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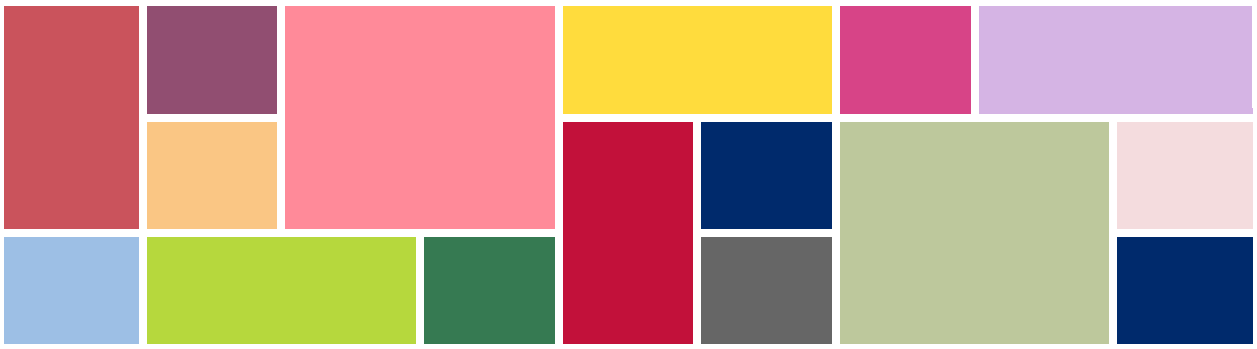
Maternal and Child Survival Program

MCSP Ethiopia Community Based Newborn Care (CBNC) Project

Do Caretakers of Sick Newborns with Possible Serious Bacterial Infection Referred from Health Post to Health Center Comply with the Referral in Tigray, Amhara, Oromia, and Southern Nations Nationalities, and Peoples' Regions, Ethiopia?



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* USAID's 25 high-priority countries are Afghanistan, Bangladesh, Burma, Democratic Republic of Congo, Ethiopia, Ghana, Haiti, India, Indonesia, Kenya, Liberia, Madagascar, Malawi, Mali, Mozambique, Nepal, Nigeria, Pakistan, Rwanda, Senegal, South Sudan, Tanzania, Uganda, Yemen and Zambia.

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Acknowledgments

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List of Acronyms

CBNC	community-based newborn care
FMOH	Federal Ministry of Health
HC	health center
HDA	Health Development Army
HEW	health extension worker
HP	health post
iCCM	integrated community case management
IMNCI	integrated management of newborn and childhood illnesses
KII	key informant interview
NEGA	Newborns in Ethiopia Gaining Attention
OPD	outpatient department
PHCU	primary health care unit
PSBI	possible serious bacterial infection
D	Saving Newborn Lives
SNNPR	Southern Nations, Nationalities, and Peoples' Region
SYI	sick young infant
VSD	very severe disease
WoHO	*woreda* health office

Executive Summary

Background

The early identification of young infants with possible serious bacterial infection (PSBI), also referred to as very severe disease (VSD), at the health post (HP) level and referral to a higher health facility where they can obtain appropriate treatment are critical for helping reduce complications and child death. A functioning and responsive referral system, provision of quality care at the referral destination facility and acceptance of and compliance with the referral by caretakers, is essential to ensure quality continuum of care to sick newborns. However, there is limited understanding of circumstances surrounding sick young infant (SYI) referrals from HPs to health centers (HCs). This implementation research was conducted to shed light on the circumstances surrounding SYI referrals, specifically to help understand levels of compliance, determinants of compliance, and the functioning of the referral system.

Objectives

The primary objective of the study was to assess the referral compliance among caretakers of SYIs classified as having PSBI/VSD, the barriers and facilitators to compliance, and the care received at the referral facility in Tigray, Amhara, Oromia, and Southern Nations, Nationalities, and Peoples' Region (SNNPR) regions of Ethiopia.

Methods

A cross-sectional study using a mixture of qualitative and quantitative methodologies was employed to collect facility- and community-based information on the care for SYIs (from birth to 2 months) in four regions of Ethiopia in March and April 2017. Data were collected from 20 *woredas* (districts) in eight zones: North Wollo and Wagimra in Amhara Region; Bale and Arsi in Oromia Region; Kembata, Hadiya, and Halaba in SNNPR; and Central Tigray in Tigray Region.

The assessment reviewed 197 HPs' community-based newborn care (CBNC) 0–2 months SYI registration book and 42 HCs' 0–2 months Integrated Under-5 outpatient department (OPD) registers from the purposively selected primary health care unit (PHCU) in the four study regions. A total of 289 PSBI/VSD cases referred to next level were identified from 66 CBNC 0–2 months SYI registration books (the rest of the HPs, 131, did not have referred cases recorded). In addition, the records of 109 PSBI/VSD cases were identified and reviewed from 28 HCs 0–2 months Integrated Under-5 OPD registers (the remaining HCs, 14, did not have PSBI/VSD registered) for the 12 months before the study.
In-depth interviews were conducted with 58 caretakers who reported receiving referral for their SYIs (28 compliant and 30 noncompliant), 52 health extension workers (HEWs), 30 health workers serving in 28 HCs, 12 *woreda* health office (WoHO) representatives, and two MCSP NEGA *woreda* coordinators. Two focus group discussion (FGD) sessions were held with a total of 25 HEWs, and 32 FGD sessions were held with a total of 160 community members.

Quantitative data were entered into and analyzed with SPSS version 21 statistical software, while qualitative information was transcribed, thematically coded, and analyzed.

Findings

- Of the total of 289 SYIs with PSBI/VSD who were extracted from the CBNC 0–2 months SYI registers of HPs as having been offered referral, 271 caretakers were tracked at the community level. Of the 271, 243 caretakers (90%) reported accepting the referral, but only 92 (38%) complied with the referral,

meaning that they visited a higher-level facility within 48 hours of accepting the referral. The remaining 62% did not comply with the referral within 48 hours.

- Determinants of referral compliance, as expressed by caretakers, include distance and/or terrain (52%), improvement following the pre-referral drug (23%), direct and indirect cost (14%), and "other," such as family or neighborhood support, provision of referral slip, nature of counseling offered by the HEWs, availability of family or friend around the destination facility, and caretaker awareness of care-seeking benefits.
- With regard to referral and counterreferral, 17% of referred cases were given a referral slip from the HPs, as reported by caretakers. Written counterreferral from HCs to HPs was very low, near 2%. However, 42% of caretakers reported that HC staff had advised them to verbally report back to the HEWs on their treatment completion. Nonwritten communications, such as telephone calls and personal visits, were widely used between HPs and supervising HCs. Factors attributed to poor communication between HPs and HCs in relation to SYI referrals included the busy schedules of care providers in the HCs, lack of HC providers' conviction on benefits of the referral slip, lack of referral slip, caretakers' failure to provide the referral slip to the respective HPs during the time of visit, and poor mobile phone network.
- Of the 109 SYIs classified as PSBI/VSD in the 0–2 months Integrated Under-5 OPD registers, 71% were treated as outpatients at the HC level. Of these, 44% were treated with gentamycin IM and oral ampicillin/amoxicillin, as per the integrated management of newborn and childhood illnesses (IMNCI) national protocol; 31% were treated with oral ampicillin or amoxicillin only; and 16% were treated with gentamycin only. Treatment information for the remaining 9% was missing from the 0–2 months Integrated Under-5 OPD registers.
- The study identified both positive and negative factors that influence the adherence to the national CBNC protocol. Positive factors from the service provider perspective include trained HEWs at the HP, availability of chart booklets, supportive supervision by WoHO/HC and partner staff, availability of essential drugs and supplies, and trained focal people at the WoHO level with commitment to the CBNC program. From the caretakers' perspective, the key factor was community acceptance of the CBNC program as cost- and time-efficient and effective care. Negative factors influencing adherence to the national CBNC protocol from provider perspective include lack of focused supportive supervision by the WoHO and HCs, inaccessibility to and cost of services at referral HCs, lack of referral format/slip, overconfidence of HEWs in treating SYIs with PSBI/VSD, shortage of IMNCI-trained health workers at the HCs, frequent closure of HPs, and interruption in the drug supply chain.

Recommendations

Based on the study findings, the following recommendations are made to improve the referral compliance for SYIs with PSBI/VSD from HPs to HCs, communication between HCs and HPs regarding referral (including counterreferral), and adherence to the national CBNC protocol.

Recommendations for the Federal Ministry of Health/Regional Health Bureaus

- Develop mechanisms for tracking and ensuring adherence to CBNC SYI management protocol at all levels.
- Ensure availability of the appropriate drugs at HCs and HPs.
- Revitalize and/or strengthen the use of written referral and counterreferral slips for SYI referrals. Explore options for unique features on the referral slip to allow for easy identification at the referral facility.
- Consider inclusion of columns in the CBNC 0–2 months SYI registers of HPs and 0–2 month Integrated Under-5 OPD registers of HCs that allow for entry of information related to referrals.

Recommendations for WoHOs/HCs

- Ensure all providers taking care of SYIs are trained in IMNCI/CBNC.
- Enforce the implementation of written referral feedback (i.e., paper-based, phone call, or short message service).
- Strengthen supportive supervision to HCs to ensure technical gaps in the management of SYIs are identified and addressed in a timely manner.
- Enforce proper and complete recordkeeping on SYIs managed at the HCs.
- Ensure availability of the appropriate drugs at HCs and HPs.
- Develop mechanism for addressing the transportation challenges associated with SYI referrals.

Recommendations for HPs/Communities

- Strengthen counseling to caretakers when offering referral to ensure caretakers understand (i) why referral is needed; (ii) the purpose of the pre-referral treatment; (iii) the need to return to the HP if they are not able to comply with referral within 48 hours; and (iv) that they participate in the decision of which facility to be referred to, in case the supervising HC is not convenient for any reason.
- Provide referral slip for all SYI referrals.
- Counsel caretakers on the need to report to the HP upon treatment completion at the destination facilities.
- Improve community awareness on the importance of complying with referrals from HPs through the Health Development Army (HDA) network and *kebele* (the lowest administrative structure in Ethiopia) leadership
- Actively engage/involve HDAs in the referral process.

1. Introduction

1.1 Overview of the Ethiopian Health System

Primary health care is Ethiopia's principal means to achieve universal health coverage, ensuring access to all necessary health services for all those in need while providing protection against financial risk.[1] Ethiopia delivers the Essential Health Services Package through its primary health care units (PHCUs) to address major health conditions of the people under a *woreda* (district) health system. Ethiopia has a three-tier health care delivery system, with the PHCU providing the primary-level care. The PHCU is composed of an average of five satellite health posts (HPs), one health center (HC), and one primary (district) hospital. HPs, HCs, and primary hospitals comprise the PHCU responsible for providing the Essential Health Services Package to an average of 5,000, 25,000 and 100,000 people, respectively, at each level.
HCs are staffed by 20 health professionals on average, including a health officer, nurse, midwife, environmental officer, laboratory technician, druggist or pharmacist, and others. Together, these professionals provide promotive, preventive, and curative services. The HCs are responsible for technical backstopping support to HPs through weekly supportive supervision visits and regular performance monitoring meetings.

There is one HP for each *kebele* (the lowest administrative structure in Ethiopia) with an average population of 5,000. Each HP is staffed by two health extension workers (HEWs) who provide preventive, promotive, and basic curative services. HEWs are young women who have completed high school and undergone a 1-year training primarily focused on health promotion and disease prevention. Subsequent on-the-job trainings facilitated the introduction of basic curative services, including integrated community case management (iCCM) and community-based newborn care (CBNC). The HEWs closely work with the Health Development Army (HDA) to mobilize the community for various health promotion and preventive activities, and improve community ownership of their own health care. The Health Extension Program serves as a platform to link the community with the PHCU, further enhanced by networks of the HDA. The coordinated effort of these structures and respective functions under the *woreda* health offices is the principal means to achieving the desired universal health coverage services. The Health Extension Program includes a newborn care package along the continuum of care—from pregnancy to childbirth and to the postnatal period—that is carried out by HEWs. The *kebele* administration (also known as the *kebele* command post) oversees the HEWs' activities and supports community mobilization around health through facilitating active engagement of HDAs and that of informal community leaders in health promotion and disease prevention. In so doing, the Government of Ethiopian has improved access to health care, community awareness, quality of care, and interlinkages among PHCUs and health care coverage.

1.2 Overview of Newborn Health

According to the *Millennium Development Goals Report 2015*, global under-5 child mortality has declined dramatically, by more than half, from 90 to 43 deaths per 1,000 live births between 1990 and 2015.[2] In 2015, 6 million children under 5 died, a decline from 12.7 million in 1990. Though sub-Saharan Africa has had the largest decline in under-5 mortality in the past two decades, from 176/1,000 in 1990 to 86/1,000 in 2015, the region still has the highest child mortality rate. Sub-Saharan Africa accounted for 50% of all child deaths in 2015.[3]

[1] Federal Ministry of Health (FMOH). 2015. *Envisioning Ethiopia's Path towards Universal Health Coverage Through Strengthening Primary Health Care.* Addis Ababa: FMOH.
[2] United Nations. 2015. *The Millennium Development Goals Report 2015*. New York City: United Nations.
[3] United Nations. 2015. *The Millennium Development Goals Report 2015*. New York City: United Nations.

The decline in the newborn mortality rate has been slower than the decline in under-5 mortality, representing 47% of total under-5 deaths in 2015.[4] The decline in newborn mortality over 1990–2015 in the sub-Saharan Africa region, from 46/1,000 live births in 1990 to 29/1,000 live births in 2015, has been slower than the decline of overall under-5 mortality. The decline in the newborn mortality rate for the region over the last two decades is 38%, even lower than the global average of 47%,[5] largely due to poor access to quality prenatal, intrapartal, and postnatal services.

1.3 Status of Newborn Health in Ethiopia

While Ethiopia achieved the fourth Millennium Development Goal target ahead of schedule, the newborn mortality rate remained high, at 29 per 1,000 live births.[6]

Over 75% of newborn mortality in Ethiopia is associated with three main causes: prematurity and preterm birth complications (36%), intrapartum causes/complications (28%), and severe infections (28%).[7] To address these causes, the Government of Ethiopia developed a CBNC program package focused on infants 0–59 days with the aim of bringing newborn health care closer to the communities.[8] CBNC was built upon lessons learned from the implementation of the iCCM of common childhood illness and research from the Saving Newborn Lives (SNL) Community-Based Intervention for Newborns in Ethiopia project. Implementation of CBNC started in September 2013 in a phased manner, starting with selected phase I/learning zones[9] in four agrarian regions of Ethiopia: Amhara; Oromia; Southern Nations, Nationalities, and Peoples' Region (SNNPR); and Tigray. Additional zones were enrolled beginning in 2014. Since 2015, CBNC has been mainstreamed into the pre-service training for HEWs.

In addition to strengthening the overall capacity of the PHCU to deliver key high-impact interventions for improved newborn health outcomes, the CBNC package introduced protocols for the management of possible serious bacterial infection (PSBI), also referred to as very severe disease (VSD), by HEWs at the HP when referral is not possible or acceptable to caretakers for various reasons. The protocol also states that there will be a strong referral link between HPs and HCs in both directions.

Based on experiences from implementing iCCM, it is expected that up to 80% of sick young infants (SYIs) with PSBI/VSD will be treated at the HP level. However, rates of newborn referral in the initial phases of CBNC implementation in Ethiopia were variable, with some HPs referring all PSBI/VSD cases identified and others treating all cases identified at their level.

1.4 National Protocol in the Management of SYIs with PSBI/VSD

The national CBNC protocol establishes standards for the management of SYIs with PSBI/VSD.[10] The protocol recommends referral to an HC as the first option for all SYIs classified as having PSBI/VSD by a HEW, after administration of the first dose of gentamycin IM and oral amoxicillin, along with proper counseling, a referral slip, and need-based additional support (e.g., facilitating transport). Treatment at the HPs

[4] United Nations Inter-agency Group for Child Mortality Estimation. 2015. *Levels & Trends in Child Mortality: Report 2015*. New York City: UNICEF.
[5] United Nations Inter-agency Group for Child Mortality Estimation. 2015. *Levels & Trends in Child Mortality: Report 2015*. New York City: UNICEF.
[6] Central Statistical Agency (CSA) [Ethiopia], ICF. 2016. *Ethiopia Demographic and Health Survey 2016: Key Indicators Report*. Addis Ababa, Ethiopia, and Rockville, Maryland, USA. CSA and ICF.
[7] Liu L, Johnson HL, Cousens S, et al. 2012. Global, regional, and national causes of child mortality: an updated systematic analysis for 2010 with time trends since 2000. *Lancet*. 379(9832):2151-61. doi: 10.1016/S0140-6736(12)60560-1.
[8] FMOH. 2013. *Community-Based Newborn Care Implementation Plan*. Addis Ababa: FMOH.
[9] The FMOH decided to initiate CBNC in a phased manner starting with learning zones (also called phase 1 zones) selected from each of the four agrarian regions based on a set of criteria (including good iCCM coverage, functional HDA network, and strong PHCU linkage). This allowed implementation lessons from these zones to be integrated in subsequent rollout to the rest of the agrarian regions.
[10] The FMOH decided to initiate CBNC in a phased manner starting with learning zones (also called phase 1 zones) selected from each of the four agrarian regions based on a set of criteria (including good iCCM coverage, functional HDA network, and strong PHCU linkage). This allowed implementation lessons from these zones to be integrated in subsequent rollout to the rest of the agrarian regions.

by HEWs is recommended only when referral is not accepted or not possible for various reasons (e.g., distance/lack of transport, lack of family support, lack of money to cover related costs, cultural barriers). If referral is not accepted by caretakers or not possible, the protocol recommends outpatient treatment for 7 days by HEWs at the HPs with gentamycin IM and oral amoxicillin. If treated at the HC level, health workers are expected to send back a referral slip, through caretakers, to the respective HPs upon completion of treatment.

Similarly, at the HC level, once the PSBI/VSD classification is confirmed, the SYI should be given a gentamycin injection, amoxicillin/ampicillin injection, and further referred to a hospital. If referral is not accepted or not possible, the integrated management of newborn and childhood illnesses (IMNCI) protocol recommends treating with gentamycin and ampicillin IM or gentamycin IM and oral amoxicillin for 7 days. Since ampicillin is given intravenously, this regimen demands inpatient care, which is not common at the HC level; most of the patients are treated on an outpatient basis.

1.5 Study Rationale

Early identification of young infants with PSBI/VSD at HPs and referral to a higher health facility, where they can obtain appropriate treatment, are critical to reducing complications and young infant death. A well-functioning and responsive referral system, the provision of quality care at the referral destination facility, and caretaker compliance to the referral are essential to ensure quality continuum of care to sick newborns.

However, there is limited understanding of the circumstances surrounding SYI referrals from HPs to HCs, including what proportion of sick newborns are referred, whether referrals are completed, reasons for noncompliance or compliance, the quality of care received at the referral destination facility, and the follow-up practice and mechanisms after treatment. This research was designed to help understand levels of compliance, determinants of compliance, how the referral system is functioning, and the quality of care received at destination facilities. Findings will be used to improve the care for SYIs at HPs and HCs, and strengthen the referral system between the two levels of care.

2. Study Objectives

2.1 General Objectives

To assess the referral compliance among caretakers of SYIs with PSBI/VSD, the barriers and facilitators to compliance, and the care received after referral in Tigray, Amhara, Oromia, and SNNPR in Ethiopia.

2.2 Secondary Learning Objectives

- To assess the perceptions of caretakers of SYIs with PSBI/VSD on the care provided for their infants at the referral health facilities.
- To understand referral procedures and processes from HP to HC, including use of referral slip, actions to assist the caretaker to reach the referral site, communication with referral site, and feedback mechanisms between HCs and HPs.
- To assess whether case management at the HC is done per the national IMNCI protocol, and explore facilitators and barriers to adhering to the national protocol.

3. Methodology

3.1 Study Design

This cross-sectional study employed a mix of qualitative and quantitative methods of facility- and community-based data collection. It was conducted in Ethiopia in March and April 2017.

3.2 Setting

The Maternal and Child Survival Program's Community-Based Newborn Care/Newborns in Ethiopia Gaining Attention (MCSP's CBNC/NEGA) project is implemented in 135 *woredas* (12 zones and two special *woredas*) of four regions: SNNPR, Oromia, Amhara, and Tigray. This study recruited participants from a subset of the project *woredas* in selected zones where program implementation had begun in January 2015. These areas were considered "mature" in reference to both the service delivery and demand creation activities, with a gradually increasing caseload. The study was conducted in 20 *woredas* selected from eight mature zones, namely North Wollo and Waghimra in Amhara Region; Bale and Arsi in Oromia Region; Kembata, Hadiya, and Halaba in SNNPR; and Central Tigray in Tigray Region.

3.3 Study Participants

Study participants included all SYIs (0–2 months) who sought care from selected HPs, classified as having PSBI/VSD and referred by HEWs to HCs in the last 12 months before the survey:

- Sample of caretakers of SYIs (0–2 months) who sought care from an HP and given referral to a higher facility
- Sample of SYIs (0–2 months) who received care from an HP, classified as having PSBI/VSD and referred by HEWs to HCs, and registered in the 0–2 Months Integrated Under-5 Outpatient Department (OPD) registration book
- Sample of HEWs and health workers responsible for treating/referring SYIs
- Fathers of SYIs with PSBI/VSD, grandmothers, in-laws, and informal and formal community leaders
- Sample of representatives of *woreda* health offices (WoHOs)

3.4 Data Collection Methods

Nine data collection instruments were used to extract data from registers, conduct interviews, and facilitate focus group discussions (FGDs). Table 1 describes the instruments and their use.

Table 1. Description of data collection instruments

Instrument	Use
Module 1: Data extraction sheet for record review at health post (HP)	To extract data on the six most recent possible serious bacterial infection/very severe disease cases in the last 12 months from the community-based newborn care 0–2 months sick young infant registration book at selected HPs.
Module 2: Structured questionnaire	To conduct in-depth interviews with mothers/caretakers of sick young infants referred from HP (identified from register) and traced at home.
Module 3: Data extraction sheet for record review at health center (HC); only for referrals	To extract quantitative data from the destination HC where the caretaker reported to have taken the sick infant. Matching was done by record date and name, sex, and age of the infant.

Instrument	Use
Module 4: Data extraction sheet for record review at HC; 0–2 Months Integrated Under-5 Outpatient Department register	To extract quantitative biodata, recorded symptoms, and treatment and referral information on the six most recent possible serious bacterial infection/very severe disease cases from register at HCs.
Semistructured interview guide for health extension workers	To conduct in-depth interviews with health extension workers.
Semistructured interview guide for health workers	To conduct in-depth interviews with health workers.
Semistructured key informant interview guide for *woreda* health office	To conduct in-depth interviews with *woreda* health office representatives.
Semistructured interview guide	To conduct in-depth interviews with caretakers who had referral history in the past 3 months before the survey and their husbands/spouses.
Semistructured focus group discussion guide	To conduct focus group discussion with men and women. Each group had eight to 12 participants recruited from the localities and representing fathers of sick young infants, grandparents, in-laws, other elders, and leaders in the communities.

3.5 Operational Definition of Selected Study Variables

Table 2. Operational definition of the major study variables

Study variables	Operational definition
Admission	Formal acceptance by a health facility of a patient who is to receive medical or paramedical care while occupying a health facility bed.[11]
Confirmed compliance	Refers to possible serious bacterial infection/very severe disease (PSBI/VSD) cases reported by caretakers to have been taken to the referral destination facility within 48 hours after being referred from the health post and recorded (records found) in the 0–2 Months Integrated Under-5 Outpatient Department register at health centers (HCs).
PSBI/VSD	Defined as a baby with one or more of the following signs of serious illness: unable to feed, lethargy, convulsions, a cold body temperature (< 35^0C) or fever (> 37.5^0C), fast breathing (> 60 breaths/minute), chest in-drawing, grunting, jaundice, redness of umbilical cord or pus, skin pustules, preterm, or low birthweight.
Preferential referral compliance	Refers to mother/caretaker who did not go to the HC specified by health extension workers (HEWs); rather, mother/caretaker went to an equivalent or higher health facility, according to the mother's/caretaker's preference.
Referral	Refers to the process of HEW counseling a caretaker of a sick young infant on the need for taking the infant to an HC for higher-level care. Referral is recorded on the community-based newborn care 0–2 months sick young infant registration book at the health post, irrespective of it being supported with referral slip or not.
Referral acceptance	Refers to informed consent made by a caretaker to take the sick young infant to a higher-level health facility within 48 hours, following a referral from an HEW.

[11] FMOH. 2016. *FMOH Health and Health Related Indicators*. Addis Ababa: FMOH.

Study variables	Operational definition
Referral noncompliance	Refers to a caretaker not visiting the higher-level health facility, following an HEW's assessment, referral, and counseling to take the infant to a higher-level health facility.
Referral compliance	Refers to a caretaker making a health facility visit within 48 hours following an HEW's assessment, referral, and counseling to take the infant to a higher-level health facility, based on what the caretakers reported (i.e., self-reported variable) either to the facility recommended by the HEWs or any other higher-level facility that the caretaker preferred.
Sick young infant	Refers to a baby under 59 days of old classified as having PSBI/VSD.

3.6 Sample Size Determination

The optimal sample size for the study was determined with the following assumptions and formula:

- 50% of cases whereby caregivers accept referral, will comply, and reach the referral site; the percentage is a conservative assumption, since the referral compliance rate is unknown
- $\pm$ 5% absolute precision
- Design effect =1.5 (to account for correlation of observations among HPs)
- 95% confidence level
- Applying a single population proportion formula to determine the needed sample size:

$$n = \frac{1.96^2\, p(1-p)(DEFF)}{d^2}$$

It was predicted that the study team would be able to successfully track 80% of the cases identified from HPs, and 90% of those successfully found would consent to be interviewed. Therefore, the study planned to identify at least 800 cases referred from the HP in order to conduct follow-up interviews with caretakers of 576 SYIs in the four study regions. Based on routine PSBI/VSD caseload data extracted through the project, it was assumed that there would be two to five referral cases per *woreda* per month, and this would give at least 50 referred cases per *woreda* for the 12-month period before the survey.

3.7 Sampling Procedure

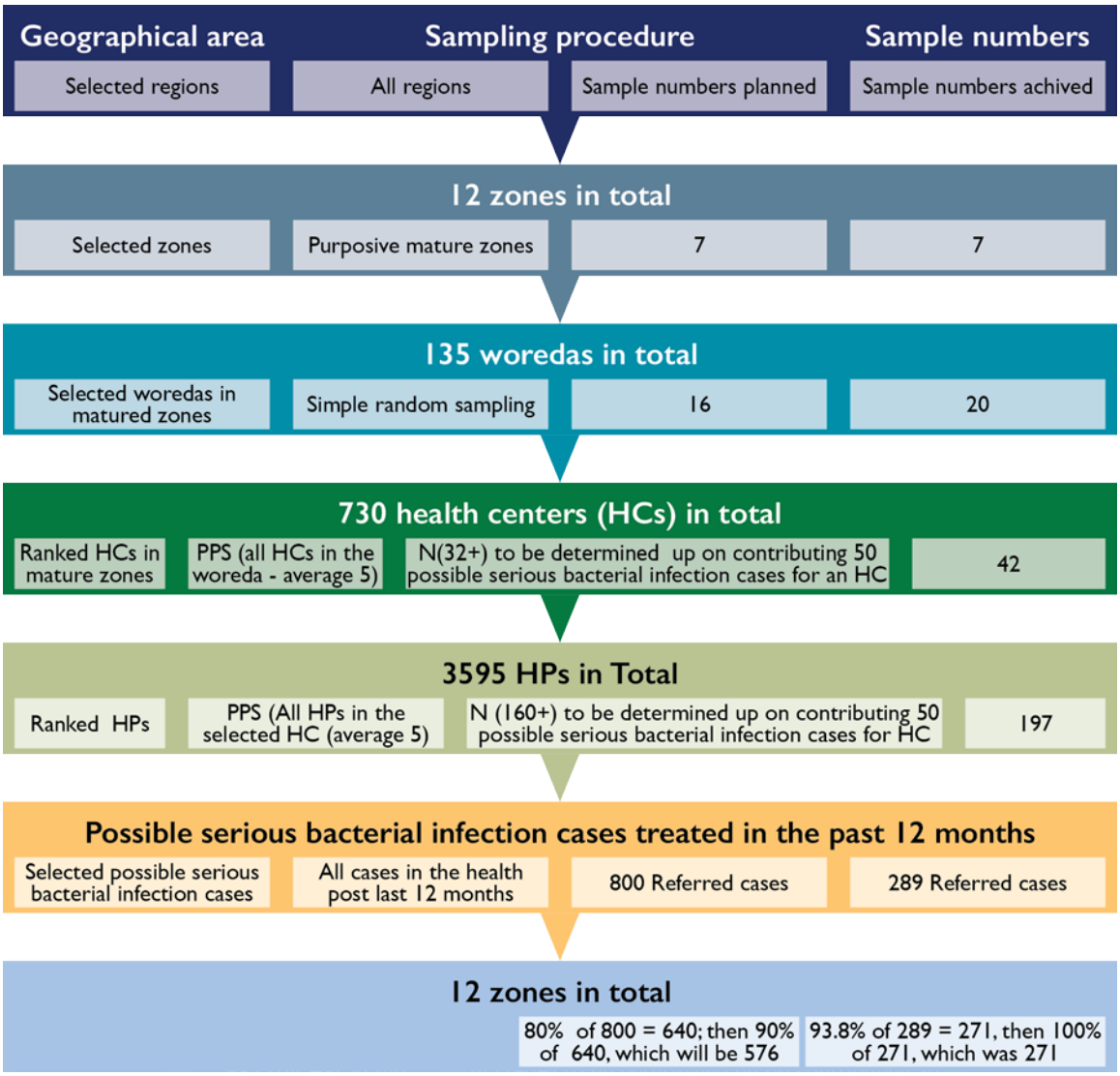
Based on the above assumption, the plan was to select 16 *woredas* with high PSBI/VSD caseloads and rank the HCs in each *woredas* based on their HPs' catchment area's PSBI/VSD caseload, starting with the high caseload cluster HC catchment and continuing to the other clusters in the rank, until a total of 50 referred PSBI/VSD cases were obtained per *woreda*. However, the assumption that two to five cases of PSBI/VSD would be referred per month per *woreda* did not hold true. In fact, case detection and treatment at the HPs was generally found to be low (approximately one to two cases per HP per year). Therefore, the study team decided that all referred PSBI/VSD cases identified in the selected HPs within the past year before the survey date would be included in the sample, with the realization that the calculated sample size would not be achieved.

- A multistage sampling procedure was used to select *woredas*, health facilities (HPs and HCs), and caretakers who visited HPs and were referred to HCs. The procedure began with selection of *woredas* from the eight intervention zones based on relatively high caseload of SYIs. Due to the small number of reported SYIs, the number of *woredas* was increased to 20 (from the planned 16)—a number that could be managed within the available resources. HCs within the selected *woredas* were selected based on the caseload of SYIs. HPs that have reported referring PSBI/VSD cases to higher HCs were identified for register review and subsequent interviews with caretakers.

- ***Selection of HCs:*** A sampling frame of HCs with at least two to five PSBI cases reported in the past 12 months within the selected *woreda* was prepared and ranked according to the number of recorded PSBI/VSD cases. Cases of SYIs with at least one recorded sign of PSBI/VSD in the past 12 months were selected for review. A total of 42 HCs were visited (more than the expected 32 HCs), and their 0–2 months Integrated Under-5 OPD registers were reviewed to extract data of all cases of SYIs (0–59 days) classified as having PSBI/VSD within the past 12 months. Of these 42 HCs, PSBI/VSD cases were found registered in only 28 HCs registration books; 109 PSBI/VSD care records were reviewed from the 28 HCs.
- ***Selection of HPs:*** From a list of HPs under the selected HCs, a total of 197 (more than the expected 160) HPs were visited—an average of 4.6 HP per HC. The decision to visit as many HPs as possible was made due to inconsistencies in the information obtained from HP focal people based in the HCs and *woreda* records in the number of SYIs referred. This visit has yielded better results than would have been obtained if selection had been based solely on *woreda* records. From the 197 HPs visited and their 0–2 months SYI registration books reviewed, only 66 were found to have at least one case referred; 289 cases of SYIs with PSBI/VSD referred to HCs were extracted from the 66 HPs registration books.
- ***Identification of caretakers of infants with PSBI/VSD who are referred:*** Caretakers of SYIs registered in the CBNC 0–2 months SYI registration book and indicated as referred in the 12 months before the survey were tracked and identified in the community and interviewed at home.

Figure 1 provides a flow chart that summarizes the planned versus achieved sample size of *woredas*, HCs, HPs, and caretakers with PSBI/VSD child.

Figure 1. Sampling procedure flow chart plan versus achieved



Probability proportional to size (PPS) sampling includes a number of sample selection methods in which the probability of selection for a sampling unit is directly proportional to a size measure, X_{it}, which is known for all sampling units and thought to be approximately proportional to the unknown F;

Lavrakas PJ. 2008. *Encyclopedia of Survey Research Methods*. Thousand Oaks, California: Sage Publications.

- **Selection of participants for qualitative survey:** A convenience sampling technique was used to select the key informants and FGDs.
    - FGDs were conducted with two groups: men and women community members. Thirty-four FGDs were conducted, including two unplanned discussions with HEWs.
    - Key informant interviews (KIIs) were conducted with 154 informants. To complement the quantitative findings (as well as better explain the low number of PSBI/VSD cases identified and referred), FGDs were done with HEWs using the opportunity of their gathering for another meeting at the *woreda* administration office. In addition, in consultation with the MCSP NEGA team, the study completed several in-depth interviews with officials and officers at WoHOs and with project staff. Table 3 summarizes the number and type of study participants in the qualitative inquiry.

Table 3. Study participants in the qualitative inquiry

In-depth Interviews	Expected	Achieved
Health workers from health centers	32	30
Health extension workers from health posts	32	52
Caretakers of sick young infants who complied with referral	32	28
Caretakers of sick young infants who did not comply with referral	32	30
Representatives of *woreda* health office	Not planned	12
Representatives of MCSP Newborns in Ethiopia Gaining Attention team in Southern Nations, Nationalities, and Peoples' Region	Not planned	2
Focus Group Discussion	**Expected**	**Achieved**
Focus group discussions with men (fathers of sick young infants, informal and formal leaders)	16	16
Focus group discussions with women (grandmothers, in-laws, traditional birth attendants, other respected women in the community)	16	16
Focus group discussions with health extension workers	Not planned	2

3.8 Administration of Field Data Collection

Four teams, each responsible for one study region and composed of a survey manager (the team leader), a supervisor, two research assistants, and two note takers, were deployed for the survey. The survey manager led the entire field data collection in each region. Supervisors were responsible for overseeing the data collection conducted by the research assistants at household level. The research assistants, in addition to conducting the household survey, facilitated the KIIs and FGDs at the community level together with the note takers. In each region, the respective survey manager carried out the data extraction at both HP and HC levels, including interviews of health workers and *woreda* representatives.

All members of the field data collection team were health professionals with at least a first degree in a health-related discipline who received a 2-day extensive and interactive training by experts knowledgeable in iCCM/CBNC, IMNCI, and interviewing techniques.

3.9 Data Quality Assurance Control

The following measures were taken to ensure data quality during data collection and management.

Preparation for Data Collection

- Recruited highly experienced research assistants, supervisors, and enumerators with relevant educational background and language proficiency.
- Deployed highly qualified qualitative data collectors who speak the local language of the respective study areas to facilitate KIIs and FGDs.
- Recruited a qualified expert researcher with experience in facility- and community-based work as well as qualitative and quantitative research techniques to coordinate field data collection.

- Developed and used a comprehensive training manual to enhance the data collection team's competencies in data collection.
- Developed and used data collection manuals/guides to guide data collection team in its task.
- Consistently followed the field data collection procedures for data source identification and recruitment of respondents.

Data Collection

- Onsite supportive supervision was conducted by survey managers and supervisors to ensure quality during data collection.
- The data to be collected every day were limited in number to ensure quality data collection within the available time.
- At the end of each data collection day, all questionnaires and interviews were checked for completeness and consistency. Accordingly, survey managers were able to provide continuous feedback to data collectors and supervisors.

Data Entry and Processing

- Before data entry, the data manager checked completeness of each questionnaire, defined valid values, and verified appropriateness and consistency of values.
- Qualified data entry technicians, under close supervision of the data manager, completed data entry and cleaning.
- Error checking of quantitative data and validation was performed in SPSS.
- KII and FGD data were audiotaped, transcribed, and then translated to English for thematic analysis.

3.10 Data Management

Guided by the study learning objectives, the study team developed a data analysis and interpretation plan.

Quantitative data: A data entry template was prepared with SPSS version 21 statistical software for Windows, transferred to STATA version 11 for analysis. Descriptive statistical analysis was conducted using frequencies, tables, and cross-tabulations, and graphs were used to describe the result.

Qualitative data: Qualitative information analysis was conducted manually. Transcripts were thematically coded, and a thematic analysis approach was applied. Preidentified and emerging themes from the interview data were used to conduct the analysis.

3.11 Ethical Considerations

The study obtained ethical clearance from Save the Children Ethics Review Committee and from the Ethiopian Science and Technology Ministry Institutional Review Board at the federal level. All four regional health bureaus provided an official support letter to study zones acknowledging the importance of the study, and the zones in turn wrote the same to study *woredas*.

The survey team was trained on ethical issues as part of the orientation. Verbal informed consent was obtained from all individuals who participated in the study. Confidentiality was ensured throughout the data collection and management processes.

3.12 Limitations of the Study

- Inability to get the expected sample size for PSBI/VSD referred cases in the selected *woredas*: Although initial selection of the *woredas* was based on the number of PSBI/VSD caseloads reported per *woreda*, it was later discovered that the figures obtained from the *woredas* were inclusive of cases from primary hospitals. As mentioned elsewhere in the document, PSBI/VSD caseload in the HPs was generally low, amounting to one to two per HP per year. As a result, only half of the expected sample size could be reached (i.e., 271 of 576 caretakers of SYIs). This led to a drop in the study power, limiting the strength of the quantitative analysis findings.
- Possible recall bias, as demonstrated by conflicting responses between caretakers and HEWs about whether a referral was offered: In many cases, HEWs claimed to offer referral as a first option, but the caretakers denied any referral offer during their visits to the HP. In cases in which referrals were not documented in the CBNC 0–2 SYI register, data collectors deferred to the caretakers' recall, rather than the HEWs' recall.
- The study participants might fail to provide accurate information as the result of the longer time lapsed (about 12 months) between the time the infant was sick and the time the caretaker was interviewed: Caretakers' recall bias, especially when caretakers have many children and made frequent health facility visits in the past year, may make it difficult to remember exactly the referral compliance, the referral system, and the quality of care at the referral facility.
- There were challenges in confirming caretakers who claimed to have complied with the referral with facility register records. This could be caretakers' difficulty to recall (e.g., where and when the sick infant was taken), caretakers visiting other HCs than those advised by HEWs, and/or the care providers' data recording (e.g., multiple, missing, and/or incomplete data entry).
- Potential overestimation of referral rate as HPs with high numbers of referrals were purposively selected, which could contribute to an artificially inflated referral rate.

4. Results

4.1 Characteristics of Data Sources

The study visited 42 HCs and 197 HPs to review the 0–2 Months Integrated Under-5 OPD register and CBNC 0–2 months SYI register, respectively, in 20 *woredas* found in eight zones of the four regions to document management experiences of PSBI/VSD cases. Of the 42 HCs whose 0–2 Months Integrated Under-5 OPD registers were reviewed, only 28 had PSBI/VSD cases recorded in the 12 months before the survey. Similarly, of the 197 HPs whose CBNC 0–2 months SYI registers were reviewed, only 66 had PSBI/VSD cases that were referred to HCs recorded in the 12 months before the survey. Table 4 presents the number of HPs and HCs visited and PSBI/VSD cases referred to higher facilities by region.

The study team conducted KIIs with 58 caretakers of SYIs who had accepted referrals from HPs to HCs (28 of them were compliant and 30 were noncompliant), 52 HEWs, 30 health workers serving in the 28 HCs where PSBI/VSD cases were extracted from registers, 12 WoHO representatives, and 2 MCSP NEGA *woreda* coordinators. FGDs were conducted with HEWs (two sessions, with a total of 25 HEWs) and community members (32 sessions, with a total of 160 people).

Table 4. Summary of possible serious bacterial infection/very severe disease (PSBI/VSD) cases referred in the 12 months before the survey, based on health center and health post register review

Region	# of Woreda	Health Post (HP)			Health Center (HC)		
		# HPs visited	# of PSBI/VSD cases		# HCs visited	# of PSBI/VSD cases	
			Registered	Referred		Registered	Referred
Amhara	3	48	85	70	7	2	0
Oromia	8	82	153	140	19	53	8
SNNPR	5	50	11	9	9	38	7
Tigray	4	17	72	70	7	16	10
Total	20	197	321	289	42	109	25

From the HPs' CBNC 0–2 months SYI registers, 289 cases of PSBI/VSD referred to HCs were extracted in the 12 months before the survey. Two hundred forty-three (84%) of these received pre-referral treatment, 33 (11%) did not receive treatment, and information was not recorded for 13 (4%) SYIs. Of the 289 cases, 271 (94%) caretakers of the SYIs with PSBI/VSD were tracked and contacted for caretaker interview in the community. Of the 271 who were contacted and consented for interview, 243 (90%) reported to have been offered referral by HEWs.

From the HCs' 0–2 Months Integrated Under-5 OPD registers, 109 PSBI/VSD case records were extracted for the 12 months before the survey. Of these, 32 (29%) were referred to a higher facility (governmental or nongovernmental hospitals).

4.2 Adherence to the CBNC National Protocol and Its Determinants

All of the HEWs and approximately 20% of health workers in the study health facilities (66 HPs and 28 HCs) completed CBNC/IMNCI in-service trainings; on average, two of the 10 health workers in an HC are assigned in under-5 clinics to manage SYIs. The national CBNC and IMNCI chart booklets were available in all visited HPs and HCs. Interviewed WoHO staff also received related CBNC trainings and are aware of the national protocol. Nevertheless, many argue that the national protocol—in particular, the aspect of referral as a first option—does not adequately consider the local context and challenges, particularly challenges related to the terrain and geographic access, poor transport network, direct and indirect costs associated with the referral, traditional belief systems, and availability (or lack thereof) of family/neighborhood support, especially during rainy seasons.

Cognizant of this reality, some WoHOs/facilities decided to amend the national protocol so that many PSBI/VSD cases are treated at the HP level without giving a referral as the first option. Some others opted to "reclassify" newborn danger signs as "moderate and severe" and only refer those that they consider having severe danger signs, such as those in need of admission and parenteral treatment. Variations were observed in terms of offering referral as first option for all SYIs classified to have PSBI/VSD at HPs. The major ones were: (i) referral as primary option (as per the national protocol); (ii) referral as secondary option (as per a caretaker's choice; when health facility faces drug stock-outs of amoxicillin, ampicillin, and/or gentamycin; and/or when SYI is perceived to require inpatient treatment because of the presenting danger signs); (iii) put both options on equal footing and let the caretaker decide. Across the study regions, the most commonly chosen option varied, as described below.

Study *woredas* in SNNPR: The majority of the 12 interviewed WoHOs staff reported encouraging HEWs to treat PSBI/VSD cases at HP level insofar as they have the drugs, feel confident about the management of

the specific case, and observed improvement in the subsequent days. For SYIs presenting with danger signs considered "severe," such as failure to suck, convulsion, loss of consciousness, preterm, underweight, multiple danger signs, and other comorbidities, they were encouraged to offer referral.

"We had four cases of VSD in the past 1 year. We have gentamycin and amoxicillin in the health post, and we thought that it is not necessary to refer simple cases, such as newborn that only have fast breathing. If these cases show good prognosis with the treatment, we continue to give the treatment for 7 days. We closely follow these cases to see whether or not they improved. If the newborn's health has not improved, we refer to health center."
HEW (SNNPR)

The 0–2 Months Integrated Under-5 OPD register review highlighted variations in the PSBI/VSD management protocol among higher health facilities in the SNNPR. For example, an HC visited in Kembata Zone treated all PSBI/VSD cases with oral amoxicillin, whereas an HC in Hadya Zone "reclassified" PSBI/VSD cases as moderate and severe, treating the former with oral amoxicillin and the latter with combination of oral amoxicillin and gentamycin IM. A district hospital recently upgraded from an HC and still supporting satellite HPs admits all PSBI/VSD cases and treats with a combination of oral ampicillin and gentamycin IM for 2 days, discharging with oral amoxicillin for 5 days if there is improvement or, if no improvement, referring to the zonal hospital for better management. All described variations were based on individual health worker and facility decisions.

Some of the reasons given for the variations and nonadherence to the national protocol included lack of training, lack of trust in the protocol (i.e., many health workers consider it to be relevant for HEWs but not for nurses/health officers), and shortage of supportive supervision by the WoHO.

Study *woredas* in Oromia Region: All HEWs in the study HPs received CBNC training and essential drugs for management of SYIs. However, while most of the HEWs follow the national protocol, some *woreda*-level variations were observed. For example, a *woreda* in Arsi Zone encourages HP treatment as first option, while a *woreda* in Bale Zone encourages referral as the first option.

At the start of the CBNC program, we used to strictly follow the chart booklet—HPs provide pre-referral medication and refer to HCs. Later, in consultation with our partners, we agreed that HEWs have ample training and resources, and can safely treat PSBI/VSD cases that do not deserve admission care. Accordingly, we encouraged HEWs to treat at HP level. Consequently, we observed more PSBI/VSD cases in HPs than HCs."
WoHO Coordinator (Arsi Zone)

"We realized the VSD management at the HP is in the interest of the mother. Our stand in the management of VSD is to strictly follow the national protocol. We also consider PSBI/VSD treatment at the HP as the last option, and practice if only referral is not possible."
WoHO Coordinator (Bale Zone)

Another variation is encouraging the HEWs to start gentamycin and amoxicillin treatment at the HP, schedule an appointment for the next day, and offer referral only if no improvement.

Less than one-fifth of the health workers in the 28 visited HCs reported to have attended either CBNC or IMNCI training. WoHO and HC interview participants reported that when the untrained health workers are assigned in the under-5 clinic, they often do not follow the national protocol. Variation in the use of the IMNCI chart booklet and inconsistency were widely observed, which could be related to lack of knowledge and commitment.

Many WoHO respondents expressed a concern that IMNCI trained health workers in the HCs are not cascading the training to or orienting other health workers; other times, they are transferred/relocated to

other facilities/units. As a result, untrained health workers are assigned to manage SYIs, leading to nonadherence of the national protocol.

Study *woredas* in Amhara Region: All interviewed HEWs were trained on CBNC and use the national chart booklet in the assessment, classification, and management of SYIs. At times, cognizant of the local context and caretakers' situation, some HEWs design their own approach that they feel is workable to the community.

"Because of inaccessibility of the HC and lack of transport, at times, the situations force us to reclassify danger signs as mild and worse. Sick young infants presenting with the worse signs (being very weak, unable to feed, convulsion, flaccid, and coma) are offered referral after giving pre-referral drugs. We even pay for the transport cost and accompany the caretaker to the HC. Later, we follow the development through calling health workers at the HC. We don't offer referral for the mild cases; we treat them at the HPs."
HEW (North Wollo Zone, Amhara Region)

"We saw a total of 14 PSBI/VSD cases in the past 1 year, and none were referred. All were identified during the postnatal care visit in the first week of delivery. Most of the mothers has episiotomy stiches during delivery and had difficulty to walk up to an hour to the referral HC. Spouses in our community are not cooperative to take the sick baby to health facility. We provided full antibiotic course for these babies by taking turns during weekends to make sure treatment is not interrupted."
HEW (North Wollo Zone, Amhara Region)

Some WoHOs, taking the local context into consideration, encourage HEWs to treat PSBI/VSD cases at HP level as first option of management.

"We are familiar with the chart booklet, which clearly states referral at HP level in case of VSD. Taking the access challenge into consideration, however, we encourage HEWs to treat at home or HP level so far as they feel confident and have the proper medication. Actually, there is no management different at HP and HC level, other than further investigation in case of poor response to treatment. Of course, there are mandatory referral reasons—run out of essential drugs and deserves admission care."
WoHO Staff (North Wollo Zone, Amhara Region)

Health workers based in the HCs often fail to adhere to the national protocol (and chart booklet) in the management of SYIs, mostly due to a lack of training on the protocol and/or unwillingness to refer to the chart booklet while with a client. Thus, many non-IMNCI-trained health workers at the study HCs treat PSBI/VSD cases based on their pre-service training protocol that is not aligned with the current national protocol.

Study *woredas* in Tigray Region: The majority of the 17 visited HPs and seven HCs in Tigray Region reported strictly following the national protocol. Accordingly, HPs offer referral to all PSBI/VSD cases as a first option unless there are convincing reasons not to be referred, including the following: caretaker too weak to travel, financial constraints, and/or a lack of support at home. HCs in turn offer referral to all PSBI/VSD cases to the nearby hospital with a referral slip and pre-referral drug. They reported consistent use of ambulance services and health workers to usually accompany the SYI to the referral hospital and follow through with a phone call. However, there were exceptions to this reported adherence. An HEW in one of the HPs said:

"I had four cases of PSBI/VSD cases in the past 1 year and treated all at their respective homes by traveling to the household on a daily basis till completion of treatment. I would refer only cases beyond my level of competence, such as unable to feed, not moving, or weak, or flaccid. I believe HCs have better diagnostic facility and better trained professionals, but so far as PSBI/VSD is concerned, I am fairly equipped and trained."
HEW (Werhi Lehe woreda, Central Tigray Zone)

As a rare incident, an HEW in Central Tigray Zone who reported to have taken CBNC training 2 years ago mentioned that she did not know referral was the first option in managing PSBI/VSD. She treated three cases in the past year and referred one when she ran out of gentamycin.

Overall, modification of treatment regimen by WoHO or HCs was not reported in Tigray. Any nonadherence in the treatment protocol that was reported was based on an individual health worker's decision, not the decision of health managers/leaders.

Table 5 presents a summary of factors that affect implementation of the CBNC management and referral protocol according to the level of health care delivery.

Table 5. Summary of factors affecting adherence to community-based newborn care (CBNC) management and referral protocol

Levels	Facilitators	Barriers
Woreda health office	• Health managers and maternal and newborn health focal people trained and familiar with the protocol • Strong *woreda* leadership and commitment for CBNC • Technical support from implementing partner	• Failure to systematically integrate CBNC activities in annual *woreda* plans • Adaptation/modification of the national protocol based on *woreda* health office (WoHO) and/or health facilities' decision • Poor health human resource management: e.g., failure to ensure availability of integrated management of newborn and childhood illnesses (IMNCI)-trained health workers in the health centers (HCs); difficulty to enforce efficient use of health extension workers' (HEWs') time • Poor sense of program ownership
Health center/health workers	• Availability of chart booklet and willingness to use it • Availability of essential drugs for the management of sick young infants (SYIs) • Technical support from implementing partner • Verbal recognition and encouragement of good performing facilities (health posts and health centers) by WoHO	• Non-IMNCI-trained health workers managing SYIs • Failure to consistently provide feedback for referred cases • Entering incomplete and/or incorrect records into the 0–2 Months Integrated Under-5 Outpatient Department registers • CBNC indicators not integrated in the integrated supportive supervision checklist • Failure of IMNCI-trained health workers to orient other health workers in the under-5 clinics • Costs associated with the care (e.g., for consultation card, laboratory, and at times for drugs) • Geographic inaccessibility, shortage of transport

Levels	Facilitators	Barriers
Health post/health extension workers	• Availability of chart booklet and willingness to use it • Availability of essential drugs for the management of SYIs • Verbal recognition and encouragement of good performing facilities (health posts and health centers) by WoHO	• Low early postnatal care coverage and poor case identification • Overconfidence and the belief that HEWs have better CBNC training and capacity to manage SYIs than health workers • Closure of health posts (HPs) during the weekends at times affecting completion of 7-day course of gentamycin • Shortage and stock-out of CBNC drugs, affecting provision of pre-referral dose
Community/caretaker	• Community knowledge on the availability of CBNC service • Community trust of HEWs • Community trust /acceptance of service quality at the HCs	• Poor decision-making power of women (e.g., the mother may accept the referral offered, but spouse or spouse's family may disagree) • Perception that small newborns are "unfit" for care at a higher facility • Caretakers missing to submit the referral feedback to HEWs upon returning from HCs • Lack of family or neighborhood social support to take care of the home and other children • Lack of or limited conviction that the care provided at HCs for the SYI is better than at HPs • Distance, topography, shortage of transport • Lack of acquaintance at the referral town to host the caretakers until drug completed or lack of money to cover the cost of the caretakers' stay in the town where referral facility is located

4.3 Referral Compliance

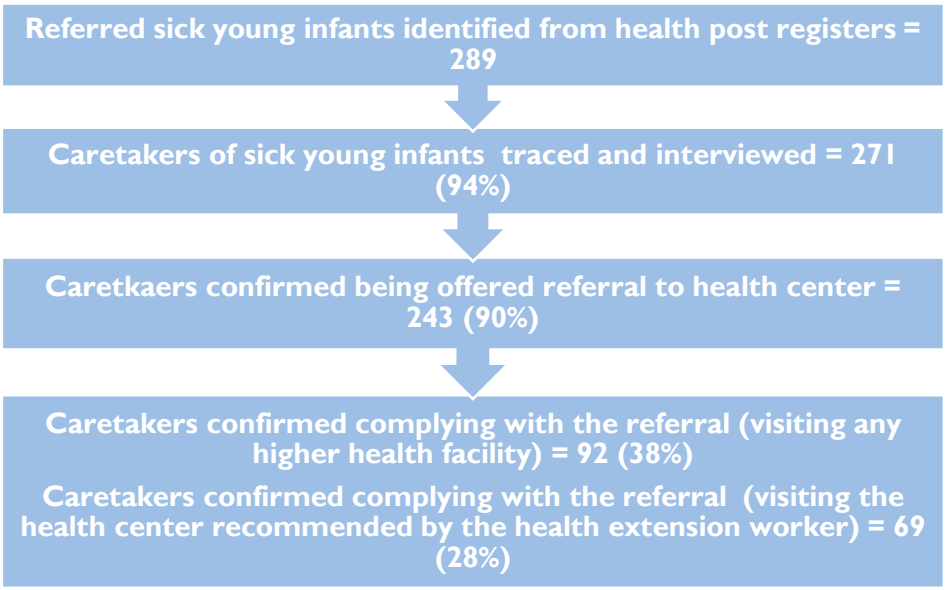
Level of Compliance from HPs to HCs

Of the 243 caretakers who reported having been offered referral by HEWs and accepted it, 92 (38%) reported to have visited a higher-level health facility for the care of the SYI with 48 hours of accepting referral, putting the noncompliance rate among the study caretakers at 62%. The noncompliant caretakers initially consented for the referral but failed to go to a higher-level health facility for various factors. Cited factors include limited financial means, lack of family and/or neighborhood support, poor geographic access, and observed improvement of the baby's condition following pre-referral drugs. In-depth interviews with HEWs and caretakers affirmed that many of these SYIs eventually ended up in HP treatment (identified upon follow-up or returned when the problem worsened). Few reported visiting private clinics, traditional/religious healers, or claimed that the illness has resolved within a few days.

Although 92 (38%) caretakers reported they visited a higher facility, surprisingly, none were linked with or confirmed through the HC register review (using the infant's name, age, sex, and date of referral) within 1 week of the date of referral extracted from the HP registers. Interviews with health workers at the referral HCs disclosed that failure to track the caretakers claiming to visit the HC was frequently a result of one or more of the following:

- Failure to enter the SYI information into the 0–2 Months Integrated Under-5 OPD registers (usually when non-IMNCI-trained health workers are on duty, who may use individual patient cards for recording patient information)
- Difficulty to read the names on the 0–2 Months Integrated Under-5 OPD registers
- Caretaker might have taken the SYI to the referred facility many days after the referral was offered (register review was limited to 1-week period after the date of referral recorded in the HP registers)
- Caretakers might have taken the SYI to a different health facility outside the study sphere, such as to private clinics and hospitals
- Caretakers' recall bias: this occurs when caretakers visited different facilities for different infants at different times in the 12 months before the study

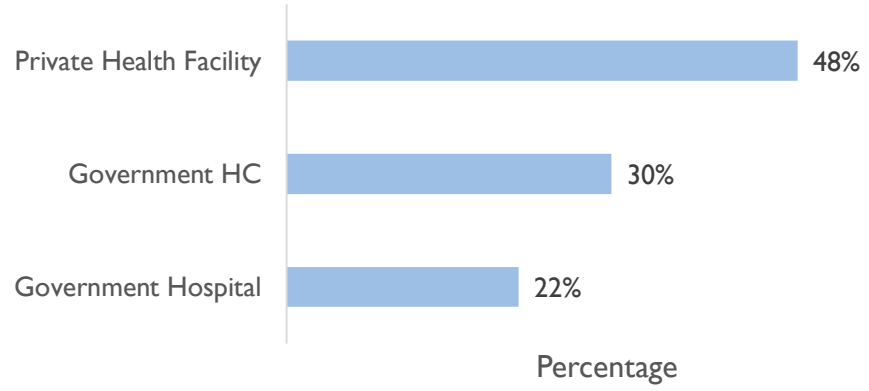
Figure 2. Flow chart showing caretakers reached and those who complied with referral



Preferential Compliance

Caretakers who accepted referral but visited a higher-level health facility other than the one suggested by the HEWs represented 25% (23/92) of caretakers who complied with the referral. Reasons given for this include trust based on previous experience (36%), proximity/access to the preferred facility (32%), and unavailability of a health worker in the destination facility (31%). The preferred facilities included private clinics (48%), other government HCs (30%), and government hospital (22%). See Figure 3.

Figure 3. Caretaker interview results: preferential referrals destination health facility



4.4 Determinants for Referral Compliance

The study also looked into possible factors that may contribute to or deter caretaker compliance to the referral. Bivariate and multivariate analysis (binary logistic regression) was performed to determine factors that influence referral compliance among caretakers of SYIs with PSBI/VSD (Table 6). Factors identified to fit into the regression model were sex of the SYIs, age and education of caretakers, caretakers' perceived and informed severity of illness, primary caretaker who took the infant to HP, and provision of referral slip, as these variables are assumed to predict the compliance outcome.

Table 6. Multivariate analysis of factors the facilitate compliance with referral

Characteristics	Average Referral		OR (95%CI) and p-values			
			COR		AOR$	
	Compliance n (%)	Noncompliance n (%)	Odds Ratio (CI)	P value	Odds Ratio (CI)	P value
Total n = 243 (100%)	Compliance n = 69 (28%)	Noncompliance n = 174 (72%)				
Sex of the infant with possible serious bacterial infection/very severe disease						
Male	48 (70%)	94 (54%)	1.95 (1.08,3.52)	0.03*		
Female	21 (30%)	80 (46%)	1			
Age of the caretaker						
<25 years	25 (36%)	54 (31%)	4.3 (0.37–49.90)	0.241		
26–35 years	32 (46%)	95 (54%)	5.9 (0.52–67.69)	0.151		
36–45 years	10 (15%)	24 (14%)	4.8 (0.39–59.14)	0.221		
Above 45 years	2 (3%)	1 (1%)	1			
Caretaker education: attended school						
Yes	37 (54%)	83 (48%)	1.27 (0.73–2.21)	0.41		

Characteristics	Average Referral		OR (95%CI) and p-values			
			COR		AOR$	
	Compliance n (%)	Noncompliance n (%)	Odds Ratio (CI)	P value	Odds Ratio (CI)	P value
Total n = 243 (100%)	Compliance n = 69 (28%)	Noncompliance n = 174 (72%)				
No	32 (46%)	91 (52%)	1			
Education by grade level (n = 60)						
Above 6 grades	48	108 (62%)	1.4 (0.77–2.54)	0.273		
1 up to 6 grades	21	66 (38%)	1			
Caretaker's occupation						
Housewife	19 (28%)	42 (24%)	1.19 (0.64–2.25)	0.582		
All other	50 (72%)	132 (76%)	1			
Caretaker's spouse's occupation						
Daily laborer/government employee/private business	21 (30%)	14 (8%)	5.00 (2.36,10.56)	<0.001*	8.9(2.9–27.5)	< 0.001*
Farmer	48 (70%)	160 (92%)	1			
Income of the household						
Below ETB 1,000/month	57 (83%)	133 (76%)	1.46 (0.72–2.99)	0.295		
Above ETB 1,000/month	12 (17%)	41 (24%)	1			
Mother accompanied to health post						
Infant taken to health post by mother only	33 (48%)	83 (48%)	1.0 (0.58–1.76)	0.986		
Mother accompanied by others	36 (52%)	91 (52%)	1			
Caretaker's perceived seriousness/ severity of illness of infant						
Severe	50 (72%)	132 (76%)	0.84 (0.45,1.58)	0.582		
Mild and moderate	19 (28%)	42 (24%)	1			
Caretaker informed of seriousness/severity of illness of infant						
Yes	65 (94%)	166 (95%)	0.78 (0.23–2.69)	0.70		
No	4 (6%)	8 (5%)	1			
Referral slip given						

Characteristics	Average Referral		OR (95%CI) and p-values			
			COR		AOR$	
	Compliance n (%)	Noncompliance n (%)	Odds Ratio (CI)	P value	Odds Ratio (CI)	P value
Total n = 243 (100%)	Compliance n = 69 (28%)	Noncompliance n = 174 (72%)				
Yes	48 (70%)	9 (5%)	41.91 (18.0–97.5)	<0.001*	72.3 (26.1–200.5)	<0.001 *
No	21 (30%)	165 (95%)	1			

Note: *Variables included in the multivariate model were sex of the infant with possible serious bacterial infection/very severe disease, age category of the caretaker, caretaker education (attended school and education by grade level), caretaker's occupation, oncome of the household, mother accompanied or not, caretaker's perceived seriousness/severity of illness of infant, caretaker informed of seriousness/severity of illness of infant, caretaker's spouse's occupation, and referral slip given. Only the last two variables showed significant difference.*

SYI sex and age: *(n = 243; 142 males, 101 females):* Male SYIs (48, 70%) were two times more likely to be taken to referral facilities than female SYIs (21, 30%) at P = 0.03. There is no significant variation in referral compliance for SYI by age of the caretaker.

Caretakers' perceived illness severity (n = 243): There was no significant variation in referral compliance based on caretakers' perceived severity of illness. Of those who complied, 72% (50) perceived the illness as severe, and of those who did not comply, 76% (132) perceived the illness as severe (P = 0.582). It is expected that those who perceive the illness to be severe would more often comply with referral than those who perceive the illness of their infant as not severe. However, the majority of both compliers and noncompliers perceived the illness of their infant as severe.

Informed severity (n = 243): Similar to perceived severity, no significant variation in referral compliance by informed severity was observed. Ninety-four percent of caretakers who complied were informed about the severity of illness by HEWs, and 95% of those who did not comply were informed of the severity of the illness (P = 0.70).

Of all variables included in the binary regression model, only three of the variables—sex of the SYI, occupation of caretaker's spouse, and provision of referral slip—were found to be statistically significant facilitators of referral compliance. When the model was adjusted for all variables other than level of education, only occupation of caretaker's spouse and provision of referral slip were found to be statistically significant. Level of education was excluded from the model to avoid interaction with a similar variable that asked about school attendance history. All variables that were entered into the model are listed and returned a significant value are presented in Table 6. The result of the multivariate analysis needs to be cautiously interpreted, given the small sample size.

After controlling for possible confounders, the multivariate analysis indicated the occupation of caretaker's spouse and provision of referral slip to facilitate referral compliance. While there is a need to interpret this cautiously, caretakers of SYIs whose spouses were not farmers (daily laborer/government employee/private business) were more than eight times more likely to comply with the referral compared with farmers, and caretakers who were given referral slip were more than 70 times more likely to comply with the referral than those who were not given referral slips.

During the in-depth interviews, many HEWs reported that referral compliance was relatively high in cases in which mothers delivered at a health facility, mothers were aware of the benefits of early health seeking, caretakers had relatives/friends to host them near the facility, caretakers had support from the family/neighborhood, and/or caretakers resided closer to HCs. Conversely, cited reasons for noncompliance were inaccessible or far HCs, caretaker's perception of no difference in the treatment of PSBI/VSD in the HPs and HCs, direct/indirect costs associated with the referral, the quality of counseling given by the HEW, and lack of family/neighborhood support to take care of the household chores or other children while the caretaker is away. Some HEWs also reported that some caretakers are not keen to bring SYIs for medical attention, as they believe "the baby's fate (live or die) is determined by God despite medical care."

Improvement with symptoms after the pre-referral treatment was another factor mentioned by HEWs for deterring referral. According to the HEWs, those caretakers who consent to the referral usually go back to their homes to make the necessary preparations for the next day's travel to the referral facility. If, in the meantime, they see improvement in the SYI's symptoms after the pre-referral drug, many refrain from complying with what they perceive as a costly and tiresome referral venture.

"We usually take sick babies to the HP. At times, we were told that the baby was very sick and needed urgent referral to the HC. In which case, the HEW gives the baby an injection and oral medication. We usually return home and make the necessary arrangement for the next day's travel to the HC. However, we see improvement overnight following the injection and oral medication. As a result, we refrain from the difficult referral trip. Had there been no improvement, we would have gone to the referral facility."
Caretaker/Mother (North Wollo, Habru Woreda, Amhara Region)

"A week-old baby was brought with breathing problem and failure to suck. I gave proper counseling on the nature/severity of illness and the urgency to take the baby to an HC. The mother accepted the referral, and I provided the baby oral amoxicillin (as I ran out of gentamycin). When I visited the household on the third day, the baby was not taken to the referral facility. The mother justified the noncompliance with the improvement she observed on the next day—thinking the pre-referral medication suffices and insisted not to take the baby to the referral facility. Finally, I resumed the medication at the HP, and the baby improved."
HEW (North Wollo, Habru Woreda, Amhara Region)

Some HEWs consider referral when the SYI failed to respond to the HP drug.

"My referral criteria are when [I consider that] the sick young infant deserves admission of care and when s/he failed to respond to the treatment I gave at the HP level. Thus far, no caretaker refused to be referred. During referral, I provide the necessary counseling, pre-referral medication (gentamycin and amoxicillin), and referral slip. However, counterreferral from the HC is never seen."
HEW (Arsi Zone, Digeluna Tijo Woreda, Oromia Region)

Another determinant of referral compliance was HEWs' lack of conviction with the need for referral. Many HEWs believe there is no PSBI/VSD management difference between HP and HC level. Even some HEWs feel they are better trained than HCs in PSBI/VSD management, have better drugs, and provide free care. Some HEWs advise caretakers that HPs have the same capacity in managing SYIs as the HCs, leading to failure to accept/comply with the referral. A mother in Wolitie Kejelu *kebele*, Goro *woreda*, Bale Zone noted that she never visited the supervising HC in Betezeda HC because she believed there is no difference in the management of newborn at HP and at HC, and thus no need to be referred.

Some WoHO officials interviewed acknowledged that HEWs are in a better position than higher-level facility health workers in managing PSBI/VSD cases. Some of the reasons cited include the perception that patient load in the HC compromises service quality, HEWs refer to the treatment protocol (i.e., chart booklet job aid) better than health workers, almost all HEWs were trained on CBNC while one or two health workers at the higher facility got IMNCI training, and health workers tend to follow pre-service training protocol. Many

caretakers prefer to be treated at the HP level for easy access, friendly/familiar service providers, free service, and trust built from previous rapport.

The study found that a traditional outlook toward young infants was a barrier to complying with referral. An HEW in North Wollo, Amhara Region mentioned that the community where she is based generally considers newborns as "blood" and "not yet full humans." Thus, they are not keen on taking the infants to a health facility farther out of their area or to a referral facility. Other HEWs mentioned payment at the HCs as one of the factors affecting referral compliance. According to them, caretakers/mothers often do not have money for transport (HEWs reported to pay for transport costs in many occasions) and will refrain from going to the referral when they learn that services at the HC are not provided free of charge.

Some mothers/caretakers mentioned that HEWs told them during antenatal care visits and pregnant women conferences that HPs have started providing care for SYIs free of charge, and there was no mention of referrals then. As a result, they did not prepare for the referral option and were not convinced of the need to comply with the referral.

Caretakers' trust of the HEW, whether they understand the reason for referral or not, was found to be a major determinant for following the HEW's advice.

"When my baby suffered fever, cough, and diarrhea, I took him to the HP. Since we are illiterate farmers, we did not comprehend what the HEW told about the illness. But she gave the baby injection and oral medication and advised to be urgently referred to the nearby HC. She also called ambulance and provided referral letter to the HC. I trusted the HEW and accepted the referral."
Caretaker (Ahferom Woreda, Sefo Kebele, Tigray Region)

Table 7. Summary of barriers and facilitators to referral compliance as reported by caretakers

Barriers	Facilitators
• Distance of health center • Cost of care (direct, indirect) • Perception that there is no difference between health post and health center treatment • Newborns are "not yet humans," so not ready for higher facility care • Perceived symptomatic improvement following pre-referral treatment	• Informed severity of illness • Good awareness of benefits of health seeking • Having relatives or acquaintances in the referral town • Having support from family/neighbors to take care of the chores/other children at home • Good counseling • Facilitation of transport for referral • Facility delivery • Better awareness on benefits of early care seeking • Provision of referral slip

4.5 Referral System between HPs and HCs

This section describes the systems of referral and counterreferral, including communication between HPs and HCs, and additional support provided to encourage compliance, as reported by HEWs and caretakers.

Means of Communication

The following three means of communications were employed to convey SYI-related messages between HPs and HCs: referral and counterreferral slip, telephone call, and personal visit.

Overall, 9% (57/243) of the caretakers with SYIs reported to have been given referral slips by HEWs. Of those who have reported receiving referral slips (n = 57), the majority (84%; 48/57) complied with the referral. Although the CBNC 0–2 months SYI register does not have column to enter referral system, 16% (n

= 52) of interviewed HEWs reported having given referral slips to caretakers while referring PSBI/VSD cases. They also reported that none of these referral slips provided by the HEWs were formal referral slips; they were just a small piece of paper where the child's name and diagnosis were written. Based on interviews with HEWs (n = 52), the rate of counterreferral (sending written feedback from HCs to HP) was very low, with only 2%of the HEWs reporting receiving written feedback from HCs. On the other hand, oral feedback was found to be high, with 42% of caretakers who complied with the referral (n = 69) claiming that they were told by the health workers at the referred HC to report to the HP upon treatment completion (see Figure 2 and Table 8). Overall, 43% of caretakers noted taking the infant to the HP for checkup upon completion of the drug.

Further qualitative inquiry revealed that communications not in written form, such as telephone calls and personal visits, were widely used between HPs and referral facilities. Depending on their level of commitment and local network, some HEWs called a health worker at the referral facility; others checked with the health workers in the HCs through personal visits and discussed the status of referred SYIs. Some HEWs also reported that in some cases, HP focal people at the HC informed the respective HEWs about the status of referred PSBI/VSD cases while holding routine supportive supervision visits.

Table 8. Summary of counterreferral as reported by caretakers who complied with the referral (visited the health center recommended by health extension workers, n = 69)

Variables	n (%)
Counseled by health workers at the health centers to return to the health post after completing drugs (n = 69)	29 (42%)
Of those counseled, who received a counterreferral feedback slip to the health post (n = 29)	19 (65%)
Mothers/caretakers who took the infant for checkup at the health post after completing drugs (n = 69)	30 (43%)
Mothers/caretakers who took the infant for checkup at the health center after completing drugs (n = 69)	17 (25%)

Adherence to the Referral Protocol

Woreda health office staff interviewed in the Amhara Region reported that few facilities follow the protocol consistently in terms of using referral slips and providing feedback to the referring HPs. Although workload was mentioned as a common reason for not giving referral and counterreferral slips to caretakers, many WoHO respondents consider it as an unjustified excuse.

A WoHO respondent cited the Serinka HC staff, who consistently provide the referral feedback slip to caretakers and file a copy of the feedback slip in the HC records, with the satellite HPs under this HC, consistently giving referral slips to caretakers as a standard procedure. According to the WoHO respondents, such instances indicate that factors other than workload, such as lack of motivation/commitment to comply with the protocol, underestimating the importance of referral/counterreferral, shortage of referral slips (or even plain paper), and poor telephone network, are possible reasons for not using referral slips.

HEWs also cited caretakers' failure to submit the counterreferral slips to the HEWs as another reason:

> *"Long time later, we found counterreferral slips with the mother. Thus, HCs shall emphasize the importance of providing the counterreferral slip to the HEWs up on return to home."*
> *HEW (Central Zone, Ahferom Woreda, Tigray Region)*

Another HEW stated her discomfort on not receiving feedback from HCs, despite consistently giving referral slips to caretakers while referring SYIs.

"There is clearly stated referral system in the chart booklet, but not stringently followed by the referral facilities. HPs send referral paper in all the referral cases; however, they never received counterreferral from the referring HCs."
HEW (North Wollo Zone, Amhara Region)

Similarly, a health worker in Werehele *woreda*, Central Zone, Tigray Region noted that the majority of the SYIs visiting the HCs come without referrals slips, which HC health workers associated with self-referral, failure of HEWs to give referral slips, and/or failure of caretakers to bring the referral slips when they visit the HC.

Additional Support by the HEWs to Encourage Compliance

Caretakers who complied with the referral reported that HEWs encouraged compliance with the referral in diverse ways, including arranging transport, facilitating neighborhood support for domestic activities, persuading spouses and other family members on the importance of the referral, paying the transportation fee, and traveling with the caretaker to the HC. Among caretakers who complied with the referral (n = 69), 58% reported that HEWs had called an ambulance, 23% stated that HEWs facilitated other means of transport, and 19% noted that HEWs had accompanied them to the referral facility. Using ambulance for newborn care was reported as a positive contributing factor to referral compliance in 15 (58%) in Tigray but was not reported in the other regions.

4.6 Care Provided at Referral Facility

Data presented in this section are drawn from interviews with the 69 caretakers who reported having completed the referral to the HCs recommended by the HEWs.

Admission at Referral Facility

Referral-compliant caretakers were asked whether their SYIs were admitted at the referral destination health facility. Nearly half (49%, 34/69) of the SYIs were reportedly admitted. The average days of admission, as reported by the caretakers, was 5.3 days. It is important to note that the admissions may not necessarily be at the HCs, since: based on the IMNCI protocol, some of the SYIs may have received onward referral to hospitals, and some of the HCs (particularly in SNNPR) are in the process of being upgraded to hospitals.

Cost of Care at Referral Facility

Over half (59%, 41/69) of caretakers reported paying for medical services at the referral facility, totaling about ETB 100 on average. Among those paying, 83% paid for drugs, and 68% paid for a consultation card (Table 9).

Table 9. Payment for services at health centers as reported by caretakers

Variables	N (%)
Caretakers reported paying for services at referral destination health facility (n = 69)	41 (59%)
Specific services paid for (n = 41)*	
Drugs	34 (83%)
Consultation card	28 (68%)
Laboratory	15 (36%)
Admission	6 (15%)
Average expense for services rendered at referral destination health facility	ETB 97.4 [+SD 143 (1 to 900)]

*multiple responses possible

Treatment and Treatment Outcome at Referral Facilities

All caretakers who complied with referrals reported that their infants were provided with drugs at the referral facility. The majority (73%) received oral drugs for an average of 5.6 days, while 61% received injections for an average of 4.5 days. IV injectable drugs were given to 22% of cases for an average of 4 days (Table 10). All SYIs with PSBI/VSD whose caretakers complied with the referral (69) were reportedly provided with drugs at the destination facility. Of these, 83% reportedly completed the drugs. Caretakers were asked about the outcomes of and treatments for PSBI/VSD cases at referral health facilities. Eighty-eight percent reported "improved," and 12% reported worsened or same condition (Table 10).

Table 10. Types and duration of drugs at referral destination health center as reported by caretakers

Variables	n (%)
Types of drugs provided at the referral destination facility (n = 69)*	
Oral	50 (73%)
Injection	42 (61%)
IV	15 (22%)
Mean days of injection (range)	4.5 ± 2.2 (1 to 7)
Mean days of oral drug (range)	5.6±1.4 (2 to 7)
Mean days of IV (range)	4.0 ± 2.5 (1 to 7)
Sick young infant treatment completion status (n = 69)	
Completed drug**	57 (83%)
Do not remember	12 (17%)
Sick young infant treatment outcome (n = 69)	
Improved^	61 (88%)
Same/Worsened	8 (12%)

*multiple responses possible

**full course of antibiotics completed

^as assessed by the provider based on regression of signs

4.7 Management of SYIs with PSBI/VSD in HCs

HC registers are significant sources of data for assessing caseload and quality of care at referral facilities. The study team visited 42 HCs; of these, 28 had registered SYIs with PSBI/VSD in the 0–2 Months Integrated Under-5 OPD registers in the 12 months before the survey. In these 28 HCs, records of 109 SYIs classified as PSBI/VSD were reviewed, with a focus on the most recent six cases (i.e., in HCs where there were more than six PSBI/VSD cases, only the last six were included in the review).

Box 1. Register review of data missing in the integrated community case management register at health centers (percentage of records with missing information)

- 10%: No address
- 3%: No record of infant age
- 6.4%: No weight
- 5%: No temperature
- 31%: No birthweight among those under 1 week old
- 9.2%: No treatment information
- 41.3%: No information on whether referred
- 21%: No information on counselling
- 90%: No information about follow-up outcome

Completeness of Registers

All study HCs used the 0–2 Months Integrated Under-5 OPD registers. Completeness of data entry and accuracy of classification varied across and within regions and facilities. Poor documentation and recording practices were exhibited by missing elements in the registration book. The widely missed variables included important vital signs, such as respiratory rate and temperature. Underclassification of PSBI/VSD was widely observed through using such diagnosis terms as pneumonia, sepsis, and acute febrile illnesses.

Nature of Referral at the HC Level

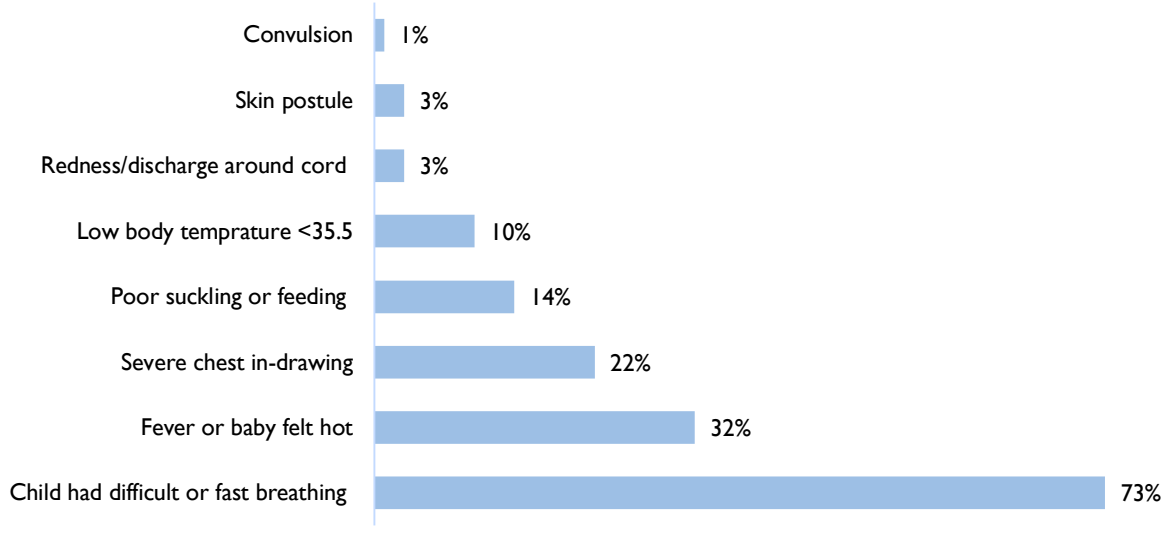
Of the total PSBI/VSD cases reviewed, 29% (32/109) were referred to public hospitals. Newborns referred to a hospital were given pre-referral drugs (mostly gentamycin injection and oral amoxicillin), counseling on breastfeeding and keeping warm (for caretakers), and a referral slip. In most cases, they were taken by ambulance from the HC to a referral hospital. None of the study health workers received counterreferral slips from the referral hospitals.

The HC 0–2 Months Integrated Under-5 OPD register used at the HC does not have a column or space to record whether the SYI visit was a self-referral or a referral from an HP. As a result, it is not possible to identify referral cases from HPs or other health facilities. Few HCs keep referral slips in a box at the under-5 clinic; others keep it in the master patient card, which is kept in the records room. Hence, it was difficult to tell the percentage of referred cases in the study health facilities.

Treatment Protocol at the Study HCs

Sixty-two percent (n = 109) of PSBI/VSD cases extracted from the registers were male; the median weight was 4 kg. Twenty-seven percent presented with fever, while 10% presented with low body temperature. Newborns 1–7 days old accounted for 25%. As described in Figure 4, the common presenting danger signs were fast breathing (73%), followed by fever (32%) and severe chest in-drawing (22%).

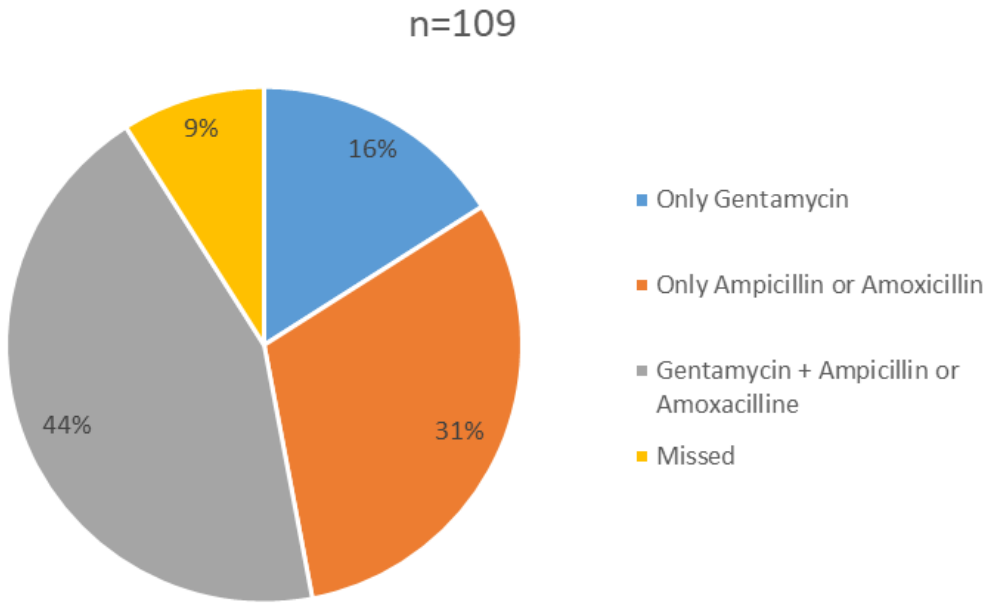
Figure 4. Health center 0–2 Months Integrated Under-5 Outpatient Department register results: danger signs among sick young infants (n = 109)



Forty-four percent (48/109) of the infants classified as PSBI/VSD cases received appropriate drugs according to the national protocol (i.e., gentamycin injection with oral amoxicillin or injectable ampicillin for 7 consecutive days; see Figure 5). Of the 109 infants, 31% received ampicillin or amoxicillin as a single

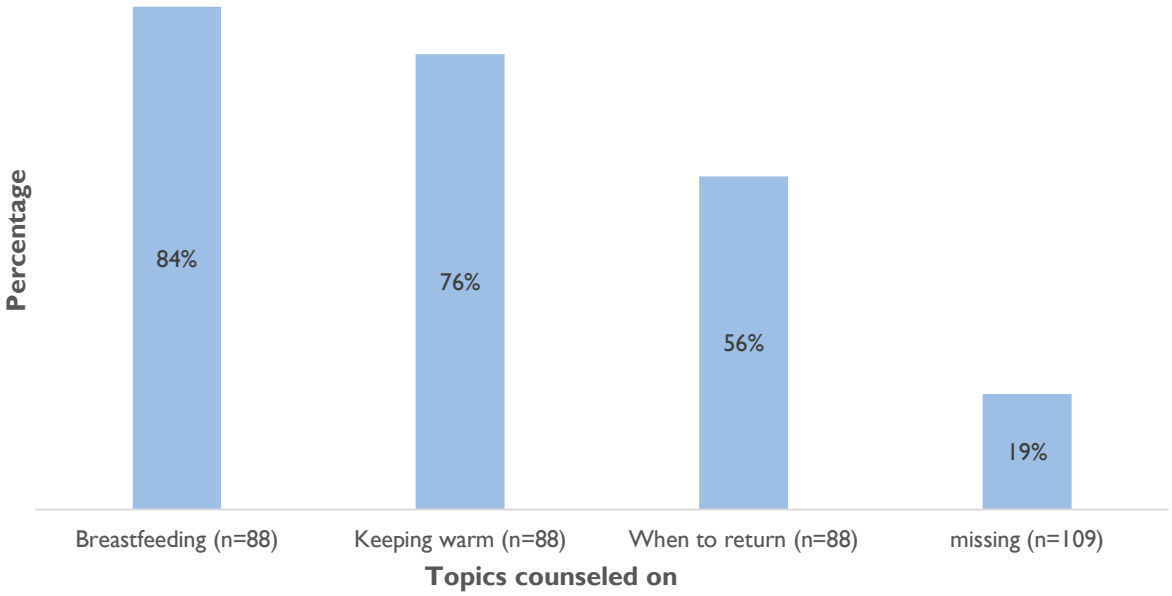
antibiotic treatment, and 16% received gentamycin as a single antibiotic treatment. Treatment information for 9% of the PSBI/VSD cases was not recorded in the registers reviewed. The major reason given by health workers who participated in the KII for the nonadherence to the national protocol was the fact that under-5 OPDs are often manned by non-IMNCI-trained health workers, as there is high attrition of health workers in health centers and health workers work on rotation basis, and those with IMNCI training many not be assigned to the under-5 OPDs all the time.

Figure 5. Health center 0–2 Months Integrated Under-5 Outpatient Department register results: drugs provided to sick young infants with possible serious bacterial infection/very severe disease



The IMNCI protocol indicates that caretakers should be counseled about the SYI after they receive drugs from the HC. Record review showed that 81% (88/109) of the caretakers of SYIs were counseled on breastfeeding, how to keep the infant warm, and when to return to the HC (Figure 6). In 19% of the cases, data is missing about whether or not the caretakers were counseled about their sick infants.

Figure 1. Health center 0–2 Months Integrated Under-5 Outpatient Department registers: counseling provided to caretakers of sick young infants (n = 109)



5. Discussion

This study is the second in Ethiopia to systematically look at caretakers' referral compliance for SYIs with PSBI/VSD and adherence to treatment protocol at HP and HC level in a program setting about 2 years after introducing CBNC. The first study was done by the SNL project of Save the Children in 2016 in five zones of Oromia and SNNPR in Ethiopia, using similar methodology and tools. By doing a similar study in additional zones and regions that are contextually different, the study team hoped to improve the representativeness of the study and extract important lessons to inform the design of strategies to improve SYI referrals and care. The findings from this study will help inform strategies to improve the PSBI/VSD management at HPs and HCs, and strengthen the referral system between the two levels of care, contributing to better health outcomes for SYIs. Given the relatively small sample size for this study, the findings should be interpreted cautiously.

The study revealed that almost all visited HEWs and, on average, two out of 10 health workers per HC had received CBNC/IMNCI in-service training. The national chart booklet was available in all visited facilities (HPs and HCs). Nevertheless, nonadherence to the CBNC protocol in managing SYIs with PSBI/VSD and following the referral protocol was observed in HPs and HCs, with variations across regions. Some of the nonadherence observed was more systematic based on guidance of health managers, while others was based on individual decisions. The practice of offering referral as the first option for all SYIs classified as PSBI/VSD cases at the HPs is found to have considerable gap in all the regions except Tigray. The implications of such guidance from health managers and "rational" decisions of HEWs to manage SYIs at HPs may be far-reaching: It could lead to mismanagement of SYIs who may require inpatient treatment; incomplete treatment, as HPs are not open 7 days a week; and possibly sending the wrong message to caretakers that newborn ailments are simple and can be treated at HPs. Moreover, such considerations (that HEWs should treat SYIs at HPs) may affect the quality of counseling given to caretakers, indirectly "encouraging" them not to accept the referral.

Once a decision is made to treat at the HP level, however, the treatment protocol is generally well adhered to.

In this study, 38% of the caretakers of SYIs with PSBI/VSD who consented to the referral from HPs complied with the referral, a much lower percentage than was found in a similar Save the Children study in SNL project implementation areas of Ethiopia.[12] In the SNL project implementation zones (three zones in Oromia and two in SNNPR), 61% of the caretakers self-reported as having complied with the referral, and 23% of these were confirmed through HC records. The significant difference in the compliance rate found in the two studies may be due to:

- The operational definitions used for referral compliance in the two studies: Referral compliance under the current study was defined as an HC visit within 48 hours of accepting the referral, while there was no time limit in the definition of the SNL study. About 11% of those who complied under SNL study did so after 48 hours of referral.
- Three of the SNL study zones were Community-Based Intervention for Newborns in Ethiopia randomized controlled trial zones. As such, newborn health interventions started in these zones in 2010, with capacity-building investment as a large part of the research.
- The high rate of provision of referral slips (70% in SNL sites, compared to 9%), which may have served as a reminder/cue for action

A much higher rate (74%) of referral compliance for SYIs was reported by a study done in eastern Uganda,[13] primarily a rural setup. The Ugandan study was based on historical cohort data from a Makerere University health demographic surveillance site, which is likely to have support to improve service delivery, as opposed to the facilities in this study, which underwent routine public-sector program implementation surveillance. The main predictors for high referral compliance in the Uganda study were the infant being sick, being born to a young mother (20–29 years old), and the community health worker making a reminder visit to the referred newborn shorty after referral. In a community trial in Bangladesh, caretakers of 32% of newborns with VSD complied with referral advice by community health workers,[14] while another community trial in the same setting reported a compliance rate of 54%.[15] The referral compliance rate was also reported at 54% for sick newborns identified by community health workers in a household surveillance of severe newborn illness in Bangladesh.[16] A study in Ghana that aimed to evaluate the performance of community-based surveillance showed a referral compliance rate of 86% for sick babies.[17] A study done in eastern Uganda that assessed newborn referral compliance that was initiated by community health workers in a retrospective cohort of 700 referred newborns reported that 63% of the caretakers of referred newborns complied within less than 24 hours.[18] Most of these studies, however, were randomized controlled trials where training and supervision were more rigorous, and transport and other incentives were provided as part of the research. This study was different, as it looked into the care and management of SYIs within the routine health system 1 year into project implementation.

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In this study, 69% of the caretakers who complied with the referral were given a referral slip. The large percentage of caretakers offered referral slips complied with the referral shows that the slips may have served as a cue for caretaker action. There is also a possibility that caretakers may have associated the referral slip with seriousness of the illness.[19]

The confirmed compliance rate (i.e., caretakers of SYIs with PSBI/VSD who reported to have complied with the referral offered and found recorded in the 0–2 Months Integrated Under-5 OPD register of the HCs) was zero in this study, unlike the SNL study, which showed a 23% confirmed compliance rate.[20] This was a surprising and unexpected finding. This could be due to difficulty in linking the HC records with the child identifiers, as there are no standard ID for babies; the high preferential compliance rate (22%) observed in this study; incomplete/poor recording or use of individual patient card (instead of the standard 0–2 Months Integrated Under-5 OPD register) at HCs where non-IMNCI-trained health workers manage SYIs; and/or caretaker recall error in terms of the date and/or health facility visited, especially if there were multiple visits to health facilities for different children.

Provision of referral slip was identified as a facilitator to referral compliance in this study and the SNL study. The same finding was documented in the Ugandan study, which showed that those who received a reminder visit from community health workers shortly after referral were 1.7 times more likely to be compliant.[21] Unlike this study, which showed no significance, the Ugandan study documented that caretakers of sick babies born to a younger mother were more likely to comply with the referral offer.

Sex of the SYI, occupation of a caretaker's spouse, and provision of referral slip were found to be statistically significant facilitators for referral compliance. Nevertheless, other referral facilitators identified in the Ugandan study, such as caretakers' perceived seriousness/severity of illness of infants, age of the SYI, support from caretakers' spouses, prior experience of referral, caretakers' choice of referred facility, and access to referral facilities (geographic access) did not show a statistically significant difference in this study.[22] The decision to comply with referral was not affected by caretakers' perceived severity of illness or by informed severity of illness, as almost all caretakers perceived the illness to be severe, and a large majority were informed of severity. It appears that, as seen in the results, the decision to comply was mainly affected by financial ability (spouse occupation) and provision of referral slips reinforcing action by caretakers. The smaller sample size reached in this study might have affected the strength of the quantitative analysis, so interpretation of these findings and comparability with other similar studies should be done with caution.

Caretakers' perceived improvement after pre-referral treatment was another potential factor for referral noncompliance mentioned by HEWs. A similar finding was reported in the SNL referral study. This may point to gaps in the pre-referral counseling by HEWs, which need to be systematically addressed going forward. The study identified community- and caretaker-related factors (traditional, awareness/knowledge, access, socioeconomic, social support), as well as provider-related factors (knowledge/skills, motivation and commitment, cost of care) that negatively impacted referral compliance. This indicates that a referral system is part of the bigger health and social system, so a "system" approach should be used in the design and implementation of a referral system for it to yield the intended result—better health outcome for SYIs. Moreover, as these factors tend to be context specific, design and implementation of a referral system should consider flexibility and adaptation to the local context.

[19] Bari S, Mannan I, Rahman MA, et al. 2006. Trends in Use of Referral Hospital Services for Care of Sick Newborns in a Community-based Intervention in Tangail District, Bangladesh. *J Health Popul Nutr*. 24(4):519–29.
[20] Bari S, Mannan I, Rahman MA, et al. 2006. Trends in Use of Referral Hospital Services for Care of Sick Newborns in a Community-based Intervention in Tangail District, Bangladesh. *J Health Popul Nutr*. 24(4):519–29.
[21] Bari S, Mannan I, Rahman MA, et al. 2006. Trends in Use of Referral Hospital Services for Care of Sick Newborns in a Community-based Intervention in Tangail District, Bangladesh. *J Health Popul Nutr*. 24(4):519–29.
[22] Bari S, Mannan I, Rahman MA, et al. 2006. Trends in Use of Referral Hospital Services for Care of Sick Newborns in a Community-based Intervention in Tangail District, Bangladesh. *J Health Popul Nutr*. 24(4):519–29.

In addition to providing referrals slips, HEWs were found to assist the referrals by facilitating transportation (ambulance and other means) and by accompanying caretakers to the referral facility. While these are important strategies to improve referral compliance, the actions appear to have been based on individual health worker willingness and decision, not as part of a more strategic approach. Moreover, the HEWs' types of assistance for caretakers to comply and reach the referral destination facilities were limited in this study compared to the findings of the SNL study, which included resource mobilization strategies to help cover transportation costs and involvement of HDAs to assist in the referrals.

In this study, communication across the various levels of the PHCU with regard to the referral and counterreferral system was suboptimal. Written feedback from HCs to HPs appears to be generally low, with only 2% of HEWs reporting to have received feedback. The use of a counterreferral feedback slip from HCs to HPs was found to be very low in this study (27%), compared with findings from the SNL study, in which about 60% of the caretakers reported that they had received a counterreferral feedback slip from the HC to deliver to HPs.[23] Care providers' busy schedule and lack of referral slip were mentioned as the main reasons for the low practice of counterreferral feedback from HCs to HPs in this study.
The recording and documentation practice of PSBI/VSD cases at HC level was poor in many of the HCs. Incomplete recoding and poor documentation practice observed in this study were similar to that of the SNL study. This is a serious gap with a negative impact on the care given for SYIs and subsequent decisions made. Strategies to systematically address it, including integration in the regular supportive supervision and mentoring visits, are very important.

At the HC level, only 44% of the SYIs classified as having PSBI/VSD in the HCs received appropriate drugs according to the national protocol, compared with 57% in the SNL study (pre-referral treatment at HPs was 84%—above the 80% national threshold). While part of this could be explained by lack of competency/training, other reasons include unwillingness to refer to/use the chart booklet and lack of the appropriate drugs. While it is critical to ensure that health workers are trained, supplied with appropriate drugs, and supported to provide the needed care to SYIs, it is also important to put in place a clear accountability mechanism so that nonadherence to protocols does not become the norm.

6. Conclusion

The study explored referral compliance of caretakers of SYIs with PSBI/VSD from HPs to HCs and factors associated with compliance in 20 purposively selected *woredas* in Amhara, Oromia, SNNPR, and Tigray regions. Based on analysis of the findings, the study team concludes that:

- Caretakers' compliance with referral of SYIs classified with PSBI/VSD from HPs to HCs is low. Many community-/caretaker- and provider-related factors appear to influence referral compliance that need to be considered as part of the effort to strengthen the PHCU linkage.
- None of the caretakers of SYIs who complied with the referral could be traced at the HC level for reasons including the absence of a unique baby ID to facilitate the tracing, and recall and recordkeeping issues.
- Provision of referral slips is positively associated with caretakers' referral compliance, but the slips were not readily available at the health facilities.
- Referral feedback from HCs to HPs is not systematic and generally limited, with oral feedback more common than written.

[23] Bari S, Mannan I, Rahman MA, et al. 2006. Trends in Use of Referral Hospital Services for Care of Sick Newborns in a Community-based Intervention in Tangail District, Bangladesh. *J Health Popul Nutr*. 24(4):519–29.

- Adherence to HPs' PSBI/VSD protocol of offering referral as the first option for all SYIs classified with PSBI/VSD is variable, with most *woredas* except those in Tigray adapting/modifying the protocol for various reasons.
- Adherence to the management protocol of HEWs using/referring to the chart booklet, administration of pre-referral dose of antibiotics, and counseling is generally good.
- On the other hand, adherence to the PSBI/VSD management protocol at the HC level is variable due to limited use/reference to the chart booklet, use of different antibiotic treatment regimens, and failure to enter complete information in the registration book.
- Health workers not trained in IMNCI/CBNC are often assigned to manage SYIs, leading to nonadherence to the management protocol.

7. Recommendations

This study shed some light on circumstances related to referrals of SYIs classified as having PSBI/VSD. Based on analysis of the findings, the following key recommendations are proposed:

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- Develop mechanisms for tracking and ensuring adherence to CBNC SYI management protocol at all levels.
- Ensure availability of the appropriate drugs at HCs and HPs.
- Revitalize and/or strengthen the use of written referral and counterreferral slips for SYIs' referrals, possibly with unique features to allow for easy identification at the referral facility.
- Consider inclusion of columns in the CBNC 0–2 Month SYI registers of HPs and Integrated Under-5 OPD registers of HCs to allow entry of information related to referrals.

WoHOs and HCs

- Ensure all providers taking care of SYIs are trained on IMNCI/CBNC.
- Enforce the implementation of written referral feedback (paper-based, phone, short message service, or any other innovation).
- Strengthen supportive supervision to HCs to ensure gaps in the management of SYIs are identified and addressed in a timely manner.
- Enforce proper and complete recordkeeping on SYIs managed at HCs.
- Develop mechanisms for tracking and ensuring adherence to CBNC SYI management protocol at all levels.
- Ensure availability of the appropriate drugs at HCs and HPs.

HPs and Communities

- Strengthen counseling for caretakers when offering referral to ensure that they understand why referral is needed, the purpose of the pre-referral treatment, and the need to return to the HP if they are not able to comply with referral within 24 hours, and that they participate in the decision of which facility to be referred in case the supervising HC is not convenient.
- Provide referral slip for all SYI referrals and counsel caretakers on the need to report to the HP upon completion treatment at the referral health facility.
- Improve community awareness on importance of complying with referrals from HPs through the HDA network and *kebele* leadership. Actively engage/involve HDAs in the referral process.