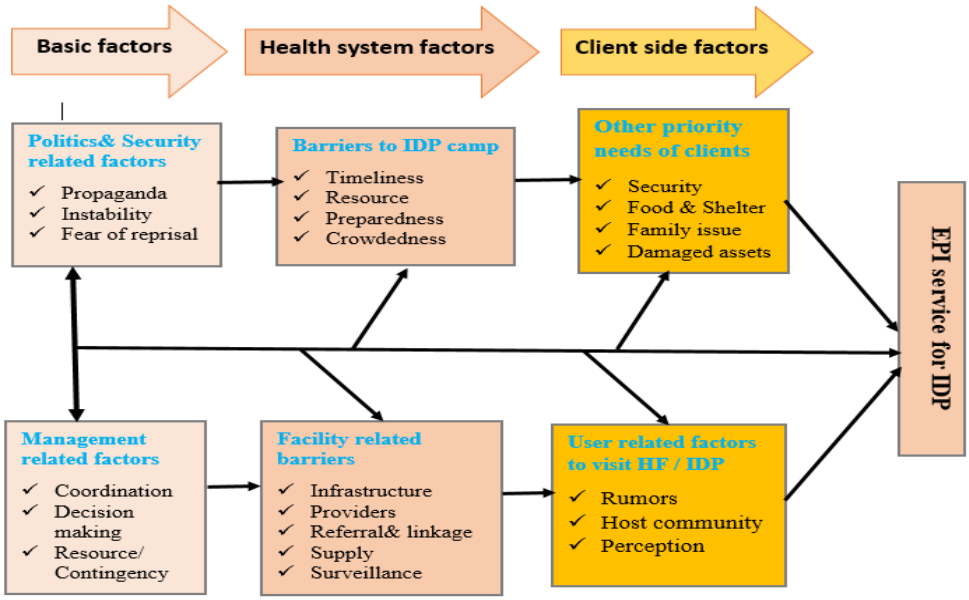

Fig 2: **Conceptual map:** Barriers in EPI service delivery in IDPs sites, Northwest Ethiopia (developed after thorough framework analysis)

Discussion

Despite the differences in the magnitude and severity of the problem, in this study, almost all participants reported that the internal conflict has dramatically affected the immunization program in the conflict areas. Some district level study participants reported that several kebeles were totally closed for months due to the conflict and this resulted in the interruption of vaccination services for several months. The document review of vaccination trend analysis report showed a reduction of vaccination coverage during the conflict period. Both findings were consistent with other studies (1, 14, 16, 25, 26).

Important subthemes emerged from the lived experiences of study participants who were directly affected by the conflict and those health service providers and program coordinators who were part of the taskforce at the time of the conflict. These subthemes include security related issues, facility related factors, management related factors, nature of the conflict and the need for housing and urgent services, its impact on service providers and vaccination related supplies and infrastructures, inaccessibility of IDP camp services, transportation and communication related barriers were the main subthemes which emerged from the analysis.

This study observed that security and its related factors were the prominent reasons for the failures in child vaccination. This finding is consistent with other studies (1, 5, 10, 14, 16, 26, 27). Directly or indirectly security was mentioned as a significant barrier, for most mothers, from visiting the health facilities or immunization sites. Women hesitate to bring their children for vaccination due to fear in relation to the conflicts in the area. This finding was similar with a study done in other settings (1, 2, 4, 5, 16).

Security was also mentioned as a reason for the migration of health workers from their working place. Several health facilities were not fully operational because of the displacement of health workers in fear of the security problems. Respondents raised that many health workers were part of the displacement and some of them didn't return even after the recovery of the situation. This finding was consistent with a study done in other settings (1, 5, 16, 28, 29).

The security issue was aggravated by the political propaganda and media elites. Respondents opt out of the services even before the actual occurrence of conflict and displacement, because of the circulation of rumors about possible incidences of conflict which is aggravated by those who demand political advantage from the conflict. The quantitative data analysis results supported this argument. The monthly EPI service report started to decline two months before the occurrence of the conflict (July and August 2018), and the displacement of residents was observed in the month of September. Women may have refrained from visiting EPI services due to the rumors (30).

This study also revealed that the damage of health facilities was a reason for the dropout of children from vaccination. Health centers and health posts were either destroyed/burned/ or looted during the conflict and were not providing services for several months. This was supported with previous studies (1, 5, 13, 16, 21, 25, 28). Following the conflict, the health facilities were also faced with supply shortages that hinders them from providing appropriate vaccination services. The supplies were out of stocks as there were no regular refills because of transport issues (1, 5, 16, 25, 30, 31).

Nearly three-fourths of children have missed their vaccinations because of displacement. Due to fear of the security problem tens of thousands of families were displaced in the host community where their address and status were not clearly identified. Due to this large scale coverage of the conflict, and the referral system which was not fully operational , the health systems didn't have clear information about the mothers and their children in terms of their whereabouts and requirements, during the conflict period (1, 5, 6, 16, 18, 25).

Many of the households didn't have access to refugee camps and most of them were displaced to the nearby districts where they thought was a safer zone or they opted to reside with family. These children were not clearly identified and didn't get vaccination services where they lived dispersed for several months. This result was similar with other studies (1, 16, 25).

Poor coordination and management were one of the reasons mentioned by the respondents for the failure of child vaccinations during this conflict and displacement period (5, 8, 10). From the onset, the management body didn't take strict and timely actions to control the conflict. Furthermore, there was poor management and coordination in handling the displaced people, to distribute important supplies, to timely replace health workers, to repair and function the damaged health facilities (8, 16). Inability to conduct active surveillance and failure to do vaccination campaigns for the host communities even after the decline of the conflict was also mentioned by respondents as poor coordination and management systems. This finding was similar with other studies (5, 16, 25, 30-32).

Resource shortages and the nature of conflict by itself were the factors explained for this reason (7, 16). Location and distances of the temporary camps/IDP camps/ were not accessible for most people displaced from remote areas. People who were dissolved in the host community were also claiming that there was no clear information about the IDP camps (1, 6, 16, 25).

In addition to the above reasons, those who had a chance of joining the IDP camp complained about the services given at the IDP camps. Respondents who have stayed in the IDP camp complain about the delayed service provision in constructing shelters, its crowded condition, its lack of hygiene, and poor handling of the situation (1, 16, 25).

According to their report, there was also an occurrence of measles and other communicable disease outbreaks in the IDP camps (2, 5, 6, 33). Program level health

managers agree on these drawbacks and their justification was lack of preparedness, shortage of budget, poor coordination among the partners and the nature of the conflict that makes the IDP camp management very difficult. This result was almost similar with several other studies (1, 5, 16, 25).

The internal conflict has resulted in the damage of households' assets and the life of many civilians. The lived experiences of women during the conflict tell us that they were worried about their survival and basic needs which include their shelter, replacement of their damaged resources, sadness due to the loss of their family members and their food security issues. Because of these critical conditions, most of the families didn't even think about their child's vaccination in that period. They reported that, "vaccination was not our concern at that time." This was similar with other studies (1, 5, 16).

Despite this study employing qualitative and quantitative methods to further substantiate its findings, it might be prone to recall bias because of self-reporting of the respondents for their one-year experiences. The study also didn't show the outcome and impact levels of the internal conflict on immunization

Conclusion and recommendation

Vaccination service delivery was found to be significantly affected before, during and after the internal conflict in the area. In this study, rumors, security, management, availability of human and other resources, damage of health facilities, access to transport, other computing priority needs, and diffusion in the host community were barriers to immunization during the internal conflict. Collaboration of different stakeholders including EPI programmers and implementers is important to tackle the problems. They need to work together and provide immunization services for clients displaced in the host community, conduct catch-up campaigns and immediate reconstruction of damaged health facilities, securing health workers, supplies and related resources are recommended for better immunization services during and after internal conflicts.

Abbreviations

EPI: Expanded Program for Immunization; HDA: Health Development Army; HEW: Health Extension Worker; HMIS: Health Management Information System; IDP: Internally Displaced People; ZHD: Zonal Health department; PHEM: Public Health Emergency Management; WHO: World Health Organization; VPD: Vaccine Preventable Diseases

Declarations

Ethical approval and consent to participate

Ethical clearance was obtained from the Ethical Review Board of University of Gondar College of Medicine Institute of Public Health. Permission letter was obtained from central Gondar zone health department and respective district health offices. The participants had the right to refuse or discontinue participation at any time, the right to answer few or all questions was respected. Written informed consent was obtained from the study participants before data collection and confidentiality and privacy of the respondent was maintained.

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.

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