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Community Based Newborn Care Programme in Ethiopia 2013 - 2017

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FINAL EVALUATION REPORT
March 2019

JaRcoo
Consulting
Ethiopia

 **IDEAS**

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Acronyms

Acronym	Definition
ANC	Antenatal Care
CBNC	Community Based Newborn Care
FGD	Focus Group Discussion
GPS	Global Positioning System
HEW	Health Extension Worker
iCCM	Integrated Community Case Management
IDEAS	Informed Decisions for Actions in Maternal and Newborn Health
IDI	In-depth Interview
IMNCI	Integrated Management of Newborn and Childhood Illness
IPLS	Integrated Pharmaceuticals Logistics System
MCH	Maternal and Child Health
MNCH	Maternal, Newborn and Child Health
NGO	Non-Governmental Organisation
PDA	Personal Digital Assistant
PHCU	Primary Health Care Unit
PNC	Postnatal Care
SNNP	Southern Nations Nationalities and People
UNICEF	United Nations International Children's Emergency Fund
USAID	United States Agency for International Aid
VSD	Very Severe Disease
WDA	Women's Development Army



Foreword

Over the last two decades, Ethiopia has made notable progress in reducing child mortality. Several factors have contributed to this decrease, particularly Ethiopia's flagship Health Extension Programme, which has served as a platform through which Health Extension Workers can provide child health services at the community level. Although newborn health has also shown improvement, further effort is needed to significantly reduce mortality in this age group. In 2014, Ethiopia introduced the Community Based Newborn Care (CBNC) programme with the belief that early contact with pregnant women and their newborns can increase identification of sick young infants, their treatment and treatment completion. The programme addressed nine components across the continuum of care.

As per the World Health Organization's recommendation, Health Extension Workers were trained to provide antibiotics for sick young infants when a referral was not possible through the CBNC programme. The programme was implemented in phases to allow for learning from early implementation areas to inform national scale-up. Over the course of five years, the London School of Hygiene & Tropical Medicine, in collaboration with JaRco Consulting conducted a rigorous evaluation. The baseline survey provided a benchmark for key maternal and newborn health indicators prior to programme initiation. The quality of care assessment highlighted the strengths of the programme, as well as gaps that needed to be addressed to effectively provide newborn services at the community level. The endline survey, as well as qualitative study findings included in this overall evaluation report, provide a comprehensive look at the status of the CBNC programme and recommends means to improve service delivery.

The Ethiopian government is committed to improving newborn survival by ensuring that service delivery and policy decisions are informed by such evaluation findings. Based on the findings, our future focus area for the CBNC programme will be ensuring sustainability and ownership of the programme by the government while meticulously working on demand creation with accelerated improvements in supply chain management. We will focus on and strengthen the alignment of our work with the quality improvement and transitional plan we have developed based on the midline findings. In doing so, we can come closer to achieving the Sustainable Development Goals, ensuring that children not only survive but thrive and transform.

Lia Tadesse, MD, MHA

State Minister of Health



Photo: Mekele landscape, Ethiopia © IDEAS/ Christopher Smith 2019

Executive Summary



Photo: Preventing asphyxia in newborns, Ethiopia © IDEAS/Paolo Patrino 2015

Background and Methods

The Ethiopian Government introduced the Community Based Newborn Care (CBNC) programme in 2013, to improve maternal and newborn health outcomes. The programme has nine components, including the innovative step of antibiotics provision by community health workers for young infants (0-2 months of age) with very severe disease. Signs and symptoms for very severe disease include convulsions, reduced or no feeding, high (>37.5°C) or low (<35.5°C) temperature, fast breathing, no or limited movement and severe chest in-drawing. Phase 1 of the CBNC programme was implemented in 2014, in 176 districts (woredas) across four regions of Ethiopia. Phase 2 of the programme was launched in 2015, covering the remaining zones within the four regions.

The Informed Decisions for Actions in Maternal and Newborn Health (IDEAS) group at the London School of Hygiene & Tropical Medicine was

requested to conduct an evaluation of the CBNC programme. The overall evaluation plan included baseline, quality of care and follow up surveys, as well as two qualitative studies. It was conducted in collaboration with JaRco Consulting, based in Ethiopia.

The baseline survey, conducted in October 2013, assessed coverage of key maternal and newborn health indicators associated with the CBNC programme. A similar follow-up survey was conducted in 2017 to estimate changes in coverage in CBNC services between 2013 and 2017. In November 2015, a quality of care study was conducted. Using qualitative methods, in November 2014 we also assessed how community health workers (Health Extension Workers (HEWs) and community volunteers (the Women's Development Army (WDA) leaders) deliver CBNC services, and in November 2015 we focussed on the administrative side of CBNC service delivery.

The baseline and follow-up population-based surveys were conducted in 52 CBNC Phase 1 and 49 Phase 2 districts across the four regions of Ethiopia. Each survey year included 206 household clusters with 50 households per cluster. Women in these households were asked questions regarding their live births in the 3-15 months preceding the survey as well as care seeking for sick young infants. In 2013, 10,295 households and

to population size. Primary Health Care Units (PHCUs) were then selected with probability proportional to the population size of the woredas, leading to 70 PHCUs in the 18 Phase 1 woredas and 40 PHCUs in the 12 Phase 2 woredas. On average, we selected two health posts per PHCU. In total, 240 WDA leaders, 240 HEWs, 240 health posts and 117 health centres were surveyed. The assessment also included direct observation of

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“The primary focus of this report are the results from the follow-up survey. For key CBNC indicators however, comparisons are made between the 2013 and 2017 household surveys.”

925 women with a recent live birth were surveyed. Similarly, in 2017, 10,300 households and 1,076 women with a recent live birth were interviewed. As CBNC programme scale-up to Phase 2 districts was initiated in 2015, prior to the completion of the evaluation, the findings of the household surveys are presented as overall difference between baseline and follow-up surveys.

In both the 2013 and 2017, the health system readiness was also assessed by surveying the HEWs and WDA leaders and the health facilities serving the selected household clusters. In 2013, 605 WDA leaders, 206 HEWs, 206 health posts and 206 health centres serving the selected household clusters were surveyed. Similarly, in 2017, 412 WDA leaders, 335 HEWs, 201 health posts and 206 health centres were surveyed.

The CBNC quality of care study was done in a sub-sample of districts involved in the baseline and follow-up surveys. Eighteen of the 52 Phase 1 districts and 12 of the Phase 2 districts were selected with probability proportional

to population size. Primary Health Care Units (PHCUs) were then selected with probability proportional to the population size of the woredas, leading to 70 PHCUs in the 18 Phase 1 woredas and 40 PHCUs in the 12 Phase 2 woredas. On average, we selected two health posts per PHCU. In total, 240 WDA leaders, 240 HEWs, 240 health posts and 117 health centres were surveyed. The assessment also included direct observation of

HEWs consultation with 893 sick young infants. The quality of care survey assessed CBNC programme maturity by comparing Phase 1 areas that had on average 19 months of programme implementation to Phase 2 areas where on average the programme had been implemented for three months.

A qualitative study was done in 2014 to assess how HEWs and WDA leaders provide CBNC services and included focus group discussions and in-depth interviews with HEWs and WDA leaders as well as in-depth interviews with woreda health office heads and health centre staff. A second round was conducted in 2015 to understand the administrative level challenges of the CBNC programme and included interviews with woreda health office heads, health centre staff heads and non-governmental organisation representatives supporting the CBNC implementation.

The primary focus of this report are the results from the follow-up survey. For key CBNC indicators however, comparisons are made between the



Photo: Immediate newborn care, Ethiopia © IDEAS/Paolo Patruno 2015

2013 and 2017 household surveys. For the health system readiness component, comparisons are made between the 2015 quality of care survey, which was conducted after CBNC services were embedded in the system, and the 2017 follow-up survey. Findings from the follow-up survey are also cross referenced to the qualitative studies conducted under this evaluation.

Results: Household Surveys

Coverage of nine CBNC components

There were some remarkable changes between 2013 and 2017 for some of the indicators covered by the CBNC programme. Antenatal care (ANC) service use increased from 69% to 83% and initial ANC visits were earlier in 2017 than in 2013. Women having four ANC visits also increased from 39% to 55% and compared with 2013, more women in 2017 were having the recommended

first visit at health centres. Facility delivery also showed a remarkable increase from 23% to 64%. Components of safe and clean delivery for facility deliveries were relatively high both at baseline and follow-up surveys. In 2017, more newborns with a breathing problem were receiving appropriate care. Antiseptic use for cord care also showed an increase particularly for facility deliveries (23% vs 67%). For home deliveries, more mothers were delaying bathing their babies for 24 hours (36% vs 52%). Skin-to-skin care also increased for both home (13% vs 25%) and facility (29% vs 37%) deliveries. More young infants with signs and symptoms of very severe disease were getting antibiotic treatment in 2017 compared with 2013. Use of amoxicillin for seven days increased from one-third to two-thirds and gentamicin injection for seven days slightly increased from 16% to 23%. At both time points, concurrent use of both antibiotics was low.

Some CBNC services showed low coverage in 2013 and 2017, a few even showing some decrease. Misoprostol use was reported for less than 10% of home deliveries at both time points. Cord care for home deliveries remained poor with only 12% in 2017 reporting use of antiseptic. In 2013 and 2017, around 60% of mothers who delivered in a facility reported that their baby was weighed and for home deliveries the proportion dropped to less than 10%. At baseline, approximately a quarter of babies had received postnatal checks in the first 6 weeks post-delivery and the proportion decreased in the follow-up survey (16%). On average, visits were taking place in the third week after delivery.

Results: Health System Readiness Surveys

1. PHCU infrastructure

In 2017 health centres had good availability of drugs for the management of very severe disease as well as vaccines to be given in the first six weeks after birth. At health posts, although 79% had amoxicillin, only one-third had gentamicin on the day of the survey. Health posts also did not have sufficient forms used for the checks and balances of drug availability and re-supply. The availability of utilities remained a problem, particularly at health posts where only two-fifths had a piped water supply and one-fifth had an electricity supply on the day of the survey. Two-thirds of health posts indicated that the last obstetric referral used a vehicle that was not government-owned. Health posts also lacked some equipment necessary for the provision of CBNC services. An Ambu bag was not available in 83% of health posts, while infant scales and a clinical thermometer were not available in 31% and 21% of health posts, respectively.

2. Technical support and staff potential to provide CBNC services

In 2017, supervisions from health centres to health posts were taking place regularly, where three-quarters of HEWs reported a visit in the last month. Around two thirds of HEWs who had received a supervisory visit had received verified written feedback from health centre staff. Content of supervision included ANC and promotion of facility delivery, but lacked focus on newborn and sick young infant care. These topics were more likely to be covered in the performance review and clinical mentoring meetings, however, these were held irregularly. HEWs reported that more support on the technical aspects of the CBNC service would improve the quality of supportive supervisory visits. Overall, most HEWs (70%) were motivated to deliver CBNC services. A deeper delve into the different domains of motivation suggested that some HEWs lacked the support to sustain their drive and commitment to deliver CBNC services.

With respect to human resources, there were insufficient trained health centre staff that could provide CBNC programme specific supervision. HEWs and WDA leaders were also not receiving continued training on newborn and sick young infant care.

3. Cultural context and community participation

In 2017, more mothers with a delivery in the previous year reported practicing some form of newborn isolation than what was reported by HEWs and WDA leaders. Among mothers that kept their newborns exclusively at home, they were kept on average for 46 days, whereas HEWs and WDA leaders reported approximately 20 days. Pregnant women's conferences were common,

organised monthly mostly by HEWs, with an average of 17 pregnant women attending.

Overall HEWs had good unprompted knowledge on when postnatal care (PNC) visits should take place, while few WDA leaders had such knowledge (less than 15%). Only one-third of mothers with a delivery in the previous year had ever used the family health guide. The majority (three-quarters) of WDA leaders and almost all (98%) HEWs reported past use of the family health guide. Mothers had difficulty identifying messages depicted in the family health guide. Although HEWs identified more images compared with WDA leaders, they still did not have optimal understanding of the images. HEWs had insufficient unprompted knowledge of very severe disease danger signs and management. Compared with the 2015 quality of care survey, in 2017, HEWs' unprompted knowledge of very severe disease danger signs and management decreased. WDA leaders' knowledge of unprompted knowledge of very severe disease danger signs was low and remained the same in 2015 and 2017.

4. Health system documentation on the management of sick young infants

A record review done during the follow-up survey (2017) showed that only one-fifth of health posts had registered one or more sick young infants in the three months preceding the survey, whereas over 80% of health centres had at least one record. A detailed review of each record showed that gestational age and birthweight were poorly recorded at health centres and health posts. Temperature was recorded in one out of 10 health post registers and respiratory rate was recorded in less than half of health post and health centre registers. Where they were recorded, high temperature and respiratory rate were the most frequently recorded signs of very severe disease.

Of the recorded sick infants, we found 105 (8%) who were classified as having very severe disease in health centres and 21 (15%) in health posts. Two out of five young infants were referred from health posts to health centres. In health centres, one in five young infants with very severe disease were given incorrect treatment whereas in health posts all were given either correct (25%) or partially correct (75%) treatment. Almost all (95%) of the newborns treated at health posts had a known successful outcome.

Discussion

At the community level, there were remarkable changes between 2013 and 2017 for facility delivery and antiseptic use for cord care in facility deliveries. There was also an increase for: one ANC visit, four ANC visits, care for newborns with a breathing problem, delayed bathing for home deliveries and skin-to-skin care. In contrast, postnatal checks in the first six weeks were very low and had even decreased since baseline. At baseline and follow-up, some newborns delivered in a facility and almost all newborns delivered at home were not weighed, indicating that pre-term and low birthweight babies are likely to be missed at birth. Although not universal, in 2017 more young infants with symptoms for very severe disease were receiving antibiotics than in 2013. However, not all children that got amoxicillin also received gentamicin.

When correlating these community-level findings with the health system readiness findings, most supportive supervisory visits to health posts covered antenatal care and promotion of facility delivery, potentially contributing to the high coverage of these services. Very few addressed newborn and sick young infant care. The referral means and communication between health posts and health centres were poor. This has potentially

led to missed opportunities for HEWs to provide postnatal checks for the increasing numbers of women who delivered at facilities. The lack of thermometers and infant scales also meant that HEWs were unable to provide CBNC services, which could potentially explain the incomplete records for sick young infants observed in the register reviews. On the day of the survey, almost 80% of health posts had amoxicillin and only one-third had gentamicin, which correlates with a higher proportion of young infants with symptoms of very severe disease being provided with 7-day amoxicillin, but had incomplete or no gentamicin concurrently given. Register reviews showed similar findings.

Comparison between 2015 (quality of care) and 2017 (follow-up) survey

Compared with 2013, more HEWs reported receiving supportive supervision in 2017, particularly a visit in the last one month, and the content of the supportive supervision covered more CBNC components. Compared with the 2015 quality of care survey, in 2017 the availability of CBNC related equipment such as thermometers and infant scales remained the same at health centres, while at health posts there was less availability. There was better availability of CBNC related drugs (gentamicin and amoxicillin) at health centres, while there was less availability at health posts. HEWs' unprompted knowledge of very severe disease danger signs decreased, while WDA leaders' knowledge remained more or less the same. In 2017, fewer HEWs had unprompted knowledge on how to manage sick young infants with very severe disease. A comparison of the register reviews also showed compared with the quality of care study, HEWs from the follow-up survey kept poorer records in the sick young infant registers.



Photo: Mothers looking at the family health guide, Ethiopia © IDEAS/Christopher Smith 2019

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“Overall, most HEWs (70%) were motivated to deliver CBNC services.”

Recommendations to improve the CBNC programme

Given the observed gaps the following actions can be recommended:

Health workers

- Integrate CBNC into in-service training for both health centre staff and HEWs
- Strengthen staff practice of immediate newborn care by promoting adherence to essential newborn care actions listed in the Integrated Management of Newborn and Childhood Illness (IMNCI) guidelines
- Allocate budget for HEWs' continued training on sick young infant management, through annual integrated refresher trainings and biannual performance reviews and clinical mentoring meetings
- Ensure that staff appraisals give equal importance to all aspects of service provision, including newborn care
- Train HEWs and WDA leaders to improve their understanding and use of the family health guide
- Increase WDA awareness of the importance of measuring birthweight immediately after delivery so they can promote such messages among pregnant women in their networks

Health centre readiness

- Increase the number of maternity and kangaroo mother care beds, to improve postnatal, low birth weight and pre-term care at health centres
- Increase the availability of government-owned ambulances to be used for newborn referral

Health post readiness

- Ensure the availability of good quality Ambu bags, scales and thermometers for HEWs
- Improve the availability of gentamicin 20 mg/2ml supplied to health posts
- Given emerging research evidence, ensure implementation of the updated (simplified) antibiotic regimen for management of very severe disease

Health System linkages

- Integrate components of sick young infant care, including technical support, into regular supportive supervisory visits
- Clarify guidelines for referral procedures for WDA leaders, HEWs and health centre staff
- Improve linkages between health posts and health centres for PNC provision and sick young infant referral, by always using referral slips
- Ensure that supervision from health centres to health posts assesses and supports the linkages between HEWs and 1-30 WDA leaders¹
- Promote better coordination between WDA leaders and HEWs to improve WDA leaders' awareness and reporting of timely PNC visits
- Utilise community structures like the pregnant women's conference, kebele (village) cabinet and WDA leaders to create awareness of:
 - The importance of facility delivery
 - Key aspects of immediate newborn care including weighing
 - CBNC services provided at the health post that can lead to timely care seeking for sick young infants

Conclusion

Overall, differences between baseline and follow-surveys show good progress in some areas along the continuum of care. This report also shows where continuous improvement is needed in the national CBNC programme to improve neonatal health outcomes in Ethiopia.

1. There are two levels to the WDA network. The 1-5 network refers to five neighbouring households which are led by one volunteer. Five or six of these 1-5 networks are then grouped and led by one team leader. This is called the 1-30 network.

1. Introduction

1.1 Background on Ethiopia

Between 1990 and 2012, Ethiopia managed to reduce child mortality by two thirds, well ahead of the 2015 Millennium Development Goals' deadline.² Neonatal mortality, which was 61 deaths per 1,000 live births in 1990, also decreased to 28 deaths per 1,000 live births in 2015.³ Deaths in neonates however, account for almost half of child mortality.⁴ There is a strong need to address this gap if the sustainable development goal of reducing neonatal mortality to 12 deaths per 1,000 live births is to be achieved by 2030.⁵

1.2 Community Based Newborn Care Programme

To improve newborn health outcomes, the Government of Ethiopia initiated the Community Based Newborn Care (CBNC) programme in 2013. It aimed to strengthen the Primary Health Care Unit (PHCU) and the Health Extension Programme, a platform for community-based primary care delivery. Furthermore, the CBNC programme aimed to enhance linkages within the PHCUs, as well as the performance of Health Extension Workers (HEWs) and the voluntary Women's Development Army (WDA) leaders, to improve antenatal, intrapartum and newborn care through the "four Cs": (1) early prenatal and postnatal Contact with mothers and newborns; (2) Case-identification of young infants with signs of very severe disease (VSD); (3) Care or treatment that is appropriate and initiated as early as possible; and (4) Completion of a full 7-days of appropriate antibiotics. The nine components of the CBNC programme are shown in Figure 1.1.

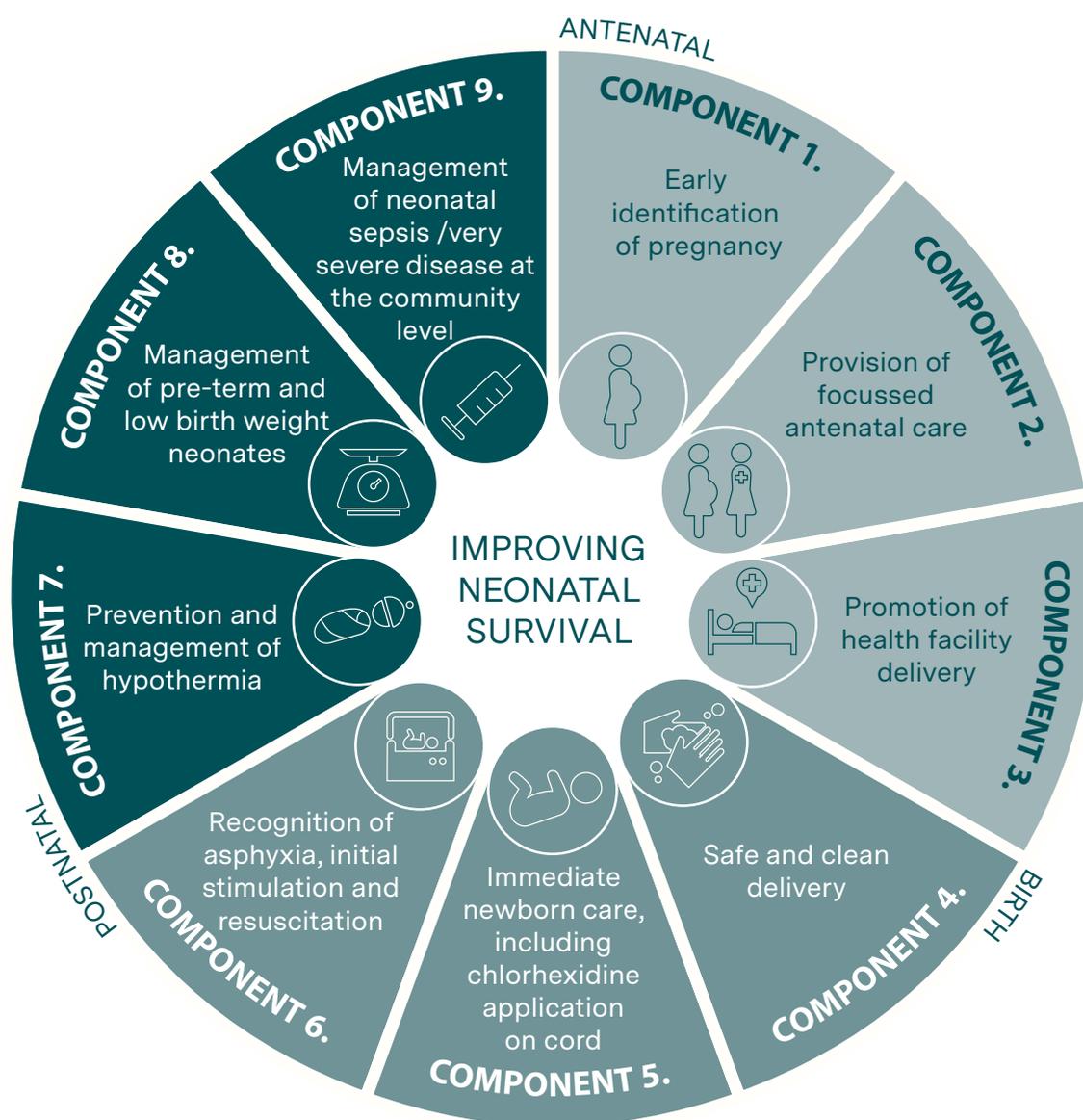
Novel component of the CBNC programme:
Management of very severe disease

With the aim of bringing life-saving services to newborns at the community level, based on international and local evidence, the ninth component of the programme introduced the treatment of very severe disease in young infants (0-59 days) at community level. With the launch of CBNC, HEWs were trained to classify a young infant as having very severe disease if he/she has one or more of the following signs and symptoms: temperature over 37.5°C or less than 35.5°C, fast breathing, severe chest in-drawing, reduced feeding, convulsions, limited or no movement and grunting. Once identified, sick young infants receive a single dose of gentamicin injection and oral amoxicillin at the household level or health post prior to a health centre referral. If referral is not possible, HEWs provide a gentamicin injection for 7-days at the health post or home of the sick young infant, while families are instructed to treat the young infant with oral amoxicillin for the same period.

CBNC implementation

CBNC was implemented in different phases, with support from implementing partners including UNICEF, Last 10 Kilometres, Integrated Family Health Programme and Save the Children. In March 2014, Phase 1 started in selected zones of four agrarian regions: Amhara, Oromia, Southern Nations, Nationalities and Peoples (SNNP) and Tigray. The Ministry of Health selected these zones for the strength in their PHCUs, Health Extension Programme, integrated Community Case Management (iCCM) programme and WDA networks. In Phase 2, which started in January of 2015, the remaining HEWs in all zones across

Figure 1.1 The CBNC programme components



2. Ethiopian Public Health Institute, Countdown to 2015: Ethiopia's progress towards reduction in under-five mortality, (Addis Ababa: Ethiopian Public Health Institute and MOH, 2014)

3. UN Child Mortality Estimation Inter-Agency Group, Levels & Trends in Child Mortality, 2015, https://www.unicef.org/media/files/IGME_Report_Final2.pdf

4. Central Statistical Authority and ICF International, Ethiopia Demographic and Health Survey 2011, (Addis Ababa, Ethiopia and Calverton, Maryland, USA: Central Statistical Agency, 2012)

5. UN, Transforming our World: the 2030 Agenda for Sustainable Development, <https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf>

the four agrarian regions were trained (Figure 1.2). Implementing partners' support in these areas is limited to technical assistance at the regional level to ensure programme ownership. In 2018, CBNC rollout was initiated in the remaining regions of the country, with field support from implementing partners: UNICEF, Emory University, USAID, Transform Health in Developing Regions.

CBNC service providers

A HEW provides CBNC services after receiving a week-long training on the nine CBNC components, with a focus on the identification and treatment of young infants with signs and symptoms of very severe disease. After the training, a HEW is equipped with a CBNC register, a CBNC chart-booklet based on iCCM guidelines (a guide for classifying and treating sick young infants) and a 'start-up kit' of gentamicin and amoxicillin. Post-training follow-up is provided in the first six weeks

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“The CBNC evaluation plan was developed in close collaboration with the Ethiopian Federal Ministry of Health and CBNC implementing partners.”

to ensure programme initiation. Furthermore, regular supportive supervision and biannual performance review and clinical mentoring meetings address identified gaps and improve the quality of the CBNC services provided by the HEWs.

1.3 CBNC Evaluation

An evaluation request was made by the Ethiopian Ministry of Health to the London School of Hygiene & Tropical Medicine, as part of the Informed Decisions for Actions in Maternal and Newborn Health (IDEAS) project. The evaluation team also included JaRco Consulting, IDEAS' partner based in Ethiopia. Funding for this project was provided by the Bill & Melinda Gates Foundation.

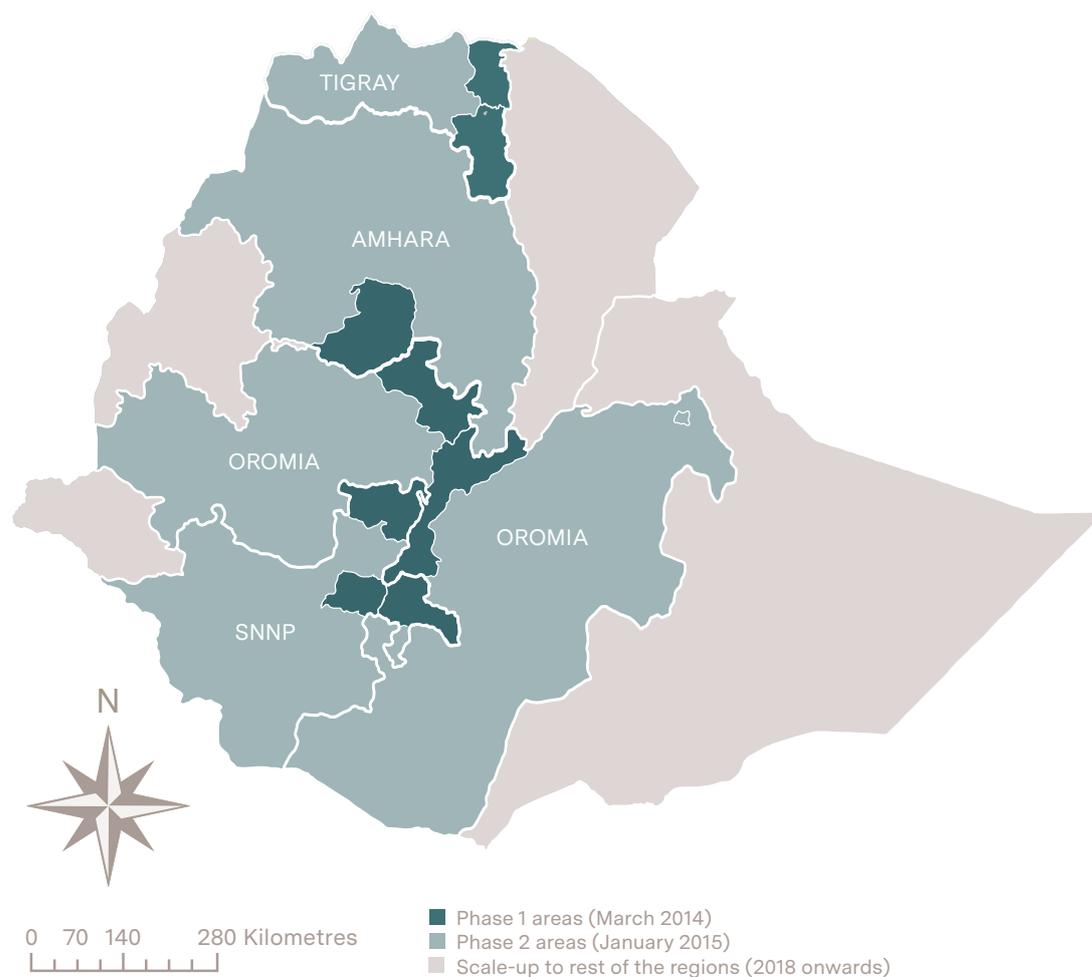
There are three assessment time points in the CBNC evaluation (Figure 1.2):

1. Baseline survey (October-November 2013): This was conducted before the initiation of the CBNC programme to assess the community level health status and the health system gaps for the delivery of CBNC services.
2. Quality of care study (November-December 2015): Twenty months after the CBNC programme was implemented, the quality of care provided to young infants (0-59 months) was assessed.
3. Follow-up survey (November-December 2017): Four years after the baseline survey and 3 years and 8 months after CBNC programme initiation, we conducted a follow-up survey to assess the change in CBNC service coverage and the health system gaps to deliver CBNC services.

To support findings from these three surveys, two qualitative studies were conducted to understand health worker and health system challenges linked to CBNC service delivery (Figure 1.3).

This evaluation plan was developed in close collaboration with the Government and implementing partners. Originally, it was agreed that selected districts in Phase 1 areas would serve as intervention areas for the study, and comparison areas would be selected from Phase

Figure 1.2. The CBNC implementation areas in three phases: Phase 1 (March 2014) shown in dark green, Phase 2 (January 2015) in pale green and areas in grey where scale up was initiated in 2018.



2 areas (Figure 1.4), with the understanding that CBNC rollout in comparison areas would take place after the end of the Phase 1 evaluation. This would have enabled a difference-in-difference analysis for CBNC indicators in intervention and comparison areas through baseline (2013) and follow-up (2017) surveys. However, the timeline for CBNC scale-up was modified. Due to the needs of the population, the Ministry of Health expedited the rollout of CBNC services. HEWs in comparison

zones received CBNC training in January 2015, earlier than originally expected. As a result, the analysis has been modified to avoid difference-in-differences. At the time of the follow-up survey, the CBNC programme was implemented in all the study areas for a duration ranging from 28-44 months. This report still shows findings from Phase 1 and Phase 2 implementation areas, facilitating a cross reference between baseline and follow-up surveys in these two areas.

1.4 Organisation of the Report

This evaluation, over the course of five years, has regularly assessed the CBNC programme, providing insights on the successes and on how the programme can be improved.

The primary focus of this report is the results from the follow-up survey, with cross references to the findings from the baseline, quality of care and qualitative studies. There are six sections in this report:

1. Executive Summary: summarises the CBNC evaluation and highlights the key findings.
2. Introduction (Chapter 1): provides an overview of the context within which the CBNC programme is implemented and introduces the components and overall evaluation.
3. Methods (Chapter 2): details the qualitative and quantitative methods employed in the CBNC evaluation.
4. Results from Household Surveys (Chapter 3): presents the results from the 2013 and 2017 household surveys
5. Results from Health System Readiness Surveys (Chapter 4): presents the follow-up survey (2017) results from health facility, health worker and WDA leaders, and cross-references these findings with the quality of care (2015) and two qualitative studies (2014 and 2015). These results are presented under the sub-headings of PHCU infrastructure to deliver neonatal services; technical support and staff potential to provide CBNC services; cultural context and community participation in CBNC services; and health facility documentation on the management of sick young infants.
6. Discussion (Chapter 5): discusses the key findings and provides actionable recommendations to improve the CBNC services.

7. Appendix I: presents a brief description and findings of an accompanying study done in CBNC evaluation areas on the professional advice networks for primary healthcare workers in Ethiopia.
8. Appendix II: summarises the distances mothers have to travel for health care with newborns.

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“This evaluation, over the course of five years, has regularly assessed the CBNC programme, providing insights on the successes and on how the programme can be improved.”

Study area

The follow-up survey took place in November 2017, four years after the baseline survey. Data were collected from Phase 1 and Phase 2 CBNC implementation areas in four regions of Ethiopia: Amhara, Oromia, Southern Nations Nationalities and Peoples, and Tigray.

Figure 1.3 Overall CBNC evaluation

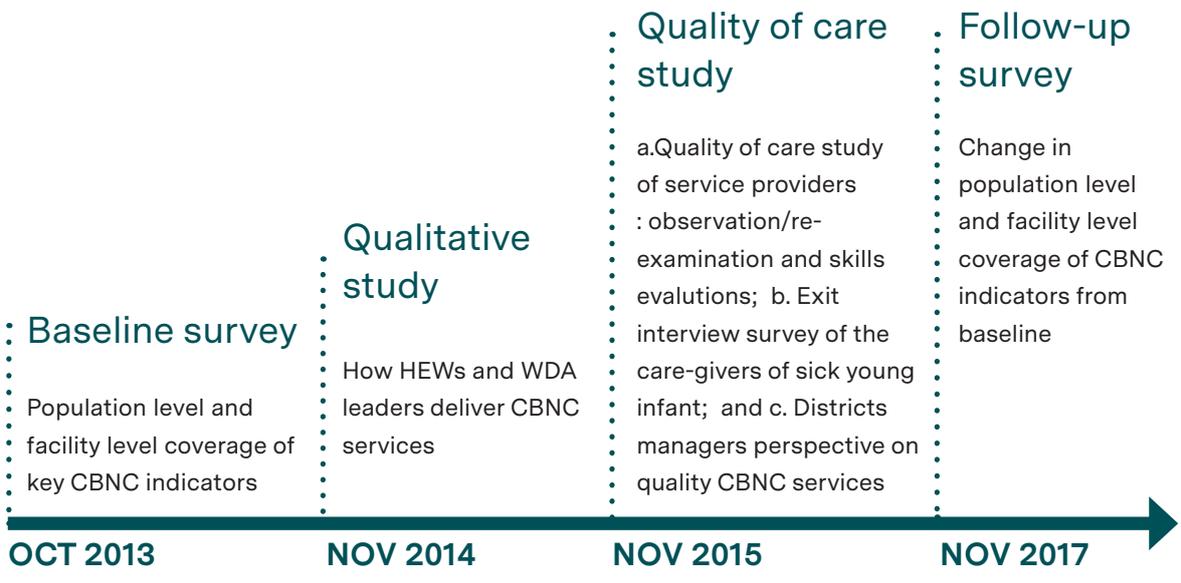
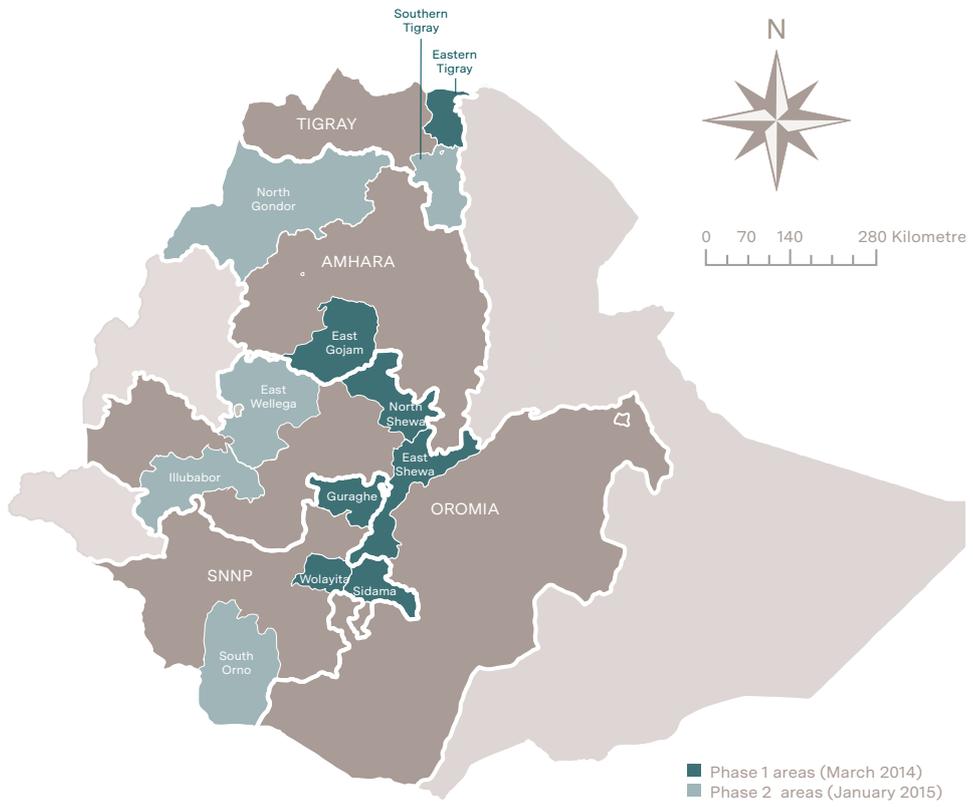


Figure 1.4. CBNC programme evaluation areas: dark green shows Phase 1 (March 2014) study areas and light green shows Phase 2 (January 2015) study areas.



2. Methods

In this chapter, we provide a detailed description of the follow-up survey while indicating any deviations from the baseline survey. We also highlight distinguishing features of the quality of care study. Lastly, a description of the qualitative research methods is provided. The methods employed for the accompanying study on professional advice networks of primary health care unit workers providing CBNC services is summarised in Appendix I.

2.1 Household, Health Facility, Health Worker and Community Volunteer Surveys

Study participants

The follow-up survey included community level and health system level participants. At the community level the participants included:

1. Households heads
2. All women of reproductive age in the household
3. All women in the household with a live birth in the 3-15 months preceding the survey

From the health system level, the following study participants were included:

1. Health centre staff
2. HEWs
3. WDA leaders

Sampling

Sample size

A total of 10,450 households would allow us to detect a difference in coverage rates of at least 10 percentage points in key CBNC interventions between baseline and follow-up surveys, including antenatal care (ANC), skilled birth attendance and postnatal care (PNC) with 80% power, 5% significance and assuming a design effect of 1.4 and 90% completeness.⁶

Sampling strategy

The follow-up survey included the same areas surveyed at baseline, which used simple random sampling to select approximately half the districts in the seven Phase 1 zones. In the five Phase 2 zones, more than half of the woredas were sampled, as sampling only half would have yielded an insufficient number of districts than required by the sample size calculations. Within the selected districts all PHCUs were listed and two PHCUs per district were randomly selected through a computerised number generation, yielding a total of 209 PHCUs (Table 2.1). In each of the selected PHCUs the health centre and a random health post were selected. To be included, health posts had to be functional, i.e. having a physical structure for provision of health services with at least one stationed HEW. In the selected health post, all the gotes (sub-villages) were listed and one was randomly selected for household interviews. All households in the selected gote were numbered and 50 were randomly selected.⁷

6. Berhanu D, Avan BI. Community Based Newborn Care: Baseline report summary, Ethiopia October 2014, (London: IDEAS, London School of Hygiene & Tropical Medicine, 2014)

7. Berhanu and Avan. CBNC: Baseline report summary, Ethiopia October 2014

Table 2.1 Regions, zones woredas and PHCUs sampled for CBNC Phase 1 baseline (2013) and follow-up surveys (2017)

Regions	Zones	CBNC implementation	Total woredas	Sampled woredas	PHCUs
4	12		176	101	206*
Amhara	East Gojam	Phase 1	18	10	20
	North Gondar	Phase 2	21	15	30
Oromia	North Shewa	Phase 1	13	7	14
	East Shewa	Phase 1	13	6	12
	East Wollega	Phase 2	17	12	24
	Illu Aba Bra	Phase 2	24	16	32
SNNP	Gurage	Phase 1	15	7	14
	Sidama	Phase 1	20	10	20
	Wolayita	Phase 1	14	7	14
	South Omo	Phase 2	9	2	10
Tigray	Eastern	Phase 1	7	5	10
	Southern	Phase 2	5	3	6

* At baseline two PHCUs in North Gondar and one in South Omo were dropped due to civil unrest and inaccessibility, respectively. These PHCUs were also dropped in the follow-up survey.

Table 2. 2. Sample sizes for the CBNC evaluation baseline, quality of care and follow-up surveys.

	Baseline survey		Quality of Care Survey		Follow-up survey	
	2013		2015		2017	
	N	N	N	N	N	N
	Expected	Achieved	Expected	Achieved	Expected	Achieved
Regions	4	4	4	4	4	4
Zones	12	12	12	12	12	12
Woredas	101	101	30	30	101	101
Health centres	209	206	120	117	206	206
Health posts	209	206	240	240	206	201
HEWs	209	206	240	240	412	335
WDA leaders	627	605	240	240	412	412
Household heads	10,450	10,295	N/A	N/A	10,300	10,300
Observation of sick young infant consultation and re-examination	N/A		720	893	N/A	N/A

At the selected health centres the most senior staff member within the relevant department was interviewed. At the health post, two HEWs were interviewed. In the selected health post catchment, two randomly selected WDA leaders were interviewed. At the selected households, the household head, women 13-49 years of age and among them those with a live birth in the 3-15 months prior to the date of the survey were interviewed. The total numbers of facilities, health workers and households included in the CBNC evaluation surveys are shown in Table 2.2.

Survey tools

The follow-up survey employed all the tools used at the baseline survey and the development of these tools is detailed in the report published in 2014 (Table 2.3).⁸ Additional modules on HEW's motivation were adapted in English, translated and then pre-tested. Questionnaires for the follow-up survey were programmed in Personal Digital Assistants (PDAs).

Survey implementation

All the research activities of the CBNC evaluation plan were implemented by JaRco Consulting (www.jarrco.info). The questionnaires for the follow-up surveys were programmed into PDAs in Amharic, Oromifa and Tigrinya.

Data collectors were selected based on their level of education, previous experiences in their role and their ability to speak the required language. There were twenty data collection teams, each consisting of one supervisor and five data collectors. Of the five data collectors, four were assigned to collect household data.

For the follow-up survey, supervisors and data collectors were trained using PDAs over

the course of four days. On the fifth day, data collectors conducted a pilot test, followed by a debrief of the field experience on the sixth day. Detailed field manuals were provided to each data collector.

Quality assurance

Quality assurance procedures were developed for the CBNC surveys. At central level, there was a country lead who coordinated the surveys and closely communicated with regional coordinators who were each assigned to supervise a specified number of teams. Regional coordinators made field visits and contacted the supervisors daily to address any issues and ensure that the survey procedures were being followed. A PDA help desk was set up and two individuals were assigned to provide support for technical and programming related issues.

In the field, supervisors ensured that the sampling procedures were followed in each cluster. They checked the number, content and completeness of interviews and kept track of outstanding interviews, ensuring that call backs were made for absent respondents. Supervisors also randomly accompanied data collectors for the different types of interviews and randomly re-interviewed study participants. If errors were identified, supervisors met with the interviewers immediately and when necessary revisited interviewees to resolve the errors. Errors were captured on a separate sheet. Completed and checked interviews were sent to JaRco, along with error capture sheets, using a secure server.

8. Berhanu and Avan. CBNC: Baseline report summary, Ethiopia October 2014

Table 2.3. Survey instruments and key thematic areas of the CBNC baseline and follow up-surveys

Instruments	Thematic areas of baseline, quality of care and follow-up surveys	Additional thematic areas of the quality of care and follow-up surveys
1. Health centre	PHCU staffing, supervision received and conducted, diagnostics kits, equipment, medicine, job aids, supplies, register review	
2. Health post	Equipment, medicine, job aids, supplies, record review	Quality of care survey: exit interview of the care-givers of sick young infant
3. HEW	Demographics, training, knowledge, services provided, supervision, linkage with WDA leaders	Quality of care study: Clinical vignettes, observation/re-examination, skills assessment Follow-up survey: Motivation, understanding of behaviour change communication tool images (family health guide)
4. WDA leader	Demographics, orientation, knowledge, understanding of behaviour change communication tool images (family health guide), practice, supervision	
5. Household Survey: Household head	Demographics, assets	
6. Household Survey: Women of reproductive age	Demographics, birth history	
7. Household Survey: Women with a delivery 3-15 months prior to survey	Pregnancy care, delivery care, immediate newborn care, postnatal care, sick young infant care, newborn death*	Follow-up survey: understanding of behaviour change communication tool images (family health guide)

*Not included in the quality of care study

Key differences between baseline, quality of care and follow-up surveys

Key differences between the baseline survey (2013) and the follow-up survey (2017) are as follows:

1. Health worker sampling: at baseline, we collected data from one HEW and three WDA leaders per PHCU. The follow-up survey included two HEWs and two WDA leaders as experience in the baseline showed that saturation of information was achieved by two WDA leaders, while selection of only one HEW did not capture the variations among HEWs at the health post level. WDA leaders during baseline survey were selected randomly from the list serving the selected health post catchment area, whereas during the follow-up survey they were randomly selected from the list of leaders serving the cluster of households to be included in the study.
2. Survey content: the follow-up survey captured additional information on HEWs' motivation. The assessment was based on a 26-item interview questionnaire.^{9,10} The responses were recorded on a Likert scale - a score of 5 represented the statement "strongly agree" for positively-worded questions. Negative questions were coded in the opposite direction with a score of 5 representing "strongly disagree" which was changed into reverse coding during the analysis. The data were converted into percentiles to create an overall HEW motivation index. The data items were further categorised into six domains and converted into percentile scores for each of the following domain indices: job satisfaction, commitment, intrinsic job satisfaction, personal issues, drive and organisation commitment.
3. Data collection: at baseline, data were collected using paper questionnaires, which were regularly brought to the central office, checked for consistency and double entered. For the follow-up survey, data were collected using PDAs.
4. Data collectors: there were more data collection teams during the baseline survey than for the follow-up survey (40 vs 20). The 2017 survey teams comprised one supervisor and four data collectors, of which three collected data from households and one collected data on health facilities, HEWs and WDA leaders.
5. Training: due to the large number of data collectors at baseline, there were two levels of training. One was done centrally for all the supervisors. This was then followed by four separate trainings in the different regions for data collectors which was co-facilitated by the trained supervisors. For the follow-up survey all data collectors were trained in one location at the same time.

Key differences between the quality of care survey (2015) and the follow-up survey (2017) are as follows:

1. Survey modules: The quality of care survey included an observation of a sick young infant consultation and an exit interview with their care-giver. Unlike the follow-up survey, the quality of care study did not include household interviews (Table 2.3). It was conducted in November 2015.
2. Sampling: the quality of care study was done in a subsample of 30 woredas, randomly selected from the baseline survey woredas, with probability proportionate to the zonal population size. With probability proportionate to the woreda populations, we randomly selected 70 PHCUs from Phase 1 and 50 from Phase 2 areas. In each PHCU, on average two health posts were randomly picked from a total of 240 health posts (Table 2.2). We aimed to observe an assessment of three young infants per health post, which would allow us



Photo: Checking temperature, Mekele, Tigray © IDEAS/Christopher Smith 2019

to detect a 15% percentage point difference between Phase 1 and Phase 2 areas, with 80% power, 5% significance assuming a design effect of 2.0 and intra-class correlation of 0.5.¹¹

3. Selection criteria: In Phase 1, we selected health posts with at least one HEW who had received CBNC training at least a year prior to the date of the survey. Phase 2 health posts were selected if there was at least one HEW who had served for at least three months. To be included for observation of assessment by a HEW, a child had to be less than two months, considered sick by the caregiver and was being seen for the first time by any of the HEWs at the health post. WDA leaders that had referred a sick young infant most recently in the last three months were included.
4. Data collectors: There were 12 teams each comprised of four members: a supervisor, a community mobiliser (convinced mothers with sick young infants to visit a health post), an

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9. Tripathy JP, Goel S, Kumar AM, Measuring and understanding motivation among community health workers in rural health facilities in India—a mixed method study, *BMC Health Serv Res.* 2016 Aug 9;16(a):366. doi: 10.1186/s12913-016-1614-0
 10. Mbindyo PM, Blaauw D, Gilson L, English M, Developing a tool to measure health worker motivation in district hospitals in Kenya, *Human Resources for Health.* 2009 May 20;7:40. doi: 10.1186/1478-4491-7-40
 11. Berhanu D, Avan BI, Community Based Newborn Care: Quality of CBNC programme assessment - midline evaluation report, March 2017, (London: IDEAS, London School of Hygiene & Tropical Medicine, 2017)

observer (observed the sick child consultation with a HEW) and a re-examiner (assessed and classified children after they had been seen by a HEW). Observers and re-examiners were government employed health officers trained in CBNC. Their selection was done in close consultation with the Ministry of Health and CBNC implementing partners. Of the 26 observers and re-examiners, 23 had attended a CBNC training of trainers and three had basic CBNC training. The quality of care study teams followed similar training procedures including three days of pilot testing that contained elements for the mobilisation, observation and re-examination of sick young infants. During the training, observers and re-examiners also received additional training on the CBNC guidelines focusing on the assessment, classification and management of sick young infants.

Data management and analysis

Data from PDAs were sent daily to data managers at JaRco central office during the first week of the survey. After the first week, data were sent when each PHCU was completed. Errors identified by the data management team were discussed with regional coordinators and then communicated to supervisors within 24-48 hours for correction. Analysis was carried out using Stata 14 (STAT Corp, Texas USA).

The analysis was split into household-level results and health-system-readiness results. The 2013 and 2017 household level results included women who were asked about pregnancy, delivery, immediate newborn, postnatal and sick young infant care for their most recent birth. The analysis compared the change between 2013 and 2017 in the coverage of these key maternal and newborn health indicators associated with the CBNC programme. Health

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The analysis compared the change between 2013 and 2017 in the coverage of these key maternal and newborn health indicators associated with the CBNC programme.”

systems readiness included interviews with HEWs and WDA leaders to assess their training knowledge, supervision, motivation and practice, as well as observations of health posts and health centres to assess PHCU staffing, equipment, supplies, medicine, job aids and register reviews. The 2017 health system readiness findings were also compared with findings from the 2015 CBNC quality of care study. Health system readiness analysis included the following indicators:

- A. Supply side: ratios of CBNC-trained staff by catchment population and ratios of CBNC related hospitalisation bed by catchment population. It also included the changes in the status of the following key themes between quality of care study and follow-up survey: medicines, equipment and supplies necessary to deliver CBNC services.
- B. Health system support and quality assurance: e.g. supervisory ratios: essential supervision available to CBNC service providers.
- C. Service providers' motivation: index of staff motivation to deliver CBNC services.

2.2 Qualitative Study

Two rounds of qualitative study were conducted.

1. CBNC service providers qualitative study (November 2014):
 - Explored the mechanisms used by HEWs and WDA leaders to deliver CBNC services
 - Identified factors that affect HEWs and WDA leaders' potential to deliver CBNC services
2. CBNC programme managers qualitative study (November 2015):
 - Explored the content and quality of CBNC programmatic activities from the perspective of CBNC programme managers
 - Identified challenges in the CBNC programme implementation and recommendations to improve CBNC programming

Methods

For both rounds of qualitative study, data were collected from a sample of districts that were visited during the baseline and follow-up surveys.

For the CBNC service providers qualitative study (2014), a sample of baseline study woredas in the seven Phase 1 study zones were included. With the assumption that woredas where very severe disease cases were treated by HEWs could provide insight into mechanisms for initiating and completing treatment, and areas with a few or no cases treated could highlight challenges, woredas with a range of very severe disease case treatments were identified. The number of sick young infants that were treated at health posts since the start of the CBNC programme were obtained from implementing partners. The



Photo: A newborn child born hours before at a regional hospital in Hawassa, Ethiopia.

© 2014 Nicole M. Melancon, Courtesy of Photoshare

information was collected from HEWs' CBNC registers during the biannual performance review and clinical mentoring meetings, approximately six months after the programme was initiated. Almost all the Phase 1 study woredas (98%) had recorded a minimum of zero and a maximum of eight very severe disease cases since CBNC programme implementation. Of these, two woredas that had a treatment load 0-3 cases were randomly selected from each of the four regions. Another two woredas that had four and more cases treated were also selected from each of the four regions. In total, 16 woredas were included for the CBNC service providers qualitative study.

The CBNC programme managers qualitative study (2015) included a sub-sample of woredas from the seven Phase 1 and five Phase 2 zones that were a part the quality of care study. We randomly selected one woreda from each of the Phase 1 and Phase 2 zones for a total of 12 woredas.

The CBNC service providers study focussed on CBNC service delivery and study participants were selected based on their ability to speak extensively on this aspect of the programme. We conducted focus group discussions (FGDs) with HEWs (N=16) and WDA leaders (N=16). In addition, we conducted in-depth interviews (IDIs) with HEWs (N=32) and WDA leaders (N=32). We also interviewed 16 woreda health office heads and 16 health centre staff who supervise CBNC-trained HEWs.

The CBNC programme managers qualitative study focussed on staff members who were involved in the administrative aspect of the CBNC programme. We interviewed 12 woreda health office heads, 10 health centre staff heads and 10 non-governmental organisation (NGO) representatives supporting the CBNC implementation.



Photo: HEW training mother on breastfeeding, Ethiopia © IDEAS/Paolo Patruno 2015

The CBNC service providers study tools were informed by the baseline survey and other similar studies. Tools were translated into Amharic, Tigrinya and Oromifa and further refined in the pretesting phase. Guides for the CBNC programme managers study were informed by findings from the 2014 qualitative study. Interview guides were translated into Amharic. IDIs and FGDs were captured using a tape recorder and written notes.

For the CBNC service providers study, four interviewers and four note takers were trained over two days followed by two days of pilot testing. For the CBNC programme managers study, the supervisors for the CBNC quality of care study received one day's training on the IDI guide, followed by a pilot test.

Data quality assurance

Field manuals were provided to the data collectors for reference during the fieldwork, which included the necessary guidelines and documents to collect quality data. The manual also detailed the roles and responsibilities of each team member and the expected day-to-day deliverables. Interviewers emailed expanded field notes and updated pre-analysis forms to the JaRco research lead at the end of each PHCU visit. These were reviewed centrally and comments were provided to interviewers within 24 hours of receipt, ensuring that emerging themes were included in subsequent IDIs and FGDs. Randomly selected audio recordings were checked against the expanded field notes. Supervisory field visits were also conducted.

Data management and analysis

For both rounds of qualitative studies, expanded field notes and sound recording were the main method for data capture. Notes were then used to populate pre-analysis templates. Completing the pre-analysis templates allowed for data analysis during the data collection period. Data were analysed centrally by reading expanded field notes and pre-analysis templates to explore and tabulate emerging themes for synthesis. Findings were also organised by type of interviewee and data collection method. Thematic areas were ranked by relevance or frequency of occurrence. An analysis workshop was then conducted with data collectors and researchers to enhance the validity of the findings. Patterns and themes that emerged from the initial analysis and workshop were refined through additional analysis. Finally, major themes and codes were drawn out and summarised. For key thematic areas, supportive quotes were identified.

2.3 Research Ethics

The CBNC evaluation was approved by the Institutional Review Boards of the London School of Hygiene & Tropical Medicine (reference no: 8759 - 4) and the Ethiopian Science and Technology Ministry (reference no:3/10-94/2010). Prior to participating in this study all respondents gave informed, voluntary written consent.

3. Results from Household Surveys

Chapter 3 presents coverage of services across the nine components from the follow-up household survey in 2017, with reference to the 2013 baseline survey.

A total of 10,294 households were interviewed in 2013 and 10,300 in 2017. In 2013, we interviewed 925 women who had a recent live birth and 1,076 such women were interviewed in 2017. The distribution by CBNC implementation phase is shown in Table 3.1.

3.1 The Nine CBNC Components: Comparison Across Baseline and Follow-up Surveys

The socio-demographic description of the women who had a live birth in the 3-15 months preceding the survey is shown in Table 3.2.

“Overall ANC has increased from 69% in 2013 to 83% in 2017. Despite the increase, one in five women did not receive any ANC in 2017.”

Table 3.1. Household survey sample in 2013 and 2017

	Phase 1		Phase 2	
	2013	2017	2013	2017
Household heads	5197	5200	5097	5100
Woman of reproductive age	5666	5617	5514	5466
Women with a live birth in the 3-15 months preceding the survey	451	542	474	534

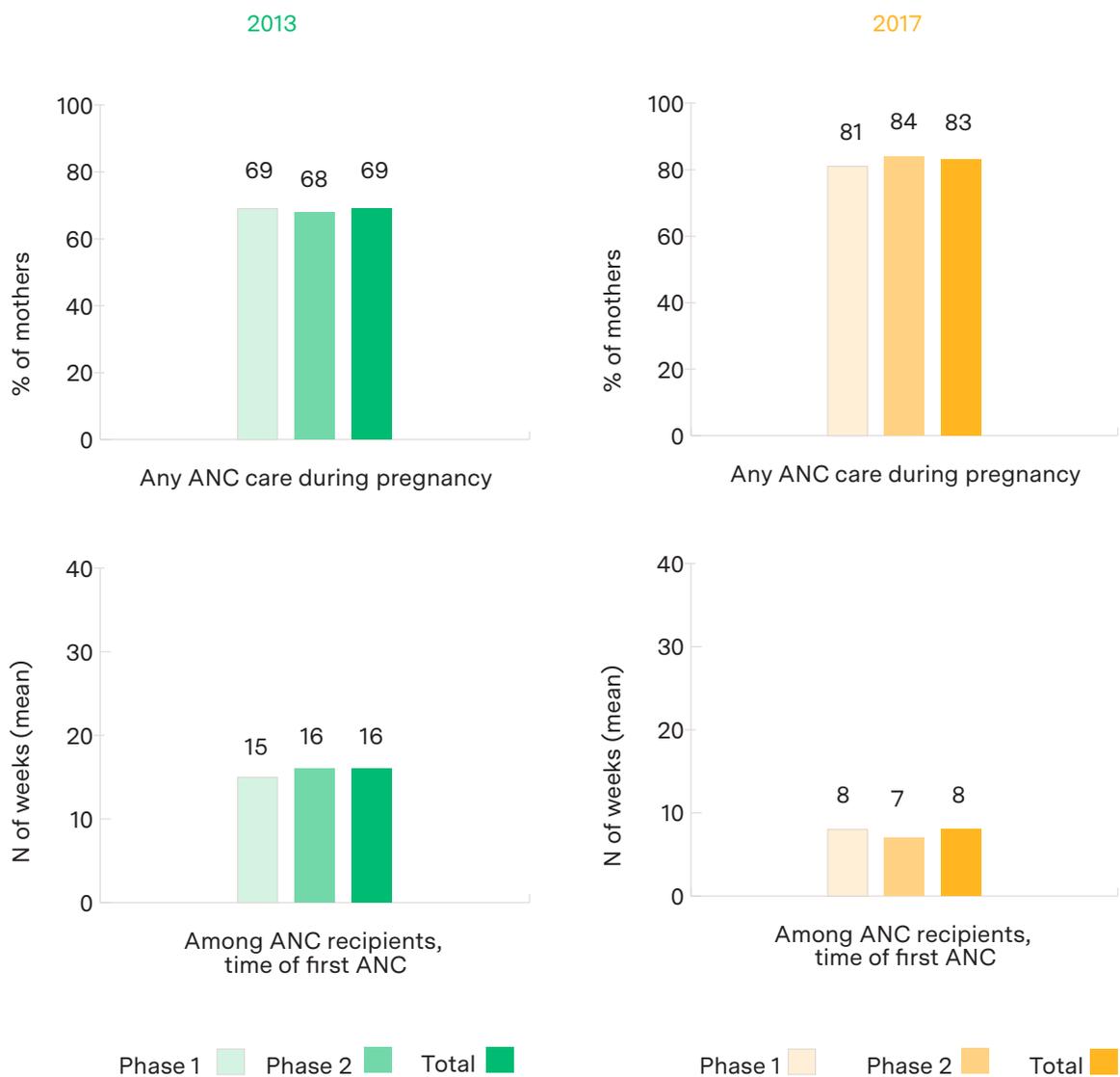
Table 3.2. Characteristics of women with a live birth in the 3-15 months prior to the survey in 2013 and 2017

	Phase 1		Phase 2	
	2013	2017	2013	2017
Age, Mean (SD)	28 (7)	28 (7)	27 (6)	27 (6)
Education (mean years)	2 (3)	3 (4)	2 (3)	3 (4)
Married, n (%)	403 (91)	502 (93)	457 (92)	491 (93)

CBNC Component I: Early identification of pregnancy

Overall ANC has increased from 69% in 2013 to 83% in 2017 (Figure 3.1). Despite the increase, one in five women did not receive any ANC in 2017. The mean timing of the first ANC visit in 2013 was the fourth month (second trimester). In 2017, the first ANC was occurring earlier on average, during the second month (first trimester).

Figure 3.1. Early antenatal care in baseline (2013) and follow-up (2017) surveys



CBNC Component II: Provision of focussed antenatal care (ANC)

Coverage of 4 ANC visits or more increased between baseline and follow up surveys (39% vs 55%). Components of focussed ANC (4 ANC visits and at least 1 visit or first visit at the health centre) also increased between the two-time points (Figure 3.2).

Figure 3.2. Focussed antenatal care at baseline (2013) and follow-up (2017) surveys

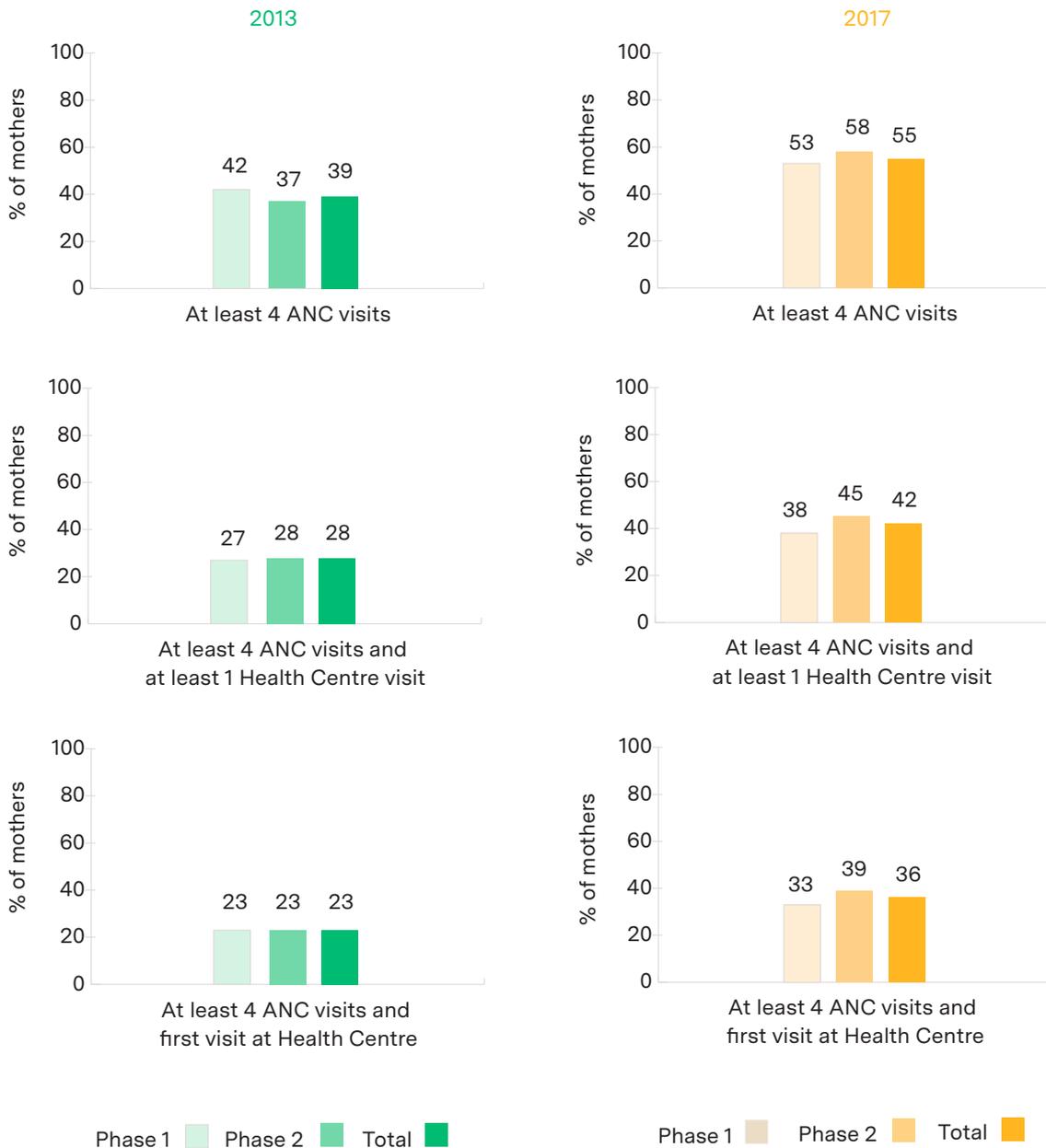


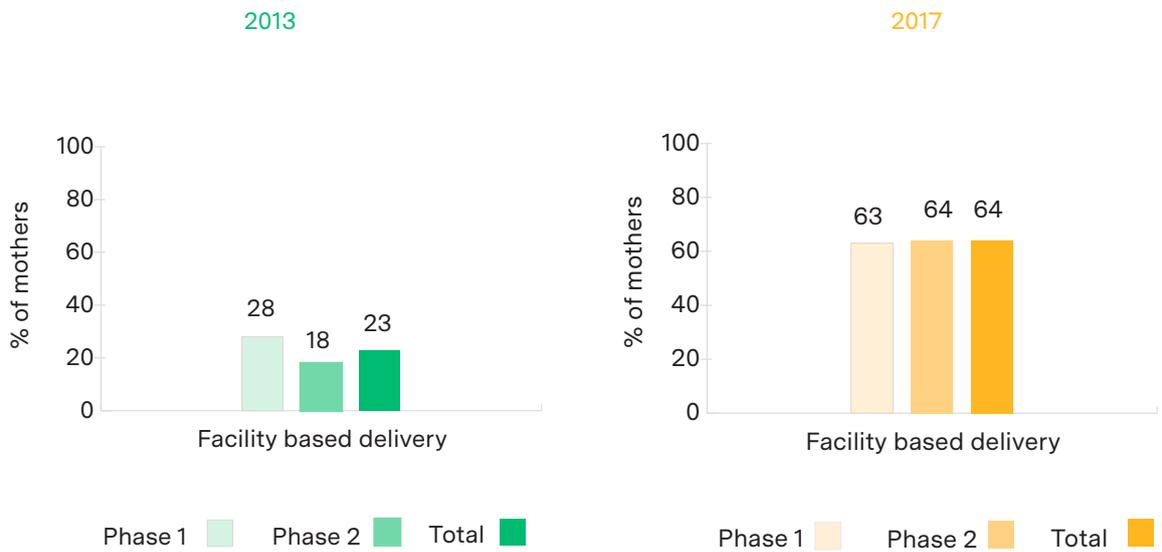


Photo: Antenatal care, Ethiopia © IDEAS/Paolo Patrino 2015

CBNC Component III: Promotion of institutional delivery

In 2013, less than a quarter of deliveries took place in facilities while in 2017 it has increased to 63%. Furthermore, even areas that were lagging behind in 2013 had caught up in 2017 and there was uniformity in the proportion of deliveries taking place in facilities between Phase 1 and Phase 2 implementation areas (Figure 3.3).

Figure 3.3. Facility delivery care at baseline (2013) and follow-up (2017) surveys



CBNC Component IV: Safe and clean delivery

Among facility (hospital and health centre) deliveries, safe and clean practices varied. Compared with 90% of women in 2013, only 44% in 2017 reported that their delivery attendant washed his or her hands and 45% said that they did not know. At baseline, 65% of women reported receiving misoprostol whereas in 2017 this proportion dropped to 56%. Maternal report of glove use by delivery attendants was relatively high at both time-points, although slightly lower at the follow-up survey (96% vs 87%) (Figure 3.4a).

Very few home deliveries were attended by a skilled birth attendant in 2013 and 2017 (4% vs 7%) and maternal report of birth attendants' hand washing remained the same (70% and 72%). Gloves were used in less than a quarter of all home deliveries at both time points. Misoprostol use in home deliveries slightly increased from 3% to 8% (Figure 3.4b).

Figure 3.4a. Safe and clean delivery including misoprostol use at baseline (2013) and follow-up (2017) surveys: facility delivery care

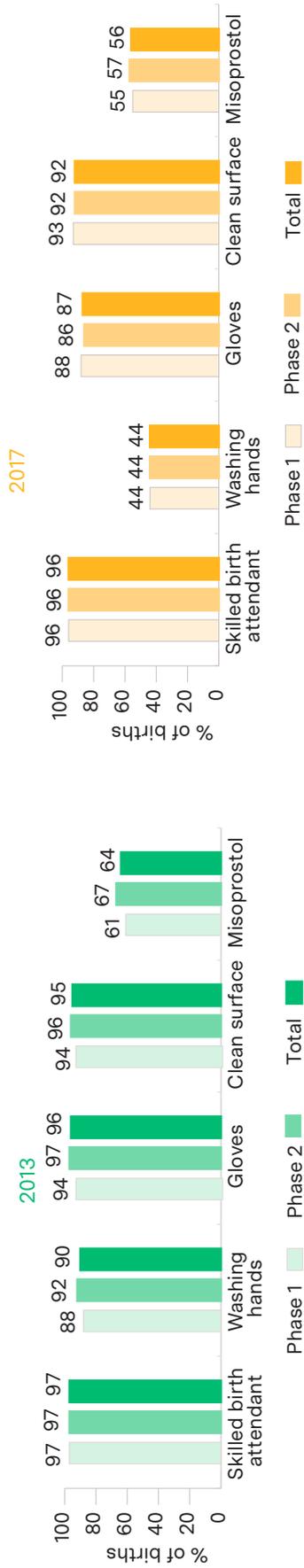
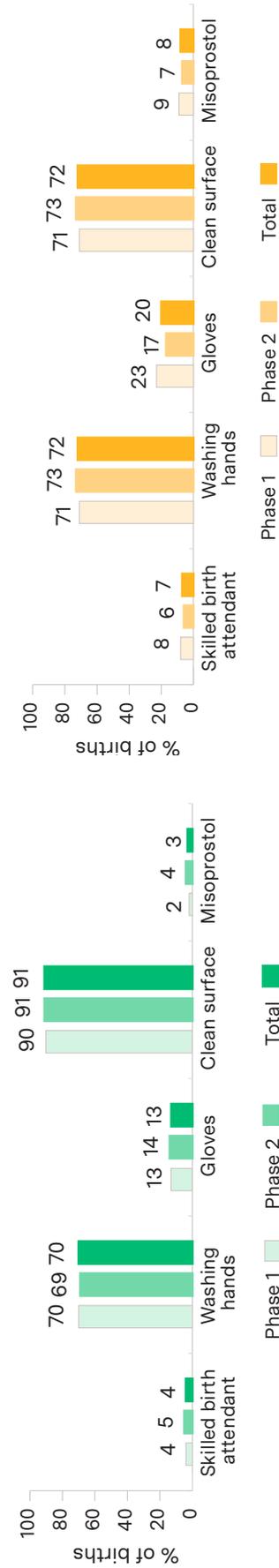


Figure 3.4b. Safe and clean delivery including misoprostol use at baseline (2013) and follow-up (2017) surveys: home delivery care



CBNC Component V: Provision of immediate newborn care including cord care

In 2013 only a quarter of women who delivered in a facility reported antiseptic use for cord care. This number dramatically increased to 67% in 2017, reaching 73% in Phase 1 areas. Chlorhexidine use was reported among 5% of mothers overall, with these being in Phase 1 areas. Reports of other practices remained similar between 2013 and 2017 (Figure 3.5a).

Use of a new razor blade in home deliveries was reported among 91% of women in 2013, but had slipped to 79% in 2017. Antiseptic application was reported among 2% of home deliveries in 2013 and increased to 12% in 2017 (Figure 3.5b). There was no notable reporting of chlorhexidine for home deliveries.

Figure 3.5a. Immediate newborn care at baseline (2013) and follow-up (2017) surveys: facility delivery care

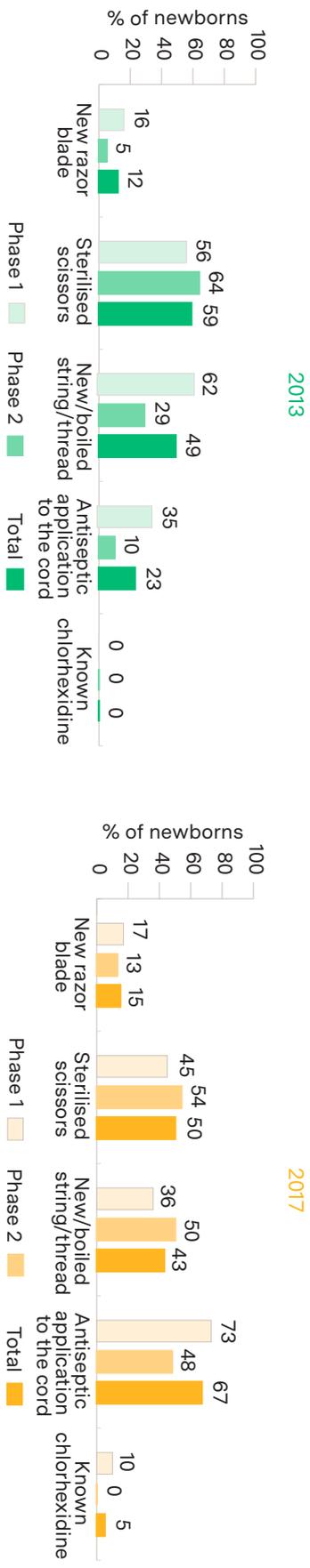
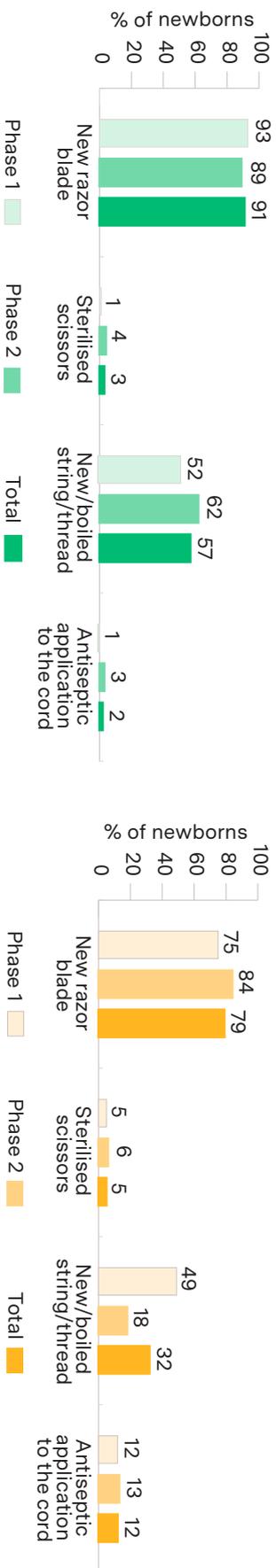


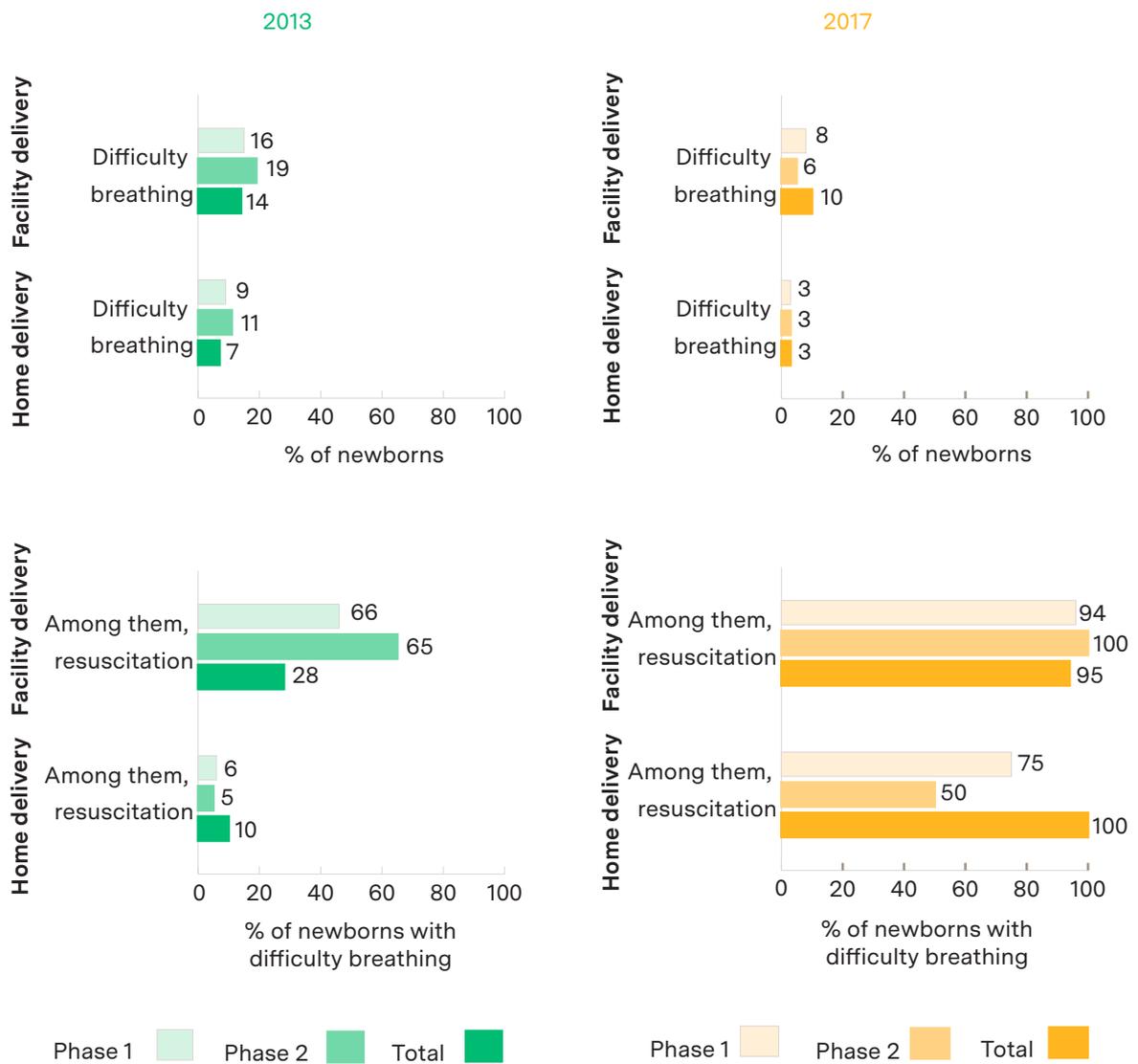
Figure 3.5b. Immediate newborn care at baseline (2013) and follow-up (2017) surveys: home delivery care



CBNC Component VI: Recognition and management of asphyxia in a newborn baby

Among facility deliveries, the proportion of mothers who reported that their child had difficulty breathing at birth dropped by half from 16% in 2013 to 8% in 2017. For both home and facility deliveries, compared with the baseline, children who were identified as being asphyxiated were likely to receive initial stimulation and resuscitation in 2017 (Figure 3.6).

Figure 3.6. Recognition of asphyxia and initial resuscitation at baseline (2013) and follow-up (2017) surveys: facility and home delivery care



CBNC Component VII: Prevention and management of hypothermia

Compared with the baseline, in the follow up survey, the practice of delaying bathing for 24 hours after delivery improved for babies delivered at home (36% vs 52%), while it remained the same for those delivered in a facility (78% vs 80%). Between baseline and follow-up surveys, skin-to-skin care practice improved for all newborns irrespective of place of delivery (Figure 3.7).

Figure 3.7. Prevention and management of hypothermia at baseline (2013) and follow-up (2017) surveys: facility and home delivery care

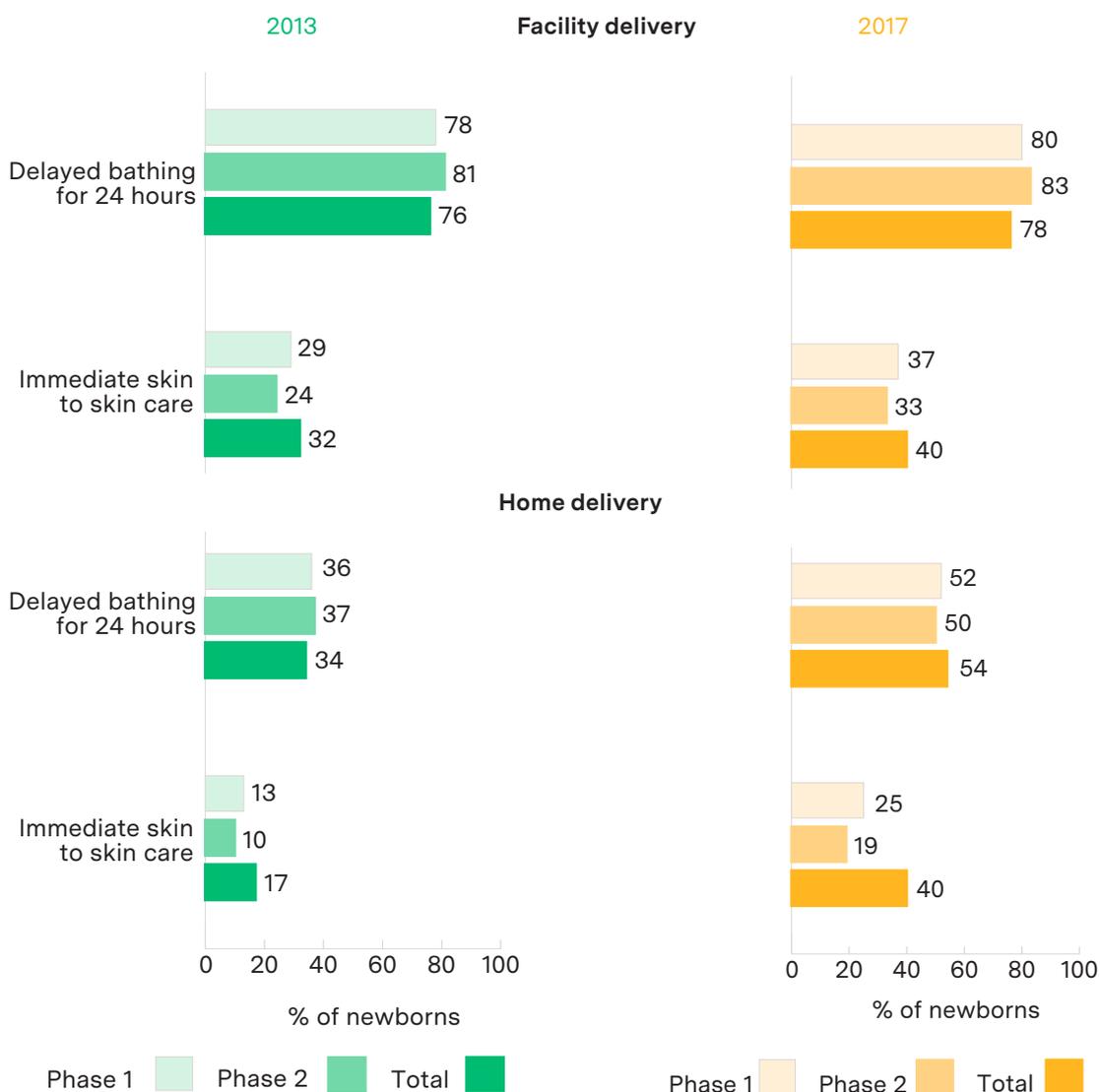


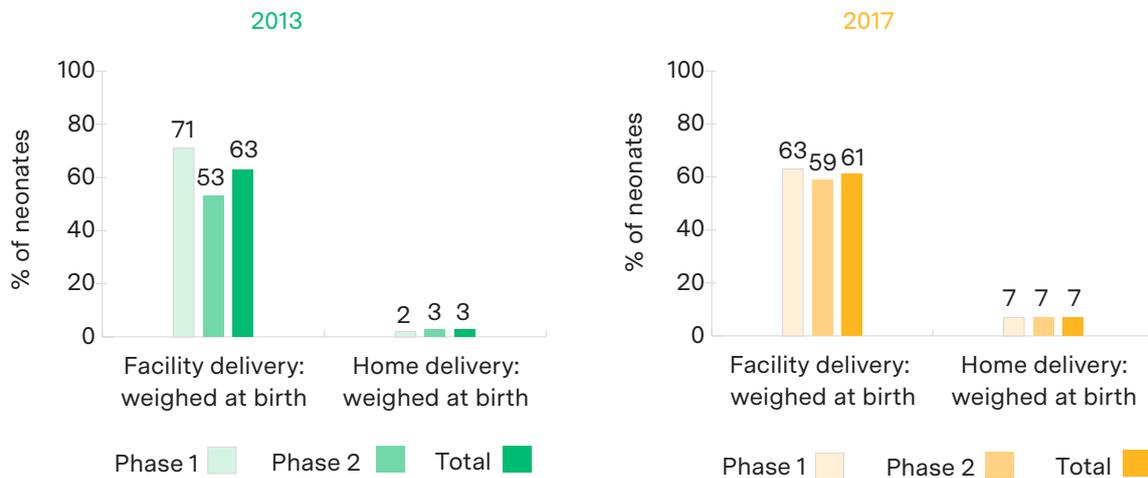


Photo: Weighing newborn, Ethiopia © IDEAS/Paolo Patruno 2015

CBNC Component VIII: Management of pre-term and low birth weight neonates

Birth weight measurement was used as a proxy indicator for the identification and management of low birth weight babies. For facility deliveries at baseline and follow-up surveys, according to maternal reports, three out of five children were weighed at the time of delivery. For home deliveries, very few babies were weighed at birth, although there was a minor increase from 3% to 7% between 2013 and 2017 (Figure 3.8).

Figure 3.8. Management of pre-term and low birth weight neonates at baseline (2013) and follow-up (2017) surveys: weighing at birth for facility and home deliveries



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“For facility deliveries at baseline and follow-up surveys, according to maternal reports, three out of five children were weighed at the time of delivery. For home deliveries, very few babies were weighed at birth, although there was a minor increase from 3% to 7% between 2013 and 2017”



Photo: Mother and baby, Dangela © IDEAS/Christopher Smith 2019

CBNC Component IX: Management of neonatal sepsis and very severe disease at community level

Any postnatal visit in the first 6 weeks was low in 2013 (28%) and dropped even further in 2017 (16%). Of those having postnatal visits, the mean number of days after delivery when the first visit took place was 19 at baseline and decreased to 16 by the time of the follow-up survey (Figure 3.9a).

Among young infants reported sick in the first 59 days of life in 2013 (12%) and in 2017 (13%), more than two-thirds were reported to have one or more of the symptoms of very severe disease (temperature 37.5 or less than 35.5, fast breathing, severe chest in-drawing, reduced feeding, convulsions, limited or no movement and grunting). Among those identified as having very severe disease, compared with 2013, a majority were getting amoxicillin for seven days in 2017 (38% vs 69%). Less than a quarter reported receiving a gentamicin injection for seven days; only 16% in 2013 and 23% in 2017 (Figure 3.9b).

Figure 3.9a. Very severe disease in young infants at community level at baseline (2013) and follow-up (2017) surveys: opportunity for case identification

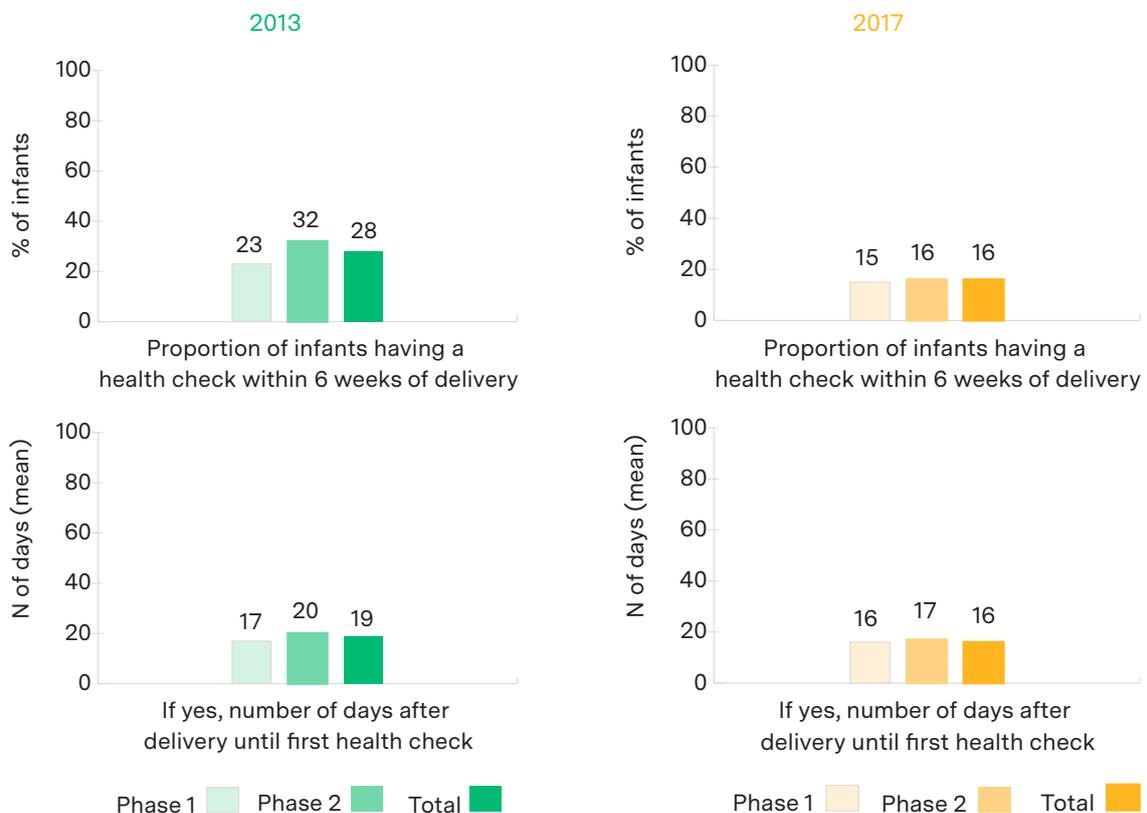
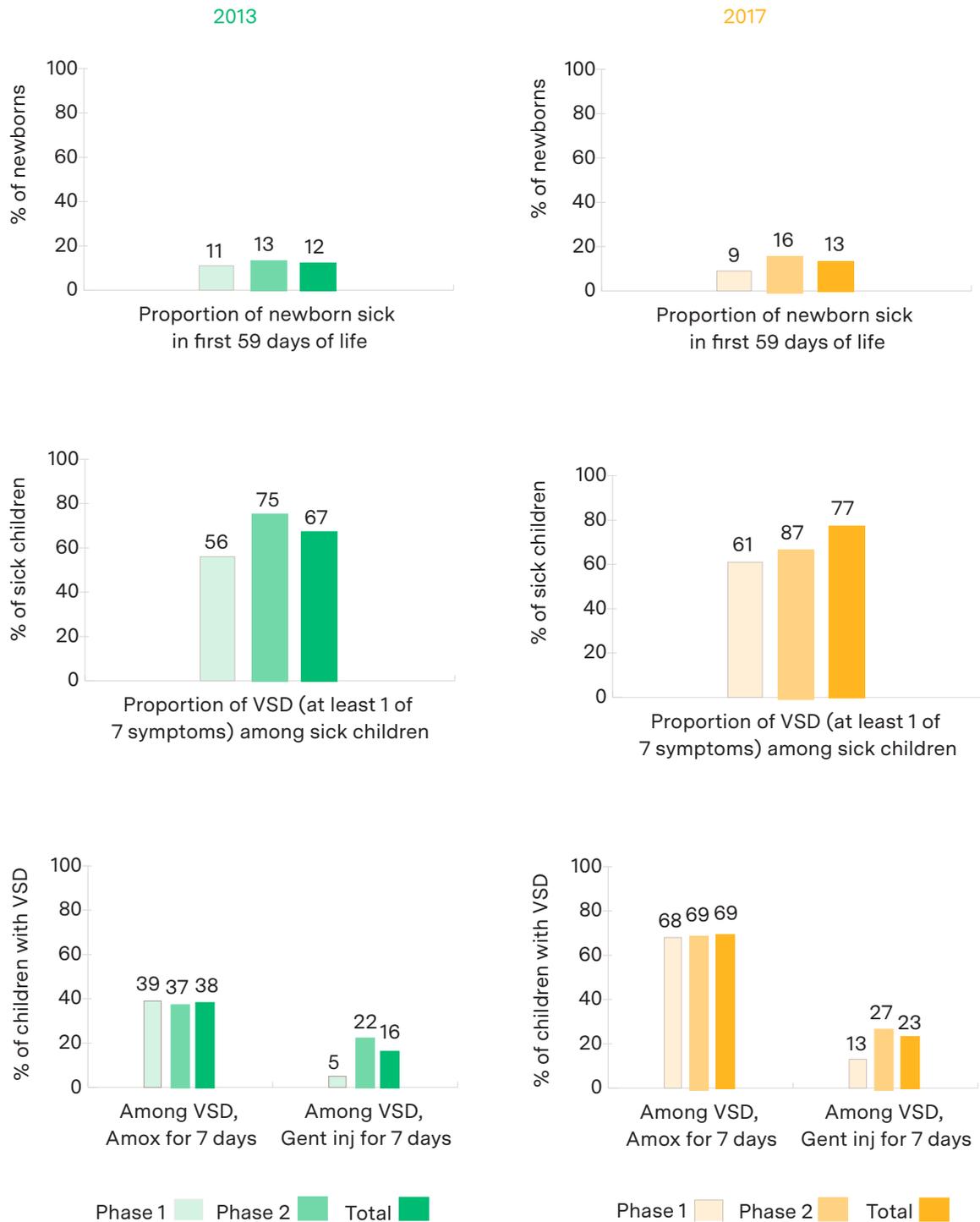


Figure 3.9b. Very severe disease in young infants at community level at baseline (2013) and follow-up (2017) surveys: classification and management



4. Results from Health System Readiness Surveys

Chapter 4 provides the findings of an in-depth assessment of health system readiness with the aim of identifying opportunities to improve CBNC services.

The results from the assessments of health posts, health centres, HEWs and WDA leaders are presented under the following sub-headings: PHCU infrastructure to deliver neonatal services; technical support and staff potential to provide CBNC services; cultural context and community participation in CBNC services; and health facility documentation on the management of sick young infants. Where pertinent, this section compares findings from the 2017 follow-up survey with the 2015 quality of care study. Cross references are also made to the qualitative studies conducted under this evaluation. The total number of health facilities, HEWs and WDA leaders sampled in the baseline, quality of care and follow-up surveys are shown in Table 4.1a.

4.1 PHCU Infrastructure to Deliver Neonatal Health Services

The surveys assessed the health system readiness to provide CBNC services with respect to staff, infrastructure, drugs, equipment and record keeping supplies. Only 60% of health centres had a CBNC-trained staff member, indicating that there were approximately 4,000 women of reproductive age and 2,500 under-5 children per trained health centre staff member (Table 4.1b).



Photo: Health equipment, Health Facility, Mekele, Tigray, Ethiopia © IDEAS/Christopher Smith 2019

PHCU staffing

Eighty percent of health centres reported that there were CBNC-trained HEWs in the catchment population in 2017. On average, there were 955 women of reproductive age and 577 under-five children per CBNC-trained HEW (Table 4.1b).

HEWs included in the 2014 CBNC service providers qualitative study reported the difficulty they face when providing CBNC services to such a large population.

“The kebele where I work is very large.....it is very difficult to see each newborn within the first 24 hours.” (HEW- Tigray)

Furthermore, some said that they were the sole service provider in their respective health post, which makes it hard to provide the necessary follow-up in the face of competing priorities, particularly for PNC.

“If there is a woman who has just delivered and a woman who is about to deliver, I am going to put my focus on the one who is about to deliver.” (HEW-SNNP)

Table 4.1a Health facility, HEW and WDA leaders sample in the baseline (2013), quality of care (2015) and follow-up (2017) surveys

	Baseline survey (2013)	Quality of Care survey (2015)	Follow-up survey (2017)
Health centres	206	117	206
Health posts	206	240	201
HEWs	206	240	335
WDA leaders	605	240	412

Table 4.1b. PHCU: Availability of CBNC-trained staff by catchment population, 2017

	Phase 1 N: 104	Phase 2 N: 102	Total N: 206
HEALTH CENTRES			
Health centre with any CBNC-trained staff, n (%)	62 (60%)	62 (61%)	124 (60%)
Among health centres with trained staff, Mean (SD)			
General population per CBNC-trained health centre worker	18117 (10295)	15045 (9356)	16568 (9913)
Women of reproductive age per CBNC-trained worker	4393 (3393)	3698 (3884)	4045 (3648)
Children under-5 per CBNC-trained worker	2893 (2069)	2286 (1476)	2587 (1813)
HEALTH POSTS	N: 102	N: 99	N: 201
Health posts with CBNC-trained HEWs	78 (75%)	86 (84%)	164 (80%)
Among health posts with trained HEWs at the PHCU level, Mean (SD)			
General population per CBNC-trained HEW	4492 (4158)	3409 (3159)	3924 (3697)
Women of reproductive age per CBNC-trained HEW	1069 (996)	852 (1192)	955 (1105)
Children under-5 per CBNC-trained HEW at the PHCU level	703 (597)	463 (403)	577 (517)

PHCU infrastructure

An assessment of availability of beds at health centres showed that for every 3,000 women of reproductive age, there was one delivery bed. Similarly, for every 2,300 women there was one maternity bed. Piped water and electricity were available in 57% and 67% of health centres, respectively (Table 4.1c).

In the 2017 survey, 61% of health centres did not use their own motorised transport for incoming referrals. Furthermore, 46% of health centres reported that the most recent obstetric referral

from a health post used non-government transport (Table 4.1c).

In health posts, piped water was available in 42% and 19% had electricity. For referrals, two-thirds of health posts reported that they had not communicated with the health centre during their last sick newborn referral and a clear majority (65%) had used a non-government owned vehicle during their last obstetric referral (Table 4.1d).

In the 2014 CBNC service providers qualitative study, participants indicated that the shortage of ambulances was a limitation for referral. This was

Table 4.1c. PHCU: infrastructure - health centre on the day of the survey, 2017

HEALTH CENTRES	Phase 1 N: 104	Phase 2 N: 102	Total N: 206
Infrastructure, n (%)			
Piped water supply	62 (60%)	55 (54%)	117 (57%)
Electricity	78 (75%)	59 (58%)	137 (67%)
Functional steriliser	76 (73%)	72 (71%)	148 (72%)
Functional fridge	92 (88%)	86 (84%)	178 (86%)
Patient toilet	100 (96%)	101 (99%)	201 (98%)
Cell phone signal	91 (88%)	73 (72%)	164 (80%)
Computer with internet access	9 (9%)	11 (11%)	20 (10%)
Consultation rooms with auditory & visual privacy	83 (80%)	81 (79%)	164 (80%)
Type of inpatient beds available at the health centre			
General bed	96 (92%)	98 (96%)	194 (94%)
Maternity bed	89 (86%)	93 (91%)	182 (88%)
Delivery bed	104 (100%)	98 (96%)	202 (98%)
Among health centres with beds: Catchment population by bed availability, Mean (SD)			
Reproductive-age women per maternity bed	2107 (1396)	2399 (1686)	2256 (1554)
Reproductive-age women per delivery bed	2787 (1806)	3099 (2180)	2938 (1997)
Referral transport, n (%)			
Motorised transport for incoming referrals	31 (30%)	49 (48%)	80 (39%)
Type of transport used in last obstetric referral from a health post to the health centre			
Facility owned vehicle	5 (5%)	6 (6%)	11 (5%)
Woreda office owned vehicle	46 (44%)	55 (54%)	101 (49%)
Others	53 (51%)	41(40%)	94 (46%)

further compounded by ambulance drivers who did not respond to calls at night time. HEWs also lacked phones for requesting ambulances and communicating referrals.

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“In the 2014 CBNC service providers qualitative study, participants indicated that the shortage of ambulances was a limitation for referral.”

Table 4.1d. PHCU: infrastructure – health post on the day of the survey, 2017

HEALTH POSTS	Phase 1 N: 102	Phase 2 N: 99	Total N: 201
Infrastructure, n (%)			
Piped water supply	45 (44%)	39 (39%)	84 (42%)
Electricity	21 (21%)	18 (18%)	39 (19%)
Functional steriliser	11 (11%)	14 (14%)	25 (12%)
Functional Fridge	11 (11%)	20 (20%)	31 (15%)
Patient Toilet	87 (85%)	76 (77%)	163 (81%)
Cell phone signals	92 (90%)	75 (76%)	167 (83%)
Referral transport, n (%)			
Type of transport used in last obstetric referral from a health post to the health centre			
Health centre owned vehicle	0 (0%)	1 (1%)	1 (1%)
Woreda office owned vehicle	29 (28%)	41 (41%)	70 (35%)
Other	73 (72%)	57 (58%)	130 (65%)
Referral communication, n (%)			
Last sick newborn referral from health post to health centre			
Facility landline/mobile phone	20 (20%)	36 (36%)	56 (28%)
Phone outside the facility	2 (2%)	0 (0%)	2 (1%)
In person communication	2 (2%)	10 (10%)	12 (6%)
None	78 (76%)	53 (54%)	131 (65%)
HEW accompanied mother and infant	8 (8%)	13 (13%)	21 (10%)

Table 4.1e. PHCU: Medicine and vaccines for neonatal health services, 2017

	Phase 1	Phase 2	Total
HEALTH CENTRES, n (%)	N: 104	N: 102	N: 206
CBNC medicine			
Tetracycline eye ointment	87 (84%)	81 (79%)	168 (82%)
Chlorhexidine	80 (77%)	47 (46%)	127 (62%)
Gentamicin 20 mg/2ml	59 (57%)	45 (44%)	104 (50%)
Gentamicin 80mg/2ml	92 (88%)	93 (91%)	185 (90%)
Amoxicillin suspension (125 mg/5 ml)	92 (88%)	86 (84%)	178 (86%)
Amoxicillin tab 250 (dispersible)	97 (93%)	93 (91%)	190 (92%)
Amoxicillin tab 125 mg (dispersible)	66 (63%)	52 (51%)	118 (57%)
Infant vaccine			
BCG	97 (93%)	96 (94%)	193 (94%)
Polio	101 (97%)	96 (94%)	197 (96%)
Penta	101 (97%)	98 (96%)	199 (97%)
PCV	101 (97%)	98 (96%)	199 (97%)
Rota	100 (96%)	96 (94%)	196 (95%)
HEALTH POSTS, n (%)	N: 102	N: 99	N: 201
CBNC medicine			
Tetracycline eye ointment	45 (44%)	33 (33%)	78 (39%)
Chlorhexidine	25 (25%)	5 (5%)	30 (15%)
Gentamicin 20 mg/2 ml	42 (41%)	28 (28%)	70 (35%)
Amoxicillin suspension (125 mg/5 ml)	36 (35%)	27 (27%)	63 (31%)
Amoxicillin tab 250 mg (dispersible)	73 (72%)	63 (64%)	136 (68%)
Amoxicillin tab 125 mg (dispersible)	40 (39%)	38 (38%)	78 (39%)
Any amoxicillin	85 (83%)	73 (74%)	158 (79%)
Infant vaccine			
BCG	18 (18%)	30 (30%)	48 (24%)
Polio	18 (18%)	29 (29%)	47 (23%)
Penta	18 (18%)	28 (28%)	46 (23%)
PVC	18 (18%)	29 (29%)	47 (23%)
Rota	18 (18%)	29 (29%)	47 (23%)

Medicine and vaccines for the neonatal health services

In the 2017 survey, a high proportion of health centres (90%) had gentamicin 80mg/2ml, which is meant for use at the health centre level. Gentamicin 20 mg/2ml, intended for distribution to health posts, was available in half the health centres, while only 35% of health posts had it in stock on the day of the survey. Four out of five health posts had some form of amoxicillin on the day of the survey (Table 4.1e).

In the CBNC programme managers qualitative study (2015), about half of the participants interviewed indicated that there was no shortage of these drugs, while some reported delays in

the supply of amoxicillin and gentamicin in the right dosage.

“There was some shortage for gentamicin last year and even this medicine (20 mg/2ml) is not available at PFSA [Pharmaceuticals Fund and Supply Agency] and they are under procurement process. But there is some delay in the procurement process.” (Health Centre staff- Amhara)

Programme managers recommended the allocation of a transportation budget to facilitate the regular delivery of these medicines to health centres, to avoid stock-out. Participants also said training on the Integrated Pharmaceuticals Logistics System (IPLS) to strengthen supply chain management was important.



Photo: Medicines, Mekele Health Facility, Tigray, Ethiopia © IDEAS/Christopher Smith 2019

Figure 4.1a: Comparison of CBNC service related drugs at health centre and health post from quality of care (2015) and follow-up (2017) surveys.

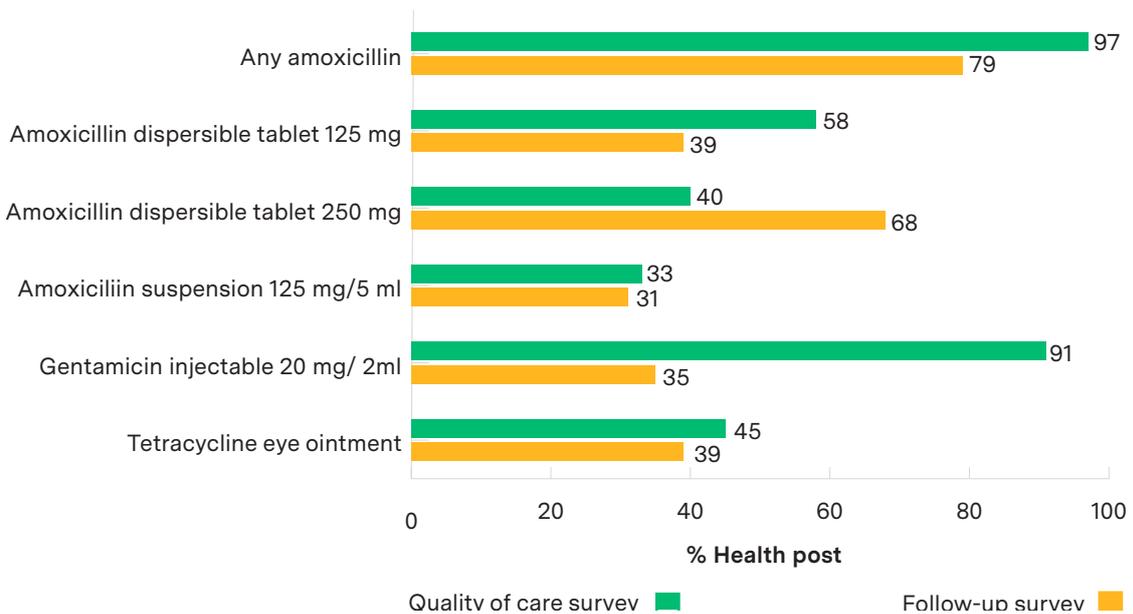
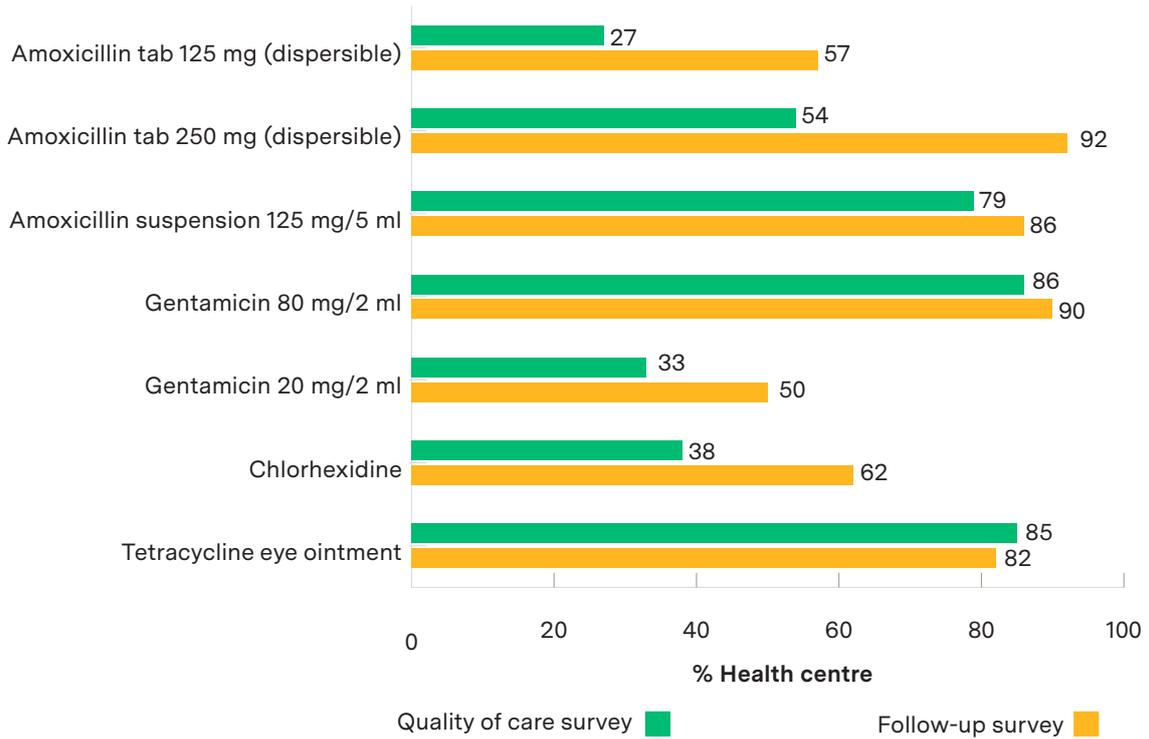
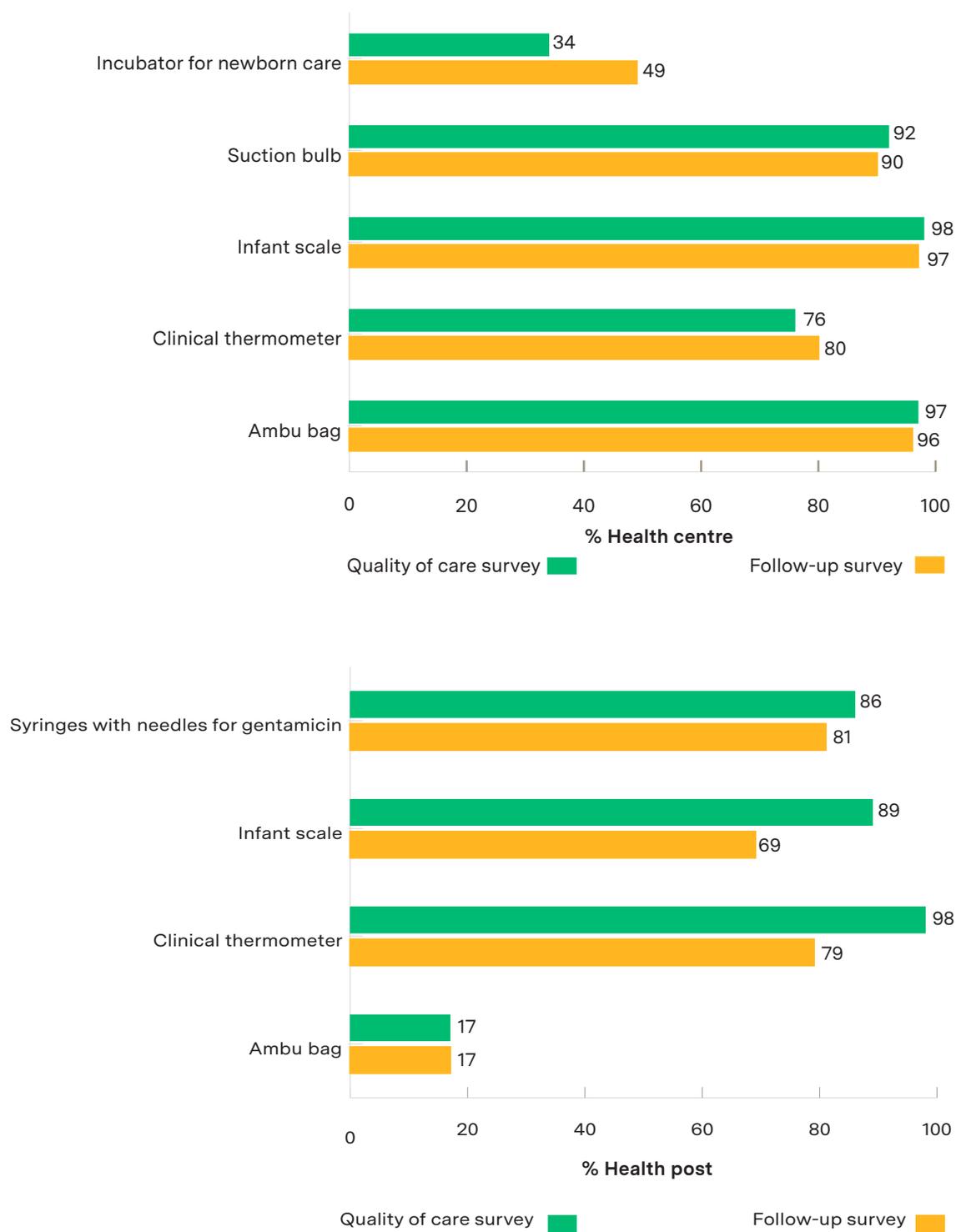


Figure 4.1b: Comparison of CBNC service-related equipment at health centres and health posts from the quality of care (2015) and follow-up (2017) surveys.



“This [IPLS] training has never been given separately. It has been given along with other trainings such as Performance Review and Clinical Mentoring Meeting, Integrated Refresher Training and other similar trainings. Most of the staff are not trained on IPLS.” (NGO participant- SNNP)

At the health post level, programme managers partially attributed the shortage of gentamicin and amoxicillin to ineffective tracking and identification of out of stock medicines by HEWs. They reported inadequate use of bin cards for commodity management. The importance of a refresher training on proper use of bin cards and timely requests by HEWs were said to be necessary to avoid medicine shortages.

Over 90% of health centres in the 2017 survey had readily available vaccines that are given either at birth or six weeks after birth. In health posts however, less than a quarter had a supply of these vaccines on the day of the survey (Table 4.1e).

A comparison of the availability of drugs essential for CBNC services in health centres showed better availability in 2017 (follow-up survey) than in 2015 (quality of care survey). In health posts however, there was less availability of drugs in 2017 compared with 2015 (Figure 4.1a).

Equipment for the neonatal health services

Health centres in the 2017 survey had good availability of equipment needed for newborn care

Table 4.1f. PHCU: Equipment and supplies for the neonatal health services, 2017

HEALTH CENTRES, n (%)	Phase 1 N:104	Phase 2 N: 102	Total N: 206
Equipment			
Ambu bag (full size 0 and 1)/Face mask	99 (95%)	98 (86%)	197 (96%)
Clinical thermometer – digital	88 (85%)	77 (75%)	165 (80%)
Infant scales	101 (97%)	99 (97%)	20 (97%)
Suction bulb for newborn care	95 (91%)	90 (88%)	185 (90%)
Radiant warmer for newborn care	64 (62%)	37 (36%)	101 (49%)
Space for kangaroo mother care	53 (51%)	27 (26%)	80 (39%)
Infection prevention			
Safe final disposal of sharps	98 (94%)	98 (96%)	196 (95%)
Safe final disposal of infectious waste	101 (97%)	100 (98%)	201 (98%)
Guidelines for standard precautions	78 (75%)	72 (71%)	150 (73%)
HEALTH POSTS, n (%)	N: 102	N: 99	N: 201
Equipment and supplies			
Ambu bag / face mask (full size 0 and 1)	15 (15%)	19 (19%)	34 (17%)
Clinical thermometer, digital	76 (75%)	83 (84%)	159 (79)
Infant scales	66 (65%)	72 (73%)	138 (69%)
Syringe with needle for gentamicin injection	83 (81%)	79 (89%)	162 (81%)
Infection prevention			
Sharps container	94 (92%)	93 (94%)	187 (93%)
Safe disposal of infectious waste	58 (57%)	61 (62%)	119 (59%)

Table 4.1g. PHCU: Record keeping supplies for neonatal health services, 2017

HEALTH CENTRES, n (%)	Phase 1 N: 104	Phase 2 N: 102	Total N: 206
Family health guides	95 (91%)	88 (87%)	183 (89%)
Vaccination cards	88 (85%)	86 (84%)	174 (84%)
Stock cards/bin cards	100 (96%)	92 (90%)	192 (93%)
Health Management Information System forms	100 (96%)	99 (97%)	199 (97%)
Request and re-supply forms	93 (89%)	86 (84%)	179 (87%)
Supervision checklist	95 (91%)	92 (90%)	187 (91%)
Chart booklet	94 (90%)	94 (92%)	188 (91%)
Birth preparedness & complication readiness (BPCR) forms	83 (80%)	84 (82%)	167 (81%)
PNC registration book	97 (93%)	95 (93%)	192 (93%)
HEALTH POSTS, n (%)	N: 102	N: 99	N: 201
Family health guides	83 (81%)	78 (79%)	161 (80%)
Vaccination cards	89 (87%)	82 (83%)	171 (85%)
Family folders	93 (91%)	86 (87%)	179 (89%)
Stock cards/bin cards	83 (81%)	69 (70%)	152 (76%)
Health Management Information System forms	86 (84%)	81 (82%)	167 (83%)
Request and re-supply forms	65 (64%)	48 (48%)	113 (56%)
Chart booklet	80 (78%)	86 (87%)	166 (83%)
Pregnant woman registration book	94 (92%)	92 (93%)	186 (93%)

apart from a radiant warmer (49%) and space for kangaroo mother care (39%). At health posts, 80% had a thermometer while only two-thirds had infant weighing scales and 16% had an Ambu bag (Table 4.1f). A participant in the 2015 programme managers qualitative study said the following with respect to thermometers:

“Thermometers do not work in many facilities. We are not getting items of good quality.” (Health centre staff member- Oromia)

In addition, some participants stated that there were insufficient weighing scales, particularly for young infants. They complained that they had not received scales, despite requesting them on multiple occasions.

Looking at CBNC-related equipment, a comparison of the quality of care (2015) and follow-up survey (2017) findings showed that at health centres the availability remained the same except for a warmer for newborns, which increased from 34% to 49% (Figure 4.1b). In health posts however, compared with 2015, in 2017 there was less availability of key equipment necessary for providing newborn care (Figure 4.1b).

Record keeping supplies for the neonatal health services

At health centres in the 2017 survey, the availability of supplies for record keeping was sufficient. Similar findings were also present at health posts, with the exception of stock/bin cards (75%) and request and resupply forms (56%) (Table 4.1g).

Table 4.2a. CBNC services: continuing professional education in neonatal health - refresher trainings in last 12 months, 2017

	Phase 1	Phase 2	Total
HEWs, n (%)	N: 164	N: 171	N: 335
Training contents			
Postnatal care for the newborn	18 (11%)	45 (26%)	63 (19%)
Managing asphyxia	8 (5%)	30 (18%)	38 (11%)
Clean cord care	15 (9%)	30 (18%)	45 (13%)
Managing VSD cases	10 (6%)	30 (18%)	40 (12%)
Managing local bacterial infection	9 (5%)	34 (20%)	43 (13%)
Managing jaundice/severe jaundice	6 (4%)	31 (18%)	37 (11%)
Managing diarrhoea	14 (9%)	37 (22%)	51 (15%)
WDA LEADERS, n (%)	N: 209	N: 203	N: 412
WDA orientation in MNCH* in the last 12 months			
Providing home visits	55 (26%)	56 (26%)	111 (27%)
Referring for PNC care	49 (23%)	52 (26%)	101 (25%)
Educating on danger signs for young infants	51 (24%)	51 (25%)	102 (25%)
Referring sick young infants	51 (24%)	43 (21%)	94 (23%)

* MNCH – Maternal, newborn and child health

Table 4.2b. CBNC services: supervisory staff ratio and social network within the PHCU, 2017

	Phase 1	Phase 2	Total
HEALTH CENTRES, Mean (SD)	N:104	N:102	N: 206
Supervisory ratio: per CBNC-trained health centre staff			
Number of CBNC-trained HEWs	6 (4)	9 (6)	7 (5)
HEALTH POSTS, Mean (SD)	N: 102	N: 99	N: 201
Number of WDA	163 (99)	167 (98)	330 (99)
Supervisory ratio: per HEW at health post level			
Number of WDA 1-5 leaders	78 (40)	61 (38)	69 (40)
Number of WDA 1-30 leaders	15 (8)	11 (8)	13 (8)

4.2 Technical Support and Staff Potential to Provide CBNC Services

Under technical support for staff and their potential to provide CBNC services, in the 2017 survey we assessed continuing professional education for health workers, as well as their supervision, satisfaction, motivation and knowledge. Furthermore, in Appendix I we present an accompanying study on the pattern of seeking and giving of professional advice related to CBNC services among health providers within a PHCU.

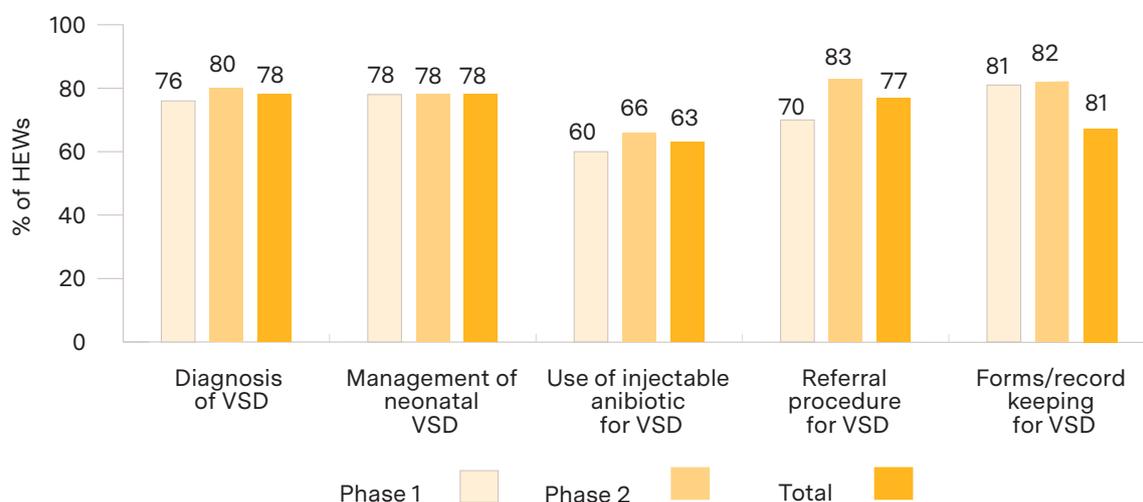
Continuing professional education in neonatal health

The 2017 survey assessed the continuing professional education for HEWs and WDA leaders on neonatal health by assessing their training and clinical mentoring in the 12 months preceding the survey. Only 19% of women reported attending a refresher training and among them, less than 15% of HEWs reported any refresher training on the components of newborn and sick young

infant care. Only 12% of HEWs reported getting a refresher training on management of young infants with very severe disease. Furthermore, training was more available for health workers in Phase 2 areas than in Phase 1 areas. For WDA leaders, only one-third reported receiving orientation in the 12 months preceding the survey and approximately a quarter said their orientation included components of newborn care including referral of sick young infants (Table 4.2a).

In the 2017 survey, of the HEWs that attended a performance review and clinical mentoring meeting in the six months preceding the survey, over three-quarters reported that diagnosis, management referral and record keeping for very severe disease were discussed. The use of injectable antibiotics was the least (63%) discussed component (Figure 4.2a). Participants from the 2015 CBNC programme managers qualitative study indicated that insufficient budget was allocated for these meetings, limiting the frequency with which they were held.

Figure 4.2a. Very severe disease (VSD) related content of performance review and clinical mentoring meetings for HEWs that attended a meeting in the six months preceding the survey, 2017



Supportive supervision

With respect to the availability of staff to provide supportive supervision in the 2017 survey, on average there were seven HEWs delivering CBNC services for every one CBNC-trained health centre staff. With respect to WDA leader to HEW ratio per kebele, on average, there were 69 WDA 1-5 network leaders and 13 development team leaders per HEW (Table 4.2b).

Most participants from the CBNC programme managers qualitative study (2015) noted the insufficient numbers of woreda and health centre staff trained in CBNC and highlighted the importance of training all staff treating under-5 children. Two participants who received CBNC training said they were insufficiently trained on the provision of supportive supervision and assessment of HEWs' technical skills. NGO interviewees also indicated some frustration with high staff turnover, which required the need for continued training.

Over half (57%) of the HEWs received supportive supervision from woreda-level in the six months preceding the survey. Health centre to health post supervision in the same period was high (82%). Around three-quarters of health posts had received a supervisory visit in the last month. Where visits were taking place, they happened in a consistent manner, with an average of seven visits in six months, four in three months and two per month. (Table 4.2c).

With respect to content, immediate newborn care was the least discussed aspect of a supportive supervisory visit (32%). The management and diagnosis of very severe disease was discussed among half the HEWs and antibiotics use with only 38%. Referral and record keeping, however, was discussed with over 60% of HEWs and 88%

reported that the visit included an observation of their record keeping. Observation of a HEW's client interaction was reported by less than two thirds of HEWs. Eighty percent of HEWs reported that they had received written feedback and our survey staff were able to verify 70% of the feedback forms (Table 4.2c).

In the CBNC service providers qualitative study (2014), some HEWs felt that the extent of the health centres' support and feedback on very severe disease management was limited to the checking of drug availability. Overall, some HEWs felt that they did not get sufficient feedback and support on their CBNC-related work. Woreda staff also reported that health centre staff did not show sufficient ownership of the CBNC programme, viewing it as an NGO-led programme. Participants from the 2015 CBNC programme managers qualitative study mentioned the use of a generic form for health post supervision:

"We don't have a standard checklist rather we use a check list prepared by ourselves." (Health centre staff member- Amhara)

Managers were not able to provide a CBNC specific form as some supervisors were untrained and incapable of providing programme focussed supervision. A few stated HEWs were better trained in CBNC than health centre and woreda staff.

Compared with the quality of care study, more HEWs reported receiving supportive supervision during the follow up survey (Figure 4.2b), particularly a visit in the past month (48% vs 73%). In addition, the extent to which the supportive supervision covered the nine areas of the CBNC programme also showed improvement (Figure 4.2c).

Table 4.2c. CBNC services: supportive supervision during last 6 months, 2017

HEWs	Phase 1 N: 164	Phase 2 N: 171	Total N: 335
Supportive supervision provided by, n (%)			
Health Ministry (federal, region, zone)	39 (24%)	30 (18%)	69 (21%)
Woreda health office	102 (62%)	88 (2%)	190 (57%)
PHCU/health centre	144 (88%)	132 (77%)	276 (82%)
NGO	31 (18%)	27 (16%)	58 (17%)
None	13 (8%)	32 (19%)	65 (19%)
Number of health posts visited by any supervisor, n (%)			
6 months	151 (92%)	139 (81%)	290 (87%)
3 months	149 (91%)	131 (84%)	280 (77%)
1 month	135 (82%)	109 (64%)	244 (73%)
If yes- number of visits by any supervisor, Mean (SD)			
6 months	8.48 (8%)	6.29 (7%)	7.43 (7%)
3 months	4.49 (4%)	3.54 (4%)	4.04 (4%)
1 month	1.79 (2%)	1.86 (2%)	1.82 (2%)
Discussion by CBNC component among those receiving visits in the last 6 months, n (%)			
I: Early identification of pregnancy	140 (93)	120 (86%)	260 (90%)
II: Provision focussed ANC	146 (97)	120 (86%)	266 (92%)
III. Institutional delivery	147 (97)	119 (86%)	266 (92%)
IV: Safe and clean delivery	109 (72)	103 (74%)	212 (73%)
V: Immediate newborn care including cord care (chlorohexidine)	62 (41)	32 (23%)	94 (32%)
VI. Recognition of asphyxia, initial stimulation and resuscitation of newborn babies	67 (44)	51 (37%)	118 (41%)
VII. Prevention and management of hypothermia	60 (40%)	57 (41%)	117 (40%)
VIII. Management of pre-term and/or low birth weight neonates	68 (45%)	58 (42%)	126 (43%)
IX: Management neonatal VSD at the community level			
Management	92 (61%)	73 (53%)	165 (57%)
Correct diagnosis	92 (61%)	71 (51%)	163 (56%)
use of injectable antibiotic	68 (45%)	41 (30%)	109 (38%)
forms/record keeping	97 (64%)	93 (67%)	190 (66%)
Referral procedure	93 (62%)	88 (63%)	181 (62%)
Administrative, n (%)			
Discussing HEW activities with WDA	129 (85%)	100 (71.94)	229 (79%)
Observing record keeping	138 (91%)	116 (83.45)	254 (88%)
Checking training manuals, job aids, request forms	99 (66%)	94 (67.63)	193 (67%)
Delivering training manuals, job aids, request forms	85 (56%)	90 (64.75)	175 (60%)
Mentoring, n (%)			
Observing client interaction with HEW	87 (58%)	93 (67%)	180 (62%)
Conducted postnatal household visits together to observe HEWs skill on checking general danger signs	91 (60%)	79 (57%)	170 (59%)
Providing written feedback	134 (89%)	98 (71%)	232 (80%)
Written feedback: copy of the last visit checked by the interviewer	117 (77%)	85 (61%)	202 (70%)

Satisfaction with training and supervision

In the 2017 survey, we assessed HEWs' satisfaction with CBNC training in the last 12 months and supportive supervision in the last six months. Among the 17% that had received a CBNC training in the last 12 months, 41% were fully satisfied. HEWs reported that more training aids and increased frequency of trainings would improve the quality of training. Half the participants from the CBNC programme managers qualitative study (2015) also indicated that the CBNC training could be improved by adding more days for practical training and including a demand creation component. A few health centre and NGO members also stated the need for quarterly refresher trainings.

On the topic of supportive supervision, HEWs who were fully satisfied appreciated the regularity of visits (94%). Over 80% of all HEWs however, said that the quality of these visits could be improved if more visits included discussions on technical aspects of services (Table 4.2d).

In the 2017 survey, among the 138 WDA leaders who had reported maternal, newborn and child health (MNCH) orientation in the past year, six out of 10 were fully satisfied with the MNCH orientation they had received. Among them, only half felt that the training had sufficient training aids and approximately 20% felt that there was insufficient post-training supervision (Table 4.2e).

Figure 4.2b. Comparison of supportive supervision reported by HEWs from quality of care (2015) and follow-up (2017) surveys.

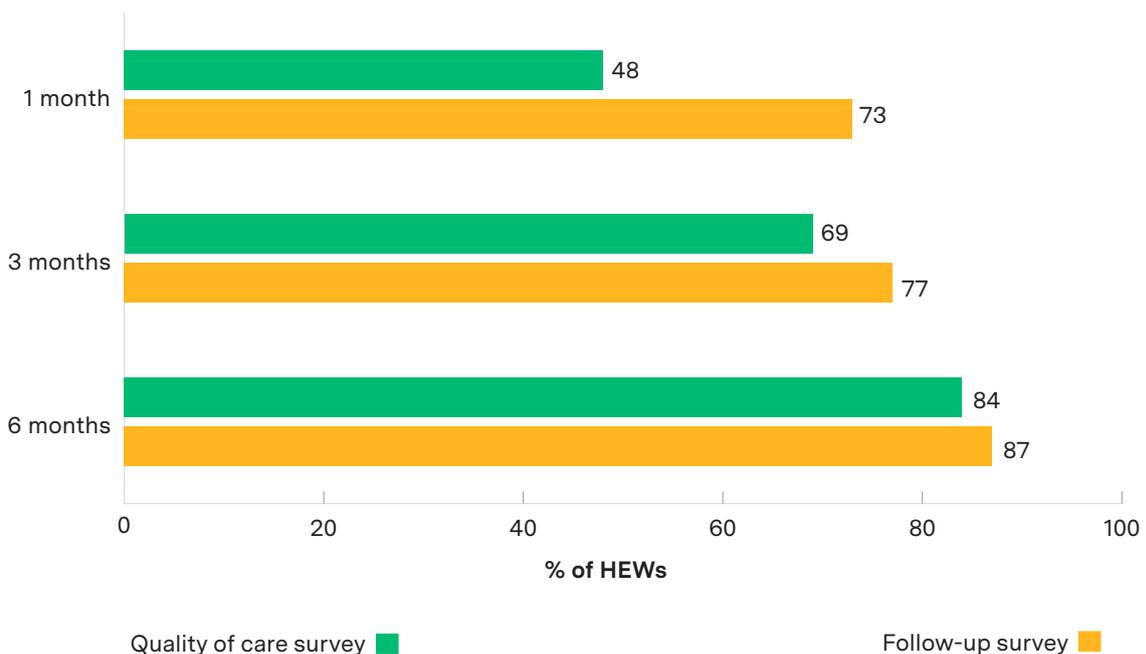
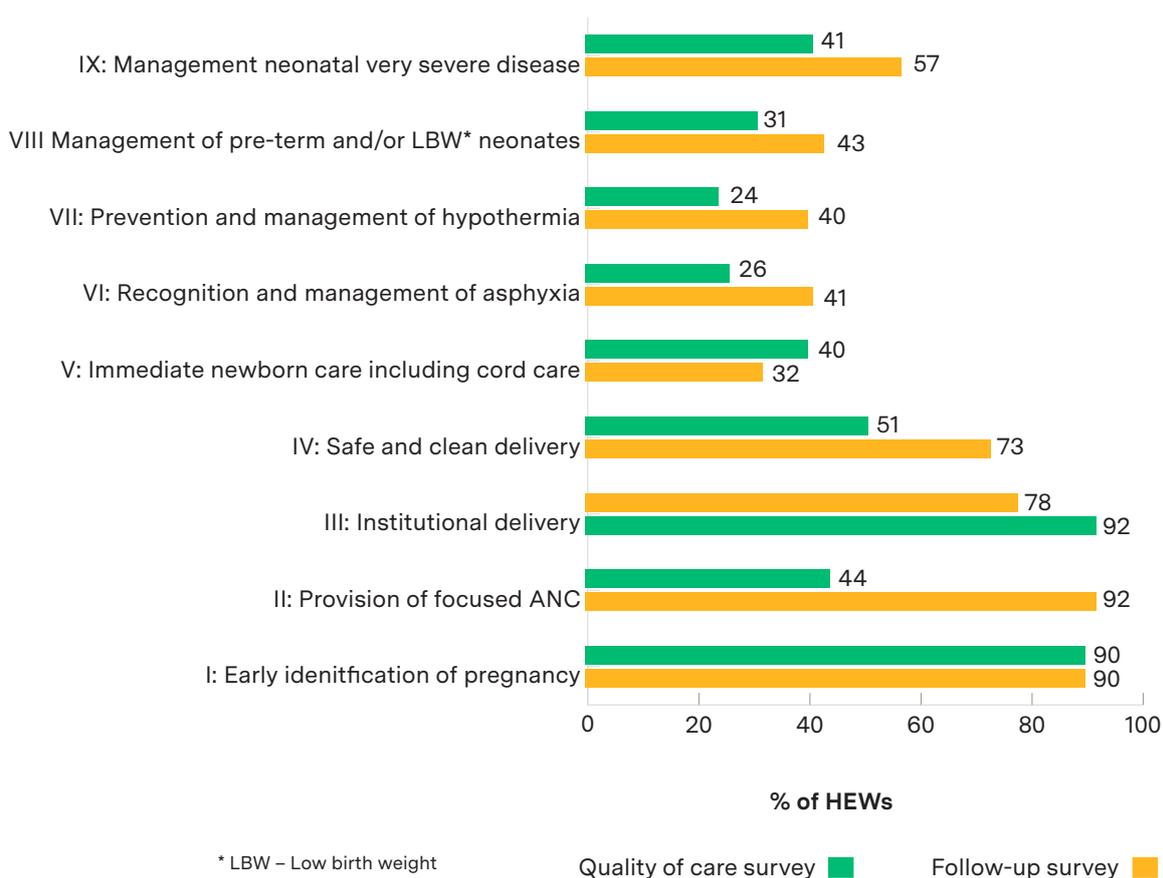


Figure 4.2c: Comparison of content of supportive supervision reported by HEWs from quality of care (2015) and follow-up (2017) surveys.



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“In the 2017 survey, we assessed HEWs’ satisfaction with CBNC training in the last 12 months and supportive supervision in the last six months. Among the 17% that had received a CBNC training in the last 12 months, 41% were fully satisfied. HEWs reported that more training aids and increased frequency of trainings would improve the quality of training.”

Table 4.2d. CBNC services: HEW satisfaction level with training and supportive supervision, 2017

HEWs, n (%)	Phase 1 N: 164	Phase 2 N: 171	Total N: 335
CBNC training received in last 12 months	10 (6%)	49 (29%)	59 (18%)
Among CBNC-trained HEWs, satisfaction level with the quality of training in last 12 months			
Fully satisfied	4 (40%)	20 (41%)	24 (41%)
Reasons			
Sufficient training	2 (50%)	20 (100%)	22 (92%)
Sufficient practice sessions	2 (50%)	20 (100%)	22 (92%)
Sufficient training aids	3 (75%)	19 (95%)	22 (92%)
Sufficient post-training supervision	3 (75%)	19 (95%)	22 (92%)
Fully dissatisfied	1 (10%)	1 (2%)	2 (3%)
Reasons			
Insufficient training	1 (100%)	0 (0%)	1 (50%)
Insufficient practice sessions	1 (100%)	1 (100%)	2 (100%)
Insufficient training aids	1 (100%)	0 (0%)	1 (50%)
Insufficient post-training supervision	1 (100%)	0 (0%)	1 (50%)
Means to improve quality of training			
More training	9 (90%)	44 (90%)	53 (90%)
More practice sessions	7 (70%)	46 (94%)	53 (90%)
More training aids	8 (80%)	47 (96%)	55 (93%)
More post-training supervision	9 (90%)	44 (90%)	53 (90%)
Satisfaction level with the supportive supervision received in last 6 months			
Fully satisfied	47 (29%)	44 (26%)	91 (27%)
Reasons			
Sufficient visits	42 (89%)	44 (100%)	86 (95%)
Sufficient crash trainings	36 (77%)	34 (77%)	70 (77%)
Sufficient technical supervision	37 (79%)	34 (77%)	71 (78%)
Fully dissatisfied	5 (3%)	12 (7%)	17 (5%)
Reasons			
Insufficient visits	5 (100%)	11 (92%)	16 (94%)
Insufficient crash trainings	3 (60%)	11 (92%)	14 (82%)
Insufficient technical supervision	3 (60%)	11 (92%)	14 (82%)
Means to improve quality of supervision			
More visits	140 (85%)	139 (81%)	279 (83%)
More crash trainings	144 (88%)	145 (85%)	289 (86%)
More technical supervision	138 (84%)	142 (83%)	280 (84%)

Table 4.2e. CBNC services: WDA leader satisfaction with orientation and supportive supervision, 2017

WDA LEADERS, n (%)	Phase 1 N: 209	Phase 2 N: 203	Total N: 412
WDA orientation in MNCH in the last 12 months	72 (34%)	66 (33%)	138 (34%)
Among those trained, satisfaction with MNCH orientation in last 12 months			
Fully satisfied	50 (69%)	34 (52%)	84 (61%)
Reason			
Sufficient training	49 (98%)	33 (97%)	82 (98%)
Sufficient practice sessions	44 (88%)	31 (91%)	75 (89%)
Sufficient training aids	22 (44%)	23 (68%)	45 (54%)
Sufficient post-training supervision	39 (78%)	28 (82%)	67 (80%)

Table 4.2f. CBNC services: Motivation status of HEWs to deliver community health services, 2017

HEWs, Mean % (SD)	Phase 1 N: 164	Phase 2 N: 171	Total N: 335
Overall Motivation of HEWs about delivering CBNC services	69% (8)	72% (10)	70% (9)
Domains of Motivation			
Commitment (dedication for job)	50% (12)	59% (16)	54% (15)
Intrinsic job satisfaction (value of service provision role)	76% (14)	78% (17)	77% (16)
Personal issues (ability to overcome personal problems to deliver services)	69% (17)	67% (21)	68% (19)
Drive (enthusiasm to provide service):	59% (19)	62% (24)	60% (22)
Job satisfaction (fulfilment with work and colleagues)	77% (16)	83R (16)	80% (16)
Organisation commitment (value being part of the health system)	79% (13)	82% (16)	80% (15)

Motivation to deliver community health services

HEWs' motivation was also assessed in the follow-up survey. Motivation was conceptualised as being multidimensional and looked at HEWs' level of commitment, drive and resourcefulness to deliver the community-based services. The key domains that were assessed are briefly defined in Table 4.2f. The measurements shown represent the mean and standard deviations of the percentile scores. Overall, the HEWs' level of motivation to deliver CBNC services was relatively high (70%) – i.e. about two-thirds of the optimal level. The domains of HEWs' motivation which showed relatively lowest scores were issues related to lack of support: a) enabling HEWs to remain dedicated to health system job (commitment) and b) maintaining persistent enthusiasm to provide services (drive).

Extrinsic job satisfaction

HEWs' motivation was also assessed in the 2014 CBNC service providers qualitative study. HEWs reported that the CBNC training had allowed them to provide curative services, changing the communities' association of HEWs only with hygiene-related work (e.g. building latrines). This in turn had increased their job satisfaction.

“Assisting in the recovery of a three-day newborn with a very severe disease gives me great satisfaction. If I had not found him early enough and given him treatment, he may have died.” (HEW-Amhara)

Intrinsic job satisfaction and drive

Participants also stated that they were proud to be HEWs. After initially expressing their pride, however, some HEWs listed the difficulties associated with their job.

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“Overall, the HEWs' level of motivation to deliver CBNC services was relatively high (70%) – i.e. about two-thirds of the optimal level.”



Photo: Mother and her baby being seen by a health worker at Addis Kidam Health Post
 © IDEAS/Christopher Smith 2019

“Of course, our job is valuable to the community, and it has had beneficial effects. However, working as HEW in rural communities is tiresome.” (HEW-Oromia)

Personal issues

Most HEWs indicated dislike for their hygiene and sanitation work. Furthermore, their performance was assessed more on their hygiene rather than their maternal and child health (MCH) activities, which demotivated them from carrying out other aspects of their work.

“...even if we show successful results in MCH, my performance is assessed or I get a higher performance score based on the change I have made in hygiene.” (HEW-Amhara)

Some HEWs even stated that they would only visit a newborn if they heard that the baby was sick.

Commitment

HEWs also identified the heavy workload they have as a demotivating factor. This was compounded by inadequate support and encouragement within the PHCU. Furthermore, HEWs said that their salary was not commensurate with the amount of work that they are required to perform. A drastic difference was said to exist between themselves and other development workers. Despite starting their careers at the same time, other government employees, such as agricultural extension workers and teachers, were said to be relatively better off in terms of salary and location of work. The HEWs' position was said to have a low ceiling for growth.

“Even after being educated, a HEW has no change in salary. A person must work and change; to be educated and grow like other workers.” (HEW-Amhara)



Knowledge and understanding of newborn care

Three-quarters of HEWs in the 2017 survey correctly stated that women should be visited within one day of delivery, while over 85% indicated visits on day 3 and day 7. In contrast, less than 15% of WDA leaders correctly identified

the timing of PNC visits (Table 4.2g). In the 2014 CBNC service providers qualitative study, “lack of delivery notification from WDA leaders” was a reason given by HEWs for their delayed contact with newborns.

Table 4.2g. Understanding newborn care: Knowledge of the timing of the postnatal home visits, 2017

HEWs, n (%)	Phase 1 N: 164	Phase 2 N: 171	Total N: 335
Day 1	127 (77%)	123 (72%)	250 (75%)
Day 3	153 (93%)	156 (91%)	309 (92%)
Day 7	150 (91%)	136 (80%)	286 (85%)
Day 42	115 (70%)	90 (53%)	205 (61%)
WDA LEADERS, n (%)	N: 209	N: 203	N: 412
Day 1	19 (9%)	41 (20%)	60 (15%)
Day 3	21 (10%)	29 (14%)	50 (12%)
Day 7	7 (3%)	23 (11%)	30 (7%)
Day 42	10 (5%)	25 (12%)	35 (9%)

Table 4.2h. Understanding of very severe disease (VSD): Knowledge of identifying the danger signs by CBNC service providers, 2017

HEWs, n (%)	Phase 1 N: 164	Phase 2 N: 171	Total N: 335
Signs for VSD in young infants			
Convulsions	49 (30%)	92 (54%)	141 (42%)
Stopped feeding or significantly reduced feeding	73 (45%)	85 (50%)	158 (47%)
Severe chest in-drawing	47 (28%)	61 (36%)	108 (32%)
Fast breathing	74 (45%)	102 (60%)	176 (53%)
Temperature with 37.5 or more	44 (27%)	60 (35%)	104 (31%)
Temperature less than 35.5 (cold)	25 (16%)	43 (25%)	68 (20%)
No or very limited movement on stimulation	32 (20%)	33 (19%)	65 (19%)
WDA LEADERS, n (%)	N: 209	N: 203	N: 412
Signs for VSD in young infants			
Convulsions	36 (17%)	63 (31%)	99 (24%)
Stopped feeding or significantly reduced feeding	57 (27%)	47 (23%)	104 (25%)
Severe chest in drawing	11 (5%)	34 (17%)	45 (11%)
Fast breathing	35 (17%)	45 (22%)	80 (19%)
Fever	80 (38%)	78 (38%)	158 (38%)
No or very limited movement on stimulation	13 (6%)	8 (4%)	22 (5%)

With respect to HEWs' unprompted knowledge of very severe disease danger signs, in the 2017 survey, five out of 10 HEWs mentioned fast breathing. The remaining six signs and symptoms were mentioned by less than half of the interviewed HEWs. Among WDA leaders, 38% had unprompted knowledge of fever as a very severe disease danger sign. The remaining symptoms

were identified by less than a quarter of WDA leaders (Table 4.2h).

A comparison between the quality of care and follow-up surveys shows that HEWs' unprompted knowledge of very severe disease danger signs decreased, while WDA leaders' knowledge remained more or less the same (Figure 4.2d)

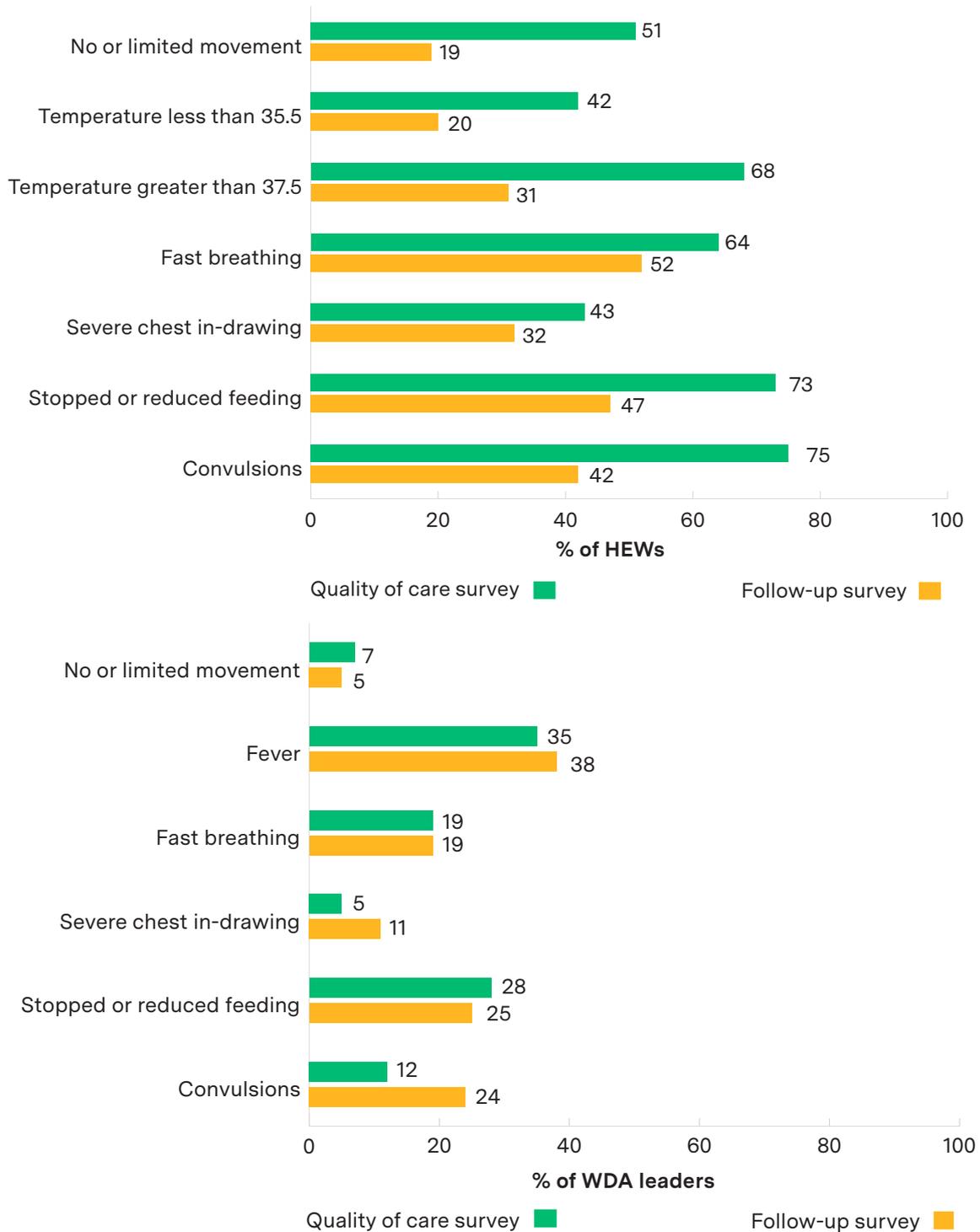
Table 4.2i. Understanding very severe disease (VSD): Management by CBNC service provider, 2017

HEWs, n (%)	Phase 1 N: 164	Phase 2 N: 171	Total N: 355
Steps to take when the young infant presents signs of VSD			
Continue to breastfeed/give expressed milk	43 (26%)	47 (27%)	90 (27%)
Pre-referral dose of amoxicillin	36 (22%)	50 (29%)	86 (26%)
Pre-referral dose of gentamicin	29 (18%)	49 (29%)	78 (23%)
Refer urgently	92 (56%)	118 (69%)	210 (63%)
If referral not possible, treat with amoxicillin for 7-days	8 (5%)	37 (22%)	45 (13%)
If referral not possible, treat with gentamicin for 7-days	14 (9%)	28 (16%)	42 (13%)

Table 4.2j. Understanding very severe disease (VSD): Effective use of family health guide for Identification of neonatal danger signs by HEWs, WDA leaders and mothers, 2017

HEWs, n (%)	Phase 1 N: 164	Phase 2 N: 171	Total N: 355
Family health guide used	158 (96%)	169 (99%)	327 (98%)
VSD			
Lethargic/unconscious baby	91 (55%)	112 (66%)	203 (61%)
Baby with breathing problem	61 (37%)	77 (45%)	138 (41%)
Increase breastfeeding frequency during illness	75 (46%)	105 (61%)	180 (54%)
WDA LEADERS, n (%)			
Family health guide used	168 (80%)	133 (66)	301 (73%)
VSD			
Lethargic/unconscious baby	48 (23%)	36 (18)	84 (20%)
Baby with breathing problem	31 (15%)	14 (7)	45 (11%)
Increase breastfeeding frequency during illness	53 (25%)	45 (22)	98 (24%)
MOTHERS, n (%)			
Family health guide used	241 (44%)	169 (31.71)	410 (38%)
VSD			
Lethargic/unconscious baby	76 (14%)	66 (12.36)	142 (13%)
Baby with breathing problem	53 (10%)	50 (9.36)	103 (10%)
Increase breastfeeding frequency during illness	97 (18%)	92 (17%)	189 (18%)

Figure 4.2d. Comparison of knowledge of very severe disease danger signs by HEWs and WDA leaders from quality of care (2015) and follow-up (2017) surveys.



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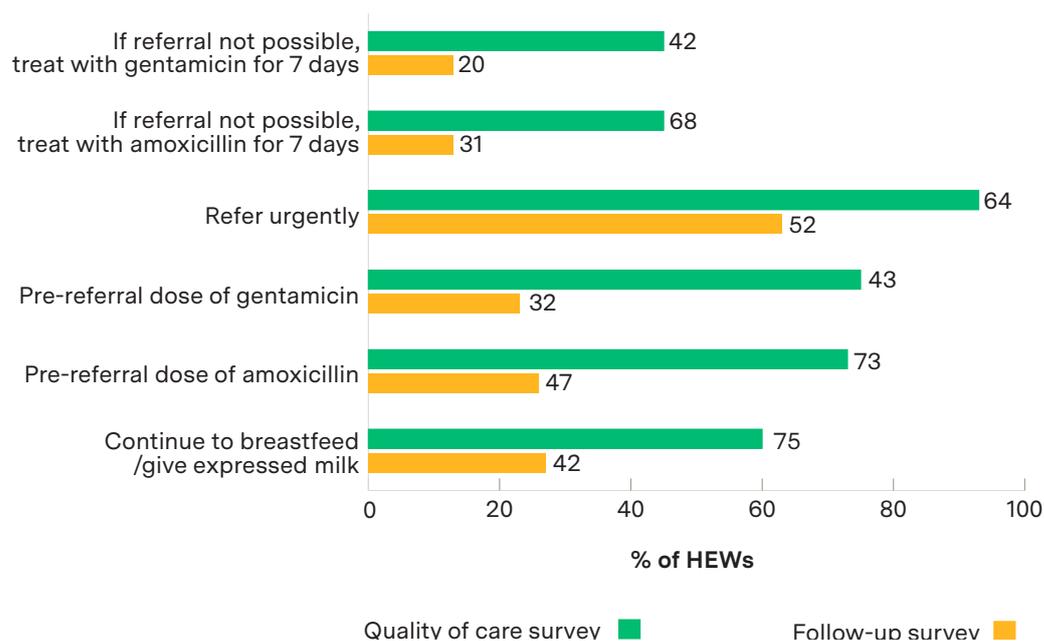
“A comparison between the quality of care and follow-up surveys shows that HEWs’ unprompted knowledge of very severe disease danger signs decreased, while WDA leaders’ knowledge remained more or less the same ”

With respect to unprompted knowledge of very severe disease management, in the 2017 survey, 6 out of 10 HEWs said to refer urgently. The remaining steps however, including treatment of very severe disease cases with antibiotics, was mentioned by a quarter or less of all HEWs (Table 4.2i). A comparison between quality of care study and follow-up surveys showed a decrease of HEWs’ unprompted knowledge (Figure 4.2e).

Mothers with a recent delivery, WDA leaders and HEWs in the 2017 survey were asked if they had

ever used the family health guide (a job aid for behaviour change communication) and those that had were asked to describe images relating to newborn and sick young infants. Around one-third of mothers, three-quarters of WDA leaders and almost all HEWs (98%) reported ever using the family health guide. Less than one in five mothers could describe images related to very severe disease signs and symptoms with the proportion increasing slightly among WDA leaders. HEWs had better but still sub-optimal understanding of the images (Table 4.2j).

Figure 4.2e. Comparison of knowledge of very severe disease management by HEWs from quality of care (2015) and follow-up (2017) surveys.



4.3 Cultural Context and Community Participation in CBNC Services

The 2017 survey assessed HEWs and WDA leaders' knowledge of newborn isolation customs in their community and measured the existence of this practice among mothers with a delivery in the 3-15 months preceding the survey. Only 31% of HEWs and 26% of WDA leaders said mothers practiced newborn isolation, whereas 85% of mothers reported this practice for their recent birth. Mothers reported that newborns were kept at home on average for 46 days post-delivery, whereas HEWs and WDA leaders said it was approximately 20 days (Table 4.3a).

Another activity that connects HEWs and WDA leaders with mothers is the pregnant women's conference. In the 2017 survey, in the three months preceding the survey, only 36% of the WDA leaders said they had participated in a pregnant women's conference, compared with 93% of the HEWs. Among HEWs and WDA leaders who participated, frequency of participation was reported to be monthly. HEWs reported that on average 17 pregnant women attended the most recent conference (Table 4.3b).



Photo: Health post, Tigray, Ethiopia © IDEAS/Christopher Smith 2019

Table 4.3a. CBNC context: Knowledge and custom of community practice of newborn isolation as reported by HEWs, WDA leaders and mothers, 2017

	Phase 1 N: 164	Phase 2 N: 171	Total N: 355
HEWs			
Mothers in kebele practicing isolation of newborns from outside contact, n (%)	43 (26%)	60 (35%)	103 (31%)
Among HEWs reporting presence of the practice			
No. of days' newborns kept at home, Mean (SD)	22 (18)	18 (19)	20 (19)
WDA LEADERS	N: 209	N: 204	N: 421
Mothers in network practicing isolation of newborns from outside contact, n (%)	51 (24%)	57 (28%)	108 (26%)
Among WDA leaders reporting presence of the practice			
Number of days newborns kept at home, Mean (SD)	22 (19)	21 (20)	22 (20)
MOTHERS	N: 541	N: 534	N: 1076
Mothers' practice of isolating her newborn from outside contact, n (%)	464 (86%)	453 (85%)	917 (85%)
Among mothers participating			
Number of days newborns kept at home, Mean (SD)	68 (17)	24 (67)	46.37 (137)

Table 4.3b. CBNC context: Status of pregnant women's conference in three last months, 2017

	Phase 1 N: 164	Phase 2 N: 171	Total N: 335
HEWs			
Organised pregnant women's conference in the last 3 months, n (%)	150 (91%)	160 (94%)	310 (93%)
Among organised, how often, n (%)			
Once a month	115 (77%)	146 (91%)	261 (84%)
More frequently	32 (21%)	11 (7%)	43 (14%)
Less frequently	3 (1%)	3 (2%)	6 (2%)
Among organised, pregnant women in network during last conference, Mean (SD)	35 (19)	23 (20)	29 (20)
How many attended, Mean (SD)	21 (9)	14 (9)	17 (10%)
WDA LEADERS	N: 209	N: 203	N: 412
Organised pregnant women's conference in the last 3 months, n (%)	84 (40%)	65 (32%)	149 (36%)
Among organised in the last three months, n (%)	59 (70%)	51 (78 %)	110 (74%)
Among organised, how often, n (%)			
Once a month	38 (64%)	46 (90%)	84 (76%)
More frequently	19 (32%)	4 (8%)	23 (21%)
Less frequently	2 (3%)	1 (2%)	3 (3%)
Among organised, pregnant women in network during last conference, Mean (SD)	6 (12)	4 (7)	5 (1)
How many attended, Mean (SD)	5(8)	4 (5)	4 (7)

4.4 Health Facility Documentation on the Management of Sick Young Infants

The 2017 study reviewed the registers for 0-2 month old babies both at health posts and health centres to assess case volume, completion of registers and management of very severe disease cases, as well as their registered outcome.

Sick young infant documentation: volume of cases

Registers were not available in 3% of health centres and 9% of health posts (Table 4.4a). Eighty-five percent of health centres with registers had recorded one or more sick young infants in the three months preceding the survey, while

this proportion decreased to 21% at health posts (Figure 4.4a). Where records of one or more sick young infants were available for the previous three months, on average seven children were registered at health centres and three children at health posts (Table 4.4a).

In the CBNC service providers qualitative study (2014), WDA leaders indicated that despite their advice, some mothers bypassed the health post and sought care directly from health centres or hospitals, which indicates that the referral pathway is not followed. Participants said that mothers lack confidence in the skills of HEWs, preferring health centres for “better quality” of care. WDA leaders also added that they counsel mothers to go to the health centre when they are not able to reach the HEW due to lack of a phone or mobile reception. HEWs stated that it was difficult to follow-up on those that bypass the health post.

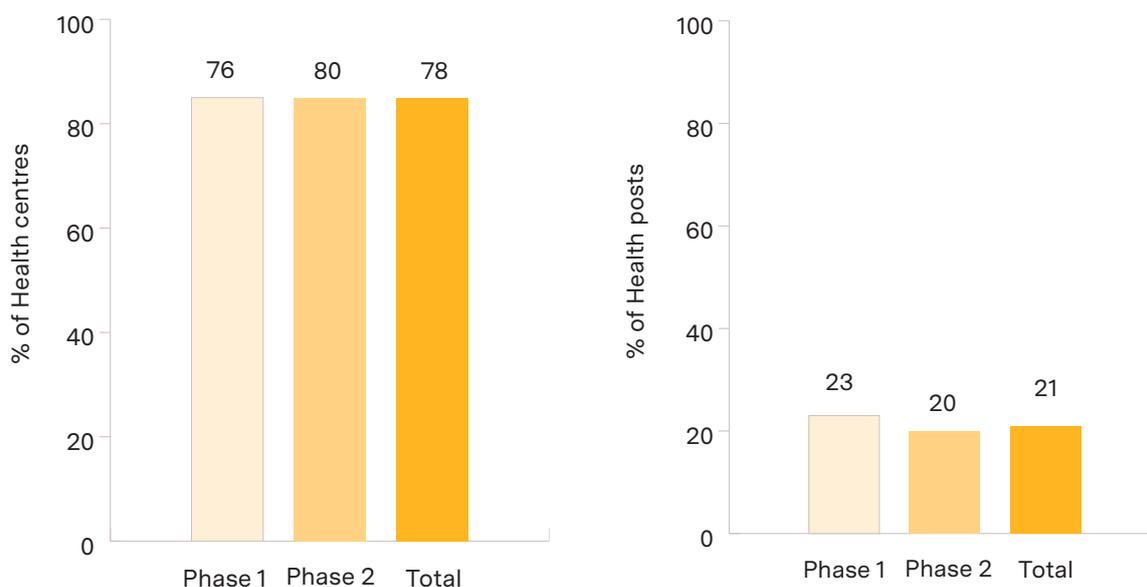


Photo: HEW filling in register, Ethiopia © IDEAS/Christopher Smith 2019

Table 4.4a. PHCU: 0-2 months old young infant outpatient record review for the last three months: Documentation, 2017

	Phase 1	Phase 2	Total
HEALTH CENTRES	N:104	N:102	N:206
0-2 months register availability, n (%)			
1+ sick young infant recorded in last 3 months	88 (85%)	87 (85%)	
Number of sick young infants age 0-2 months recorded in last 3 months	14 (13%)	11 (11%)	
Register unavailable	2 (2%)	4 (4%)	
Total number of sick young infants, n	519	796	
Among health centres with at least 1 sick young infant reported			
Number of sick young infants in last 3 months, Mean (SD)	3 (5)	9 (8)	
HEALTH POSTS	N:101	N:99	N: 201
0-2 months register availability, n (%)			
1+ sick young infants recorded in last 3 months	23 (23%)	20 (20%)	
Number of sick young infants recorded in last 3 months	72 (71%)	67 (68%)	
Register unavailable	7 (7%)	12 (12%)	
Total number of sick young infants recorded, n	73	67	
Among health posts reporting a sick young infant			
Number of sick young infants in last 3 months, Mean (SD)	3 (2)	3 (3)	

Figure 4.4a. Proportion of health centre and health post registers where health records for sick young infants were available in the three months preceding the survey, 2017.



Sick young infant documentation: completion of registration

The register review also included an assessment of the records kept on each sick young infant. At health centres, general history was well recorded except for gestational age (62%) and birth weight (62%). Similarly, at health post level only 42% had recorded gestational age and only 37% had recorded birth weight. This contrasts with the quality of care study (2015) where gestational age

was recorded in all health centres and health posts surveyed. For visit specific assessment, in 2017, 84% of young infants at health centres and 7% at health posts had their temperature recorded. At health centres 41% and at health posts 34% of sick young infants had their respiratory rate recorded. Compared with the quality of care study, fewer health centres and health posts in 2017 recorded visit specific assessments, and Phase 1 areas had better recording than Phase 2 areas (Table 4.4b).

Table 4.4b. PHCU: 0- 2 months old young infant outpatient record review for the last three months: completion status, 2017

	Phase 1 N: 519	Phase 2 N: 796	Total N: 1315
HEALTH CENTRE RECORDS, n (%)			
General history			
Name	519 (100%)	796 (100%)	1315 (100%)
Address	515 (99%)	765 (96%)	1280 (97%)
Date of visit	519 (100%)	796 (100%)	1315 (100%)
Gestational age	281 (54%)	538 (68%)	819 (62%)
Gender	519 (100%)	796 (100%)	1315 (100%)
Birth weight	297 (57%)	524 (66%)	821 (62%)
Age	514 (99%)	786 (99%)	1300 (99%)
Visit specific assessments			
Current weight	488 (94%)	709 (89%)	1197 (91%)
Body temperature	473 (91%)	625 (79%)	1098 (84%)
Respiratory rate	242 (47%)	296 (37%)	538 (41%)
HEALTH POST RECORDS, n (%)			
General history			
Name	73 (100%)	67 (100%)	140 (100%)
Address	73 (100%)	67 (100%)	140 (100%)
Date of visit	73 (100%)	67 (100%)	140 (100%)
Gestational age	47 (64%)	12 (18%)	59 (42%)
Gender	73 (100%)	67 (100%)	140 (100%)
Birth weight	38 (52%)	14 (21%)	52 (37%)
Age	71 (97%)	65 (97%)	136 (97%)
Visit specific assessments			
Current weight	72 (99%)	63 (94%)	135 (96%)
Body temperature	9 (13%)	1 (1%)	10 (7%)
Respiratory rate	35 (48%)	12 (18%)	47 (34%)

Sick young infant documentation: management and outcome of very severe disease cases

At health posts and health centres in the 2017 survey, the most common very severe disease symptoms recorded were temperature and respiratory problems. Of the sick young infants seen, 8% (n=105) at health centres and 15% (n=21) at health posts were diagnosed as having a very severe disease (Table 4.4c).

In the 2017 survey, among those recorded as having a very severe disease in the registers, at health posts two out of five sick young infants were referred to health centres and one in four was referred from the health centre to the hospital (Table 4.4d).

A little over half of the participants from the CBNC programme managers qualitative study (2015) said that HEWs used referral forms when referring sick young infants to health centres. The majority

Table 4.4c. PHCU: 0- 2-month old young infant outpatient record review for the last three months: very severe disease (VSD) management status, 2017

	Phase 1 N: 519	Phase 2 N: 796	Total N: 1315
HEALTH CENTRES, n %			
VSD symptoms			
Reduced feeding/unable to feed	19 (4%)	54 (7%)	73 (6%)
Convulsions	5 (1%)	10 (1%)	15 (1%)
Severe chest in-drawing	11 (2%)	26 (3%)	37 (3%)
Fever	114 (22%)	215 (27%)	329 (25%)
Fast breathing	49 (9%)	95 (12%)	144 (11%)
Grunting	10 (1%)	47 (6%)	57 (4%)
Movement only when stimulated or no movement even when stimulated	2 (<1%)	6 (1%)	8 (1%)
Lethargic/Unconscious	2 (<1%)	16 (2%)	18 (1%)
Signs and symptoms not given	22 (4%)	26 (3%)	48 (4%)
Disease classification			
VSD	63 (12 %)	42 (5%)	105 (8%)
HEALTH POSTS, n (%)			
Symptoms			
Reduced feeding/unable to feed	2 (3%)	1 (1%)	3 (2%)
Convulsions	0 (0%)	1 (1%)	1 (1%)
Severe chest in-drawing	1 (1%)	4 (6%)	5 (4%)
Fever	10 (14%)	7 (10%)	17 (12%)
Fast breathing	6 (8%)	8 (12%)	14 (10%)
Grunting	9 (12%)	2 (4%)	11 (8%)
Movement only when stimulated or no movement even when stimulated	0 (0%)	0 (0%)	0 (0%)
Lethargic/unconscious	0 (0%)	0 (0%)	0 (0%)
Disease classification			
VSD	15 (21%)	6 (9%)	21 (15%)

however said health centre staff do not use back referral forms, leaving HEWs with no information regarding the diagnosis, treatment and necessary follow-up for a sick child at the community level. However, a few managers did not consider this to be a major problem.

“We have never given feedback yet. This is not related to any challenge. It is just not a common practice here. For example, when we refer to a hospital, there is no feedback that we get from the hospital too. This is what we are used to.” (Health centre staff- Oromia)

In some instances, health centre staff complained that HEWs do not provide the necessary follow up even when they receive feedback from health centres.

In FGDs conducted for the CBNC service providers study (2014), HEWs were asked which they preferred: providing the treatment themselves in the community or referring cases to health centres. A few HEWs stated that the place of treatment was not about preference but rather a matter of following protocol; the chart booklet indicates that a young infant with very severe disease should be referred to a health centre after receiving

Table 4.4d. PHCU: 0-2 month old young infant outpatient record review for the last three months: very severe disease cases (VSD) outcome, 2017

	Phase 1 N: 63	Phase 2 N: 42	Total N: 105
HEALTH CENTRE VSD RECORDS, n %			
Referred to hospital	12 (19%)	13 (31%)	25 (24%)
Among young infants treated with antibiotic ^a			
Correct	9 (14%)	14 (33%)	23 (22%)
Partially correct	49 (78%)	10 (24%)	59 (56%)
Incorrect	5 (8%)	18 (43%)	23 (22%)
VSD outcome			
Health improved/healed	38 (60%)	22 (52%)	60 (57%)
Same	0 (0%)	4 (10%)	4 (4%)
Died	0 (0%)	3 (7%)	3 (3%)
Unknown	25 (40%)	13 (31%)	38 (36%)
HEALTH POST VSD RECORDS, n %	N:15	N:6	N: 21
Referred to health centre	6 (40%)	3 (50%)	9 (43%)
Among young infants treated with antibiotic ^b			
Correct	0 (0%)	3(100%)	3(25%)
Partially correct	9 (100%)	0 (0%)	9(75%)
Incorrect	0 (0%)	0 (0%)	0 (0%)
VSD outcome			
Health improved/healed	14 (93%)	6 (100%)	20 (95%)
Unknown	1 (7%)	0 (0%)	1 (5%)

a. Correct: ampicillin/amoxicillin and gentamicin; Partially correct: ampicillin/amoxicillin or gentamicin; Incorrect: no or incorrect combination of antibiotics

b. Correct: amoxicillin and gentamicin; Partially correct: amoxicillin or gentamicin; Incorrect: no antibiotics

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“Some HEWs felt the community’s confidence in their capacity to treat very severe disease gets undermined when a young infant starts treatment at a health post but only gets better after being seen at the health centre.”

a pre-referral dose of antibiotics. On the other hand, some HEWs disagreed. Referring to health centres meant that the community would perceive them as incapable. Furthermore, some HEWs felt the community’s confidence in their capacity to treat very severe disease gets undermined when a young infant starts treatment at a health post but only gets better after being seen at the health centre. They felt that successfully treating a young infant with a very severe disease on their own would improve the social acceptance for their services.

“Even though I have been told that when a newborn is sick, particularly when sick with very severe disease, I am supposed to give a pre-referral dose and send him to the health centre, my preference is to give (complete) treatment at the health post.” (HEW- Tigray)

Additionally, providing treatment in the community would spare caregivers having to travel long distances to a health centre or hospital, particularly avoiding a daily trip to these facilities for the 7-day gentamicin injections. A few health centre staff also had a similar opinion on the treatment of very severe disease by HEWs.

“HEWs should treat those they are able to at the health post.” (Health centre staff member- Amhara)

Some WDA leaders, in contrast, said the following on the matter of referral:

“We send the mother to the health centre, because when they go the health post the HEW sends her to the health centre. Besides, sometimes the HEWs don’t have the necessary medication.” (WDA leader- Tigray)

Referral from health post to health centre, and further referral from health centre to hospital for the same illness was said to frustrate caregivers. Some HEWs also expressed that there were mothers who, despite consenting to follow-up on their referral, would not seek care. Participants in the 2015 programme managers qualitative study also indicated that parents refuse referral due to insufficient communication from staff. For example, one participant stated that some parents think that, because of the referral, their child is about to die:

“She (HEW) should teach them that they should not take a child who is referred to a health centre back to their house. They should be taught to understand it is because of the type/severity of the disease of their child that the referral is given.” (Health centre staff member- Tigray)

In the 2017 follow-up survey, among those that received antibiotics for very severe disease, one in five young infants with a very severe disease was given incorrect treatment at a health centre. Only 22% received correct treatment at the health centre and 25% at health post level (Table 4.4d). In the CBNC service providers qualitative

study (2014), HEWs reported having insufficient gentamicin.

“There is problem with supply of medication. Sometimes we start the medication when we don’t have enough to complete the regimen.” (HEW-SNNP)

The same HEW also mentioned the challenge with the different versions of amoxicillin that are used to treat sick young infants.

“We used to have amoxicillin tablet. Now we don’t have it. It is the syrup that we have. And the syrup is difficult. For example, the mother at home might not be able to differentiate between 5 ml and 10 ml. So, she might be giving him/her less or more dose than the baby needs.” (HEW-SNNP)

In the 2017 follow-up survey, 57% of the cases treated in health centres were reported to have a positive outcome, while almost all treatment outcomes at health posts (95%) were successful (Table 4.4d).

HEWs from the CBNC service providers study (2014) indicated that, 7-day injections of gentamicin placed an additional workload for HEWs, as health posts are not operational at weekends.

“I must complete the treatment that I start with a newborn, even if it involves working during weekends or other holidays. I receive no extra payments for working on such occasions. On the other hand, nurses get paid for the extra hours they work.” (HEW-Oromia)

This was even more challenging when only one HEW was stationed at the health post. HEWs indicated that they are sometimes supported by

health centres, to ensure young infants receive all their doses of gentamicin injections.

The 2015 quality of care study also showed that HEWs misclassified 70% of very severe disease cases. In the 2014 CBNC service providers qualitative study, most staff from both woredas and health centres said they were not confident in HEWs’ newborn treatment skills. The CBNC training provided was said to be insufficient. A few woreda health centre staff also said that HEWs don’t have the necessary skills to provide the correct dose of gentamicin. HEWs also miss cases when they assess and classify young infants without referring to the chart booklet. Furthermore, due to the very small number of young infants with a very severe disease whose mothers seek care, HEWs do not have an opportunity to practice their skills.

HEWs were also asked about their challenges and they agreed that they have limited opportunity to practice and develop their CBNC training skills due to the small number of (or no) young infants with very severe disease that are brought to them for treatment. Similarity of symptoms for different illnesses and symptoms that fall outside the chart booklet were reported to be challenging. One HEW stated that counting a newborn’s breath when the baby is “writhing and bitterly crying with pain” made correct classification difficult. A few also said that seeing newborns who were very ill was emotionally difficult. However, some HEWs were confident that identifying the illness and its management was within their capacity.

“If the sick child is identified it is easy to figure out its illness and provide treatment.” (HEW-SNNP)

“Injecting a newborn does not frighten me. If I act frightened, then mothers will lose confidence in my service.” (HEW-Tigray)



Photo: Mother and child at Addis Kidam health post © IDEAS/Christopher Smith 2019

5. Discussion

The CBNC evaluation included household, WDA leader, HEW and facility surveys in 2013 and 2017. In 2015, quality of care was assessed. Two rounds of a qualitative study were also done in 2014 and 2015, the first to understand how HEWs and WDA leaders provide CBNC services, and the second to assess the administrative aspects of CBNC provision.

In light of the resulting wealth of information, the first part of this discussion uses the household level findings to highlight the major differences between the baseline and follow-up surveys across the nine CBNC components. The second part of the discussion focuses on the status of young infant services at the PHCU level in 2017 with, where relevant, comparisons to the 2015 quality of care study. In the third part of this section, key recommendations are provided, mainly drawn from the follow-up survey.

5.1 Nine CBNC Components: Coverage Changes from 2013-2017

There were marked differences between 2013 and 2017 in the first three components of the CBNC programme: early identification of pregnancy, focussed ANC and facility delivery. The coverage of at least one ANC visit increased by almost 15 percentage points between baseline and follow-up surveys (69% to 83%). Among those receiving ANC services, in 2017 the first ANC visit was occurring earlier, on average during the 8th week after pregnancy compared with 16th week in 2013 (Component I). More women in 2017 were having four ANC visits of which the first visit was at a health centre (Component II). Facility delivery (Component III) had almost tripled between 2013 and 2017 (23% vs 64%).

Between 2013 and 2017 safe and clean delivery (Component IV) showed a slight increase in both the use of gloves (13% vs 20%) and misoprostol at home deliveries (3% vs 8%). It is important to note that due to the promotion of facility delivery, provision of misoprostol by HEWs at community level is no longer expected. In both the 2013 and 2014 surveys, there was a high use of misoprostol at health centres, despite an alternative recommendation (oxytocin) for facility delivery. In facility deliveries, antiseptic use for cord care (Component V) tripled between the two surveys (23% vs 67%). Antiseptic use for cord care in home deliveries however was low and showed no improvement in the follow-up survey (12%).

Regardless of place of delivery, fewer women reported that their newborns had difficulty breathing in 2017 compared with 2013. Hence, compared with baseline, it is likely that only extreme cases of asphyxia were identified. Of those reporting this problem however, more newborns in the follow-up survey reportedly received resuscitation than in the baseline survey (Component VI).

With respect to prevention and management of hypothermia (Component VII), some improvements were also seen. Home deliveries showed a marked increase for delaying bathing for 24 hours between baseline and follow-up surveys (36% vs 52%).

Very few mothers who delivered at home said that their newborn was weighed in 2013 (3%) and 2017 (7%). According to mothers' reported observations, six out of 10 facility-born newborns were weighed in both 2013 and 2017. It is unlikely that low birth weight or pre-term babies are being provided with the necessary care (Component VIII), as their weight is not being assessed.

One or more postnatal checks in the first six weeks were reported by only a quarter of mothers in 2013 (28%), and the proportion decreased to 16% in 2017. Although the timing of the first PNC visit has slightly improved, the first visit on average took place outside the timeframe of when neonatal mortality is highest. Given the increase in facility delivery, this is a missed opportunity to track and provide newborns with timely PNC home visits.

With respect to Component IX, compared with 2013 more sick young infants with reported signs of very severe disease were getting treatment in 2017 with amoxicillin (38% vs 69%) and gentamicin (16% vs 33%). However, treatment with 7-days of gentamicin was very low. Most young infants who completed a 7-day course of amoxicillin did not congruently receive 7-days of gentamicin injections, possibly due to a shortage of drugs, lack of contact with HEWs which could be due to workload, distance or lack of HEWs' management skills. Some of these problems may be addressed by the changing guidelines for sick young infant management by HEWs. The guidelines have been

informed by studies conducted in Africa, as well as expected recommendations from operational studies in Tigray and Oromiya and also follow the World Health Organization's guideline for managing possible bacterial infection in young infants.^{12, 13, 14} When referral is not possible, the new guidelines instruct HEWs to: provide oral amoxicillin to sick young infants with only fast breathing; treat those with other symptoms of very severe disease with two days of gentamicin and 7-days oral amoxicillin; and refer young infants with critical illness immediately to a higher level facility.

The above results are from population based household surveys, where in 2013 and 2017 mothers were asked about their pregnancy, delivery, newborn and sick young infant care in the 3-15 months preceding the date of data collection. As such, we acknowledge measurement limitations that include recall bias. Although the tools were also pre-tested, some questions relied on mothers' understanding of some technical concepts (e.g. presence of a breathing problem for a newborn). In addition, our study design lacked a concurrent comparison group which was not exposed to the programme: changes over time may have been due to factors other than the CBNC programme.

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12. African Neonatal Sepsis Trial (AFRINEST) group, Tshetu A, Lokangaka A, et al., Oral amoxicillin compared with injectable procaine benzylpenicillin plus gentamicin for treatment of neonates and young infants with fast breathing when referral is not possible: a randomised, open-label, equivalence trial. *Lancet*. 2015 May 2;385(9979):1758-1766. doi: 10.1016/S0140-6736(14)62285-6. Epub 2015 Apr 1.
 13. Lokangaka A, Bauserman M, Coppieters Y, et al., Simplified antibiotic regimens for treating neonates and young infants with severe infections in the Democratic Republic of Congo: a comparative efficacy trial. *Matern Health Neonatol Perinatol*. 2018 Apr 18;4:8. doi: 10.1186/s40748-018-0076-2. eCollection 2018.
 14. Guideline: Managing possible serious bacterial infection in young infants when referral is not feasible. World Health Organization. 2015. Accessed November 14, 2018. <https://tinyurl.com/y2xyhmnx>

5.2 Health System Readiness Findings

PHCU infrastructure to deliver young infant health services

An assessment of the health system infrastructure indicated that there were limited maternity beds in health centres, which restricts both the availability and quality of postnatal and newborn care. Also, very few health centres had space allocated for kangaroo mother care (38%) which hinders the provision of care for low birth weight and pre-term babies. Very few health centres had their own motorised transport for referrals. Referrals from health posts to health centres tended to use vehicles from the woreda or from non-government providers. This suggests that delays in receiving care are likely to happen during referral as the transport-level nexus is at a distance from the PHCU.

An assessment of CBNC-related human resources showed that although staff in the PHCUs had been trained in CBNC, the numbers trained were not sufficient. This has implications for their ability to appropriately follow-up on young infants with very severe disease who are referred from health posts. The number of CBNC-trained HEWs relative to the number of women of reproductive age and under five children in a kebele was also low, limiting the technical and human capacity of HEWs to provide adequate CBNC services.

There was good availability of amoxicillin in both health centres and health posts in 2017. Almost all (90%) the health centres had gentamicin (80 mg/2ml) on the day of the survey and half also had gentamicin 20 mg/2ml for distribution to health posts. At health posts however, only one-third had gentamicin (20 mg/2ml). This indicates there is a shortage of gentamicin at health centres for

health post distribution but also health posts are not getting the drug even when it is available in health centres. Compared with the 2015 (quality of care survey), health centres in the 2017 (follow-up survey) had better availability of CBNC-related drugs while there was less availability at health posts. Drugs for very severe disease have recently been incorporated into the country's IPLS allowing facilities to request drugs when needed.

Health posts also had a shortage of stock/bin cards and request and re-supply forms in 2017, which are both items related to supply and maintenance of drugs. This has implications for HEWs ability to provide a complete dose of gentamicin injections for very severe disease.

Health centres had good availability of vaccines that are given at birth or in the first six weeks of life, whereas 80% of health posts lacked such vaccines. The low availability of vaccines at health posts is likely to do with the fact that vaccines are given on specific days of the week, with support and supplies from health centre staff.

.....
“An assessment of CBNC-related human resources showed that although staff in the PHCUs had been trained in CBNC, the numbers trained were not sufficient.”

With respect to equipment, in 2017 there was some shortage of scales and thermometers at health posts; these items are the basic equipment necessary for the provision of CBNC services. Furthermore, for newborns with a breathing problem, an Ambu bag is necessary at the first point of contact and only 17% of health posts had this available. It is important to note that health post deliveries are no longer recommended. However, as one-third of deliveries are still taking place at home, it is important to ensure the availability of Ambu bags to support complicated home births or unexpected deliveries attended by HEWs. Compared with the 2015 survey, the 2017 survey showed that the availability of CBNC-related equipment remained the same at health centres while at health posts there was less availability.

PHCUs' technical support and staff potential to provide CBNC services

There were insufficient trained health centre staff members in 2017 able to provide CBNC-related supportive supervision to HEWs (ratio of 7 HEWs per trained staff member). Similarly, there were nearly 70 WDA 1-5 network leaders for every HEW, indicating the challenges of linking HEWs with this level of the WDA network. However, the ratio of HEWs to 1-30 WDA group leaders was more manageable, with approximately 13 WDA 1-30 leaders per HEW.

Almost 90% of health posts had received a supervisory visit in the last six months before the 2017 survey and three-quarters in the last one month. Where visits had occurred, they tended to be taking place regularly. Compared with 2013, in 2017 more HEWs reported receiving supportive supervision, particularly a visit in the last one month. The supportive supervision sessions in 2017 also covered more CBNC components than

in 2013. In the follow-up survey, newborn care and care for sick young infants were still not sufficiently discussed during supervisory visits, which focussed more on record keeping and referral. HEWs were asked about their satisfaction on the supportive supervisory visits they had received and only one-quarter said they were fully satisfied. Over 80% reported that they need more visits that provide technical support.

In 2017, integrated refresher training in the previous 12 months was provided to only one in five HEWs and even fewer had received refresher training on key aspects of newborn care and sick young infant care. HEWs need continued training to enhance their skills in managing young infants with very severe disease. The skills gap on very severe disease management was also shown by the 2015 quality of care study. Only one-third of WDA leaders in the follow-up survey had received an MNCH orientation in the previous 12 months and they indicated that more training aids would enhance their orientation.

In 2017, HEWs had good unprompted knowledge on when PNC visits should take place, while few WDA leaders had such knowledge (less than 15%). It is important to improve WDA leaders' knowledge of correct PNC timing and their ability to communicate delivery notifications to HEWs to improve timely PNC visits.

Only one-third of mothers with a delivery in the previous year had ever used the family health guide, while a majority (three-quarters) of WDA leaders and almost all (98%) of HEWs reported past use. Mothers had difficulty identifying the messages depicted in the family health guide. Although HEWs identified more images compared with WDA leaders, they still did not have optimal understanding of the images. HEWs also had poor unprompted knowledge of very severe disease

danger signs and management. Compared with the 2015 survey, HEWs' unprompted knowledge of very severe disease danger signs and management had decreased. In 2017, WDA leaders' knowledge of unprompted very severe disease danger signs was low and, compared with 2013, had remained the same.

Cultural context and community participation in CBNC services

Regarding the cultural practice of newborn isolation, the perception of such norms from HEWs and WDA leaders' perspectives far underestimated what was reported by the mothers themselves (average of 20 days vs 46 days).

The 2017 survey also assessed the hosting and attendance of pregnant women's conferences at the kebele level. Almost all HEWs (93%) said that a pregnant women's conference had been organised in their catchment in the last three months, and of these 98% took place at least monthly. Participation among the surveyed WDA leaders however was low (36%).

Health facility documentation on the management of sick young infants

In 2017, approximately one out of 10 health centres had no record of a sick young infant in the previous three months and in contrast, seven out of 10 health posts did not have a single sick young infant record. Where children were recorded, on average two children were registered per month at health centres and one per month at health posts. A detailed review showed that the CBNC registers were incomplete. Nine out of 10 young infants at health posts did not have their temperature recorded and approximately six out

of 10 did not have their respiratory rate recorded at health posts and health centres. Furthermore, despite being consistently incomplete in the registers, when recorded, high or low temperature and raised respiratory rate were the most frequent symptoms for very severe disease. If these assessments were not carried out, it indicates that some young infants with very severe disease were missed. Compared with the 2015 quality of care study, HEWs from the follow-up survey kept poorer sick young infant records.

Almost half of the very severe disease cases identified at health posts in 2017 were referred to health centres, as specified in the CBNC protocol. Approximately two-thirds of HEWs reported that they did not directly communicate with health centres during the last newborn referral. This indicates that there is minimal follow-up by HEWs to ensure that caregivers comply with a given referral. The 2014 qualitative study also showed confusion among health centre staff, HEWs and WDA leaders on whether a young infant with a very severe disease should be treated at the health post or referred.

Register reviews in 2017 showed that only around one-quarter of very severe disease cases at health posts and health centres were correctly treated. This is likely to be due to a skills gap, lack of drugs, or inability to follow-up with young infants to provide seven days of antibiotic injections. There was poor follow-up on sick young infants at health centres, as approximately one-third of their outcomes were unknown. However, there was much better follow-up at health posts where 95% of very severe disease cases had their outcomes recorded.

5.3 Recommendations to Improve the CBNC Programme

Given the observed gaps the following actions can be recommended:

Health workers

- Integrate CBNC into in-service training for both health centre staff and HEWs
- Strengthen staff practice of immediate newborn care by promoting adherence to essential newborn care actions listed in the Integrated Management of Newborn and Childhood Illness (IMNCI) guidelines
- Allocate budget for HEWs' continued training on sick young infant management, through annual integrated refresher trainings and biannual performance reviews and clinical mentoring meetings
- Ensure that staff appraisals give equal importance to all aspects of service provision, including newborn care
- Train HEWs and WDA leaders to improve their understanding and use of the family health guide
- Increase WDA awareness of the importance of measuring birthweight immediately after delivery so they can promote such messages among pregnant women in their networks

Health centre readiness

- Increase the number of maternity and kangaroo mother care beds, to improve postnatal, low birth weight and pre-term care at health centres
- Increase the availability of government-owned ambulances to be used for newborn referral

Health post readiness

- Ensure the availability of good quality Ambu bags, scales and thermometers for HEWs
- Improve the availability of gentamicin 20 mg/2ml supplied to health posts
- Given emerging research evidence, ensure implementation of the updated

(simplified) antibiotic regimen for management of very severe disease

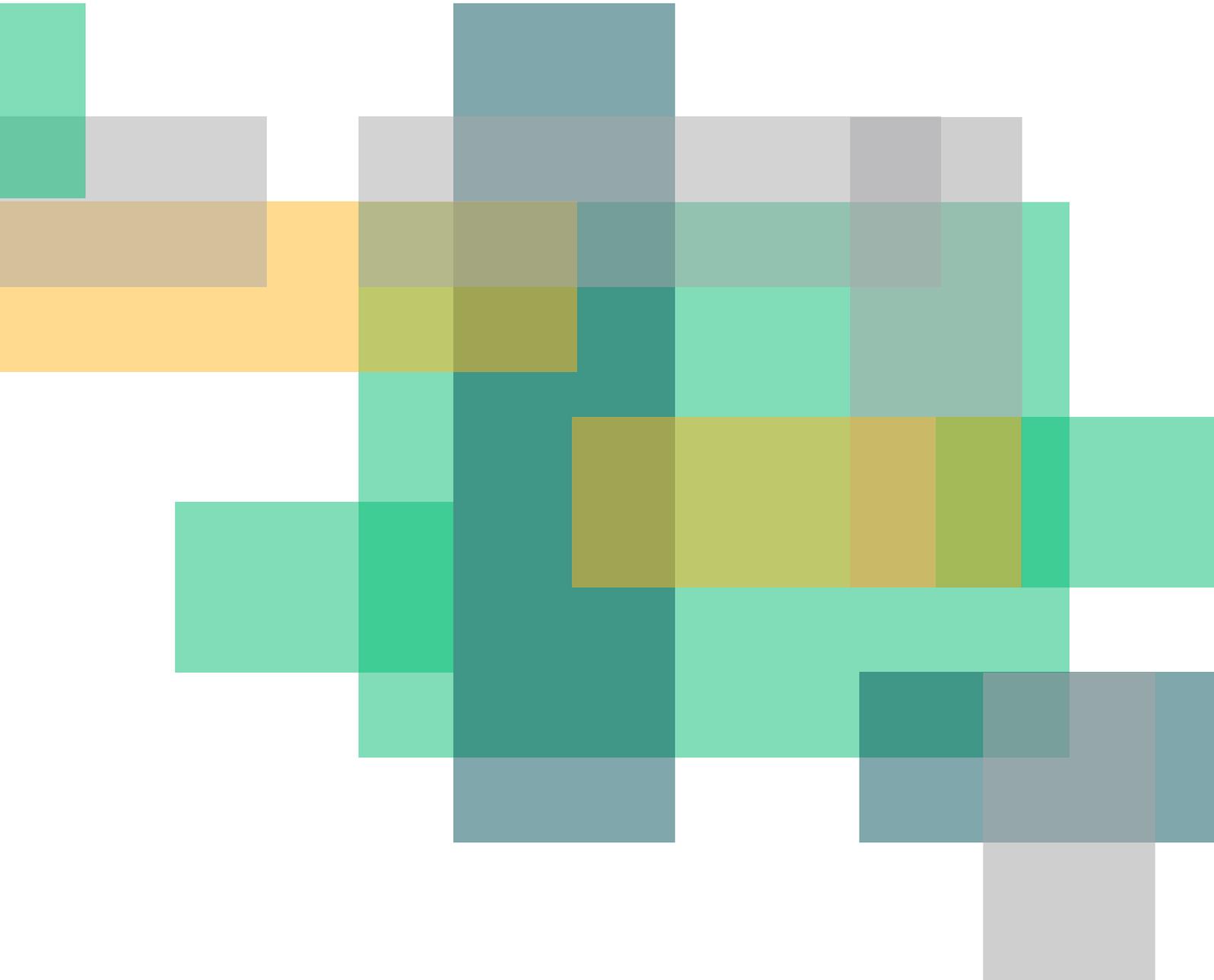
Health System linkages

- Integrate components of sick young infant care, including technical support, into regular supportive supervisory visits
- Clarify guidelines for referral procedures for WDA leaders, HEWs and health centre staff
- Improve linkages between health posts and health centres for PNC provision and sick young infant referral, by always using referral slips
- Ensure that supervision from health centres to health posts assesses and supports the linkages between HEWs and 1-30 WDA leaders¹
- Promote better coordination between WDA leaders and HEWs to improve WDA leaders' awareness and reporting of timely PNC visits
- Utilise community structures like the pregnant women's conference, kebele (village) cabinet and WDA leaders to create awareness of:
 - The importance of facility delivery
 - Key aspects of immediate newborn care including weighing
- CBNC services provided at the health post that can lead to timely care seeking for sick young infants

5.4 Conclusion

The Ethiopian Federal Ministry of Health is the flag bearer of the CBNC initiative. The evaluation of the programme has shown noteworthy improvements as well as key challenges. There is a need for ongoing monitoring, evaluation and research to support efforts to address these challenges.

Appendices



Appendix I: Study of Professional Advice for Primary Healthcare Workers in Ethiopia

by Kate Sabot, Research Fellow IDEAS

Social Network Analysis

Social Network Analysis is a research approach consisting of a set of theories and methods for mapping communication, information flow and relationships between individuals or groups. In Social Network Analysis, the relationships between actors are the unit of analysis. Relational data can be collected through questionnaires, interviews, observations or other methods.

These data are then populated into **Matrices**, or tables and uploaded into software designed to generate visualisations, known as **Socotra's**, and calculate network metrics. In Social Network Analysis, visualising data is both a means of presenting findings, and a tool for identifying patterns and generating findings. Basic network terms include:

- **Actors** the entities within a defined network whose relationships are of interest, in our case this is health service providers working within PHCUs. At the health post these are HEWs and within the health centre these are health officers, nurses and midwives

- **Density** ratio of ties, or lines drawn between actors to all possible ties
- **Centrality** number of ties incidentally, or directly connected to an actor
- **Distance** average number length of optimal path between actors
- **Size** number of actors within the network
- **Isolates** actors within a network that have no ties to other actors.

Metrics can be calculated for individual actors (in this case, CBNC providers) and networks (in this case, defined as advice exchange among various service providers (actors) around a specific function/ component of CBNC).

Social Network Analysis methods have a longstanding history, although their application in the health sector is relatively nascent.¹⁵ For more information on how to apply Social Network Analysis in health systems research please refer to Blanchet, et al.¹⁶

15. Chambers D, Wilson P, Thompson C, Harden M., Social network analysis in healthcare settings: a systematic scoping review, PLoS One. 2012; doi:10.1371/journal.pone.0041911.

16. Blanchet K, James P, How to do (or not to do)... a social network analysis in health systems research, Health Policy and Planning, 2012; 27: pp 438–446, <https://doi.org/10.1093/heapol/czr055>

Background

This study aimed to contribute to the understanding of professional advice networks of PHCU workers in Ethiopia. Specifically, the research intended to explore the properties of professional advice networks; the content of an advice exchange; the context in which that advice exchange took place; who participated in the advice exchange; and the extent to which advice networks met healthcare workers' needs. The findings shared here are focussed to those most relevant to CBNC.

Methods

This study applied Social Network Analysis methods to capture, analyse and understand professional advice networks. For this cross-sectional, mixed-method, observational network study, staff at eight primary healthcare units included in the CBNC evaluation across four agrarian regions participated.

A structured network survey tool captured the frequency of healthcare worker advice exchange over the previous year related to providing antenatal, maternity, postnatal and newborn care. The 160 participants were given a roster of fellow PHCU staff members and also asked if any advice exchange happened with people not on the roster. The following respondent characteristics, also known as attribute data, were also captured:

gender, age, cadre, experience, CBNC training of actors (at health posts, these were HEWs, and at health centres these were health officers, midwives and nurses). Network and actor-level metrics were calculated. Following quantitative network analyses, 20 semi-structured interviews were conducted with purposively selected network study participants. Interviewed subjects included three health officers, three midwives, five nurses and nine HEWs across four PHCUs. Data were entered, analysed or visualised using Excel 6.0, UCINET 6.0, Netdraw and MaxQDA10 software packages.

Results

There was diversity across the PHCUs in terms of professional advice network properties, with variability across all Social Network Analysis metrics. Table A1 shows key metrics aggregated from all PHCUs, indicating some consistent patterns, namely that antenatal and maternity care advice exchange networks are denser and more centralised relative to postnatal and newborn care advice exchange networks. While most PHCUs fit a pattern whereby there are more ties for antenatal care and maternity care advice networks compared with networks for postnatal or newborn care advice, other network properties and some PHCUs were more nuanced. Typically, midwives and fellow primary healthcare unit staff were preferred; however, supervisors were

Table A1: Key social network analysis metrics aggregated from all PHCUs

	Average of 8 PHCU for each of the advice exchange networks			
	Antenatal	Maternity	Postnatal	Newborn
Density	0.16	0.13	0.10	0.10
Centrality	0.44	0.42	0.35	0.35
Distance	2.21	2.19	1.96	2.0
Ties	59.5	49.5	37.25	36.38

not featured prominently. Overall, there were few isolates, with most staff engaged in advice exchange. Notably, only 7% of HEWs were ever isolates, relative to 19% of nurses, 10% of midwives and 12% of health officers.

Level of training and knowledge were valued over experience. Advice exchange took place in person or by phone. There were few barriers to seeking advice. One reason mentioned for seeking advice was a lack of reference materials available in local languages.

The illustrative sociograms included in Figure A1 capture the differences between advice exchange networks across antenatal, maternity, postnatal and newborn care for one PHCU.

Conclusion

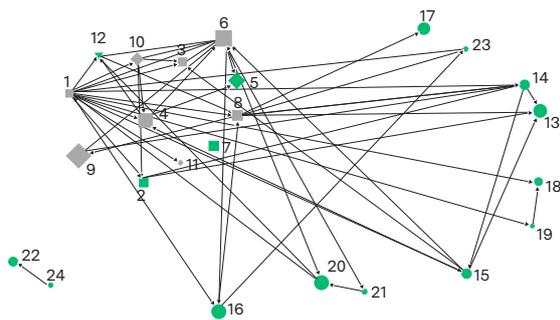
Prior to this study there had been no published network study of professional advice exchange among primary healthcare providers in Ethiopia. In a highly structured, hierarchal context it was illuminating to observe informal, inter- and intra-cadre advice networks. It was also striking, as highlighted in the sociograms, that more advice exchange occurred related to maternal care than to newborn care. This was unexpected given the focus of CBNC. There is a need for further research to understand why these patterns exist. Additional research is needed to measure performance more accurately, link network properties to patient outcomes, and investigate the impact of turnover, particularly of supervisors, as well as their absence on advice networks, ideally through a longitudinal network study. Additional research could also test models for harnessing existing advice networks and strengthening the professional advice networks of HEWs so that they can deliver CBNC services more effectively.

Possible Policy Implications

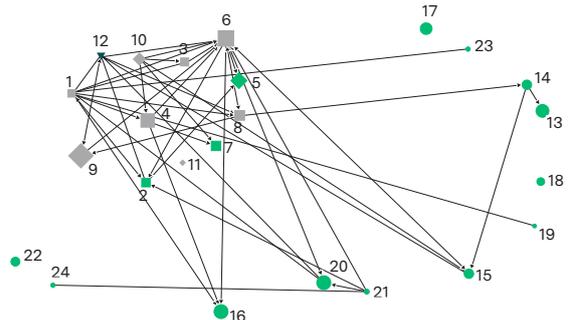
A simple policy implication of this work could be providing guidelines and reference materials in local languages, as this was mentioned as a reason for seeking advice. Policy implications for consideration include potentially focusing future training on cadres who are more central in advice networks, such as midwives for postnatal care and nurses or health officers for newborn care. One possibility could be to select one or two individuals per PHCU to be the knowledge sharing focal persons, who attend trainings and are responsible for sharing learning. Another could be cadre-based in-service trainings with the same mandate for sharing learning. Central to either approach would be ensuring that these knowledge sharing focal persons have been trained and coached on more dynamic and specific methods of sharing what they have learned with their colleagues within the PHCU.

Figure A1: Sociograms from one primary health care unit showing maternity and postnatal care advice exchange

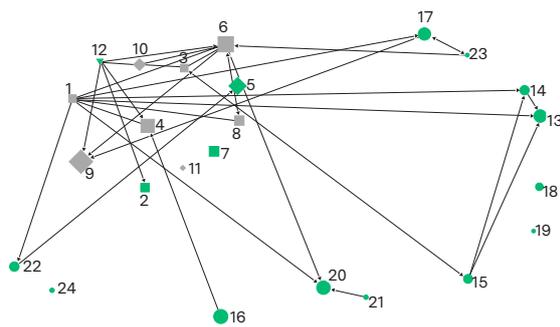
Antenatal Care



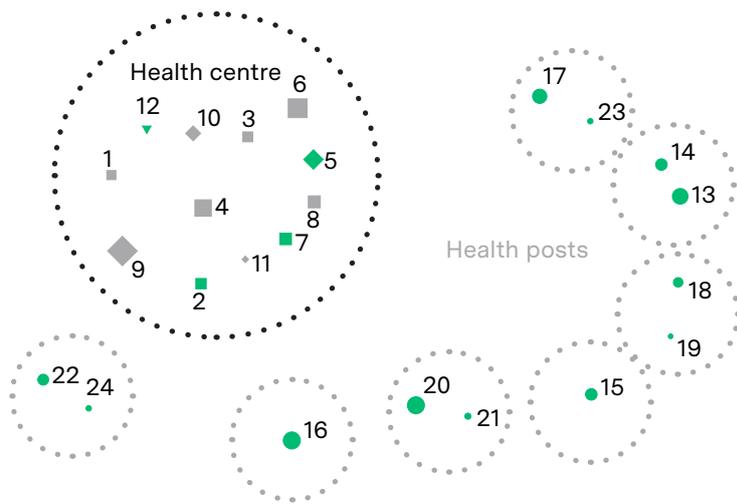
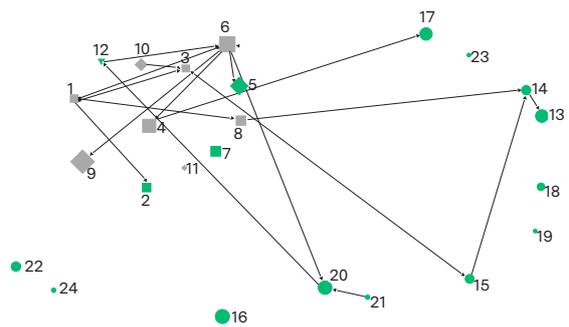
Maternity Care



Postnatal Care



Newborn Care



Legend

Position = Facility
(grouped by facility)

Green = Female

Grey = Male

Shape size = total years of
experience

◆ = Health Officer

■ = Nurse

▲ = Midwife

● = Health Extension Worker

Appendix II: Distances Mothers Have to Travel for Health Care with Newborns

by Emma Beaumont, Research Fellow IDEAS

Global positioning system (GPS) co-ordinates of the households, health posts and health centres were collected in the CBNC follow-up survey. These data were used to calculate the distances in kilometres (km) between households and health posts, households and health centres and health posts and health centres within a primary healthcare unit. The survey was unable to collect the GPS co-ordinates for 3 out of 10,300 households, 15 out of 206 the health posts and for 9 out of 206 health centre clusters. Where the calculated distance between household and health post was greater than 10km or the distance from household to health centre or health post to health centre was greater than 20km, these distances were removed from the analysis as it was assumed that one of the co-ordinates was incorrect.

The range and median (inter-quartile range) distances between health post and health centre and household and health post, and household and health centre within a primary health care unit were then calculated for clusters in Phase 1 and Phase 2 areas. These were calculated from households with a mother who had had a live birth in the 3-15 months preceding the survey, and from households containing a sick newborn. In addition, the analysis explored the difference in median distance between households and health facilities, for mothers who sought care for their sick new born and those who did not seek care. A map plotting the location of health centres, health posts and households containing a sick newborn was created using ArcGIS (Figure A2).

Results

The range of distances between households with a delivery in the 3-15 months prior to the survey, health posts and health centres is shown in Table A2a. The median distance between health posts and health centres was 1.2 km. Households were closer to health posts (median distance of 0.5 km), while they were further from health centres (median distance of 2 km). In general, Phase 2 area households were closer to health posts than Phase 1 area households.

An analysis of a small subsample of the survey showed that households where a mother sought care for a sick newborn were closer to health posts and health centres compared with households where where a mother did not seek care for a sick newborn (Table A2b).

Figure A2: Location of health centres, health posts and households containing a sick newborn

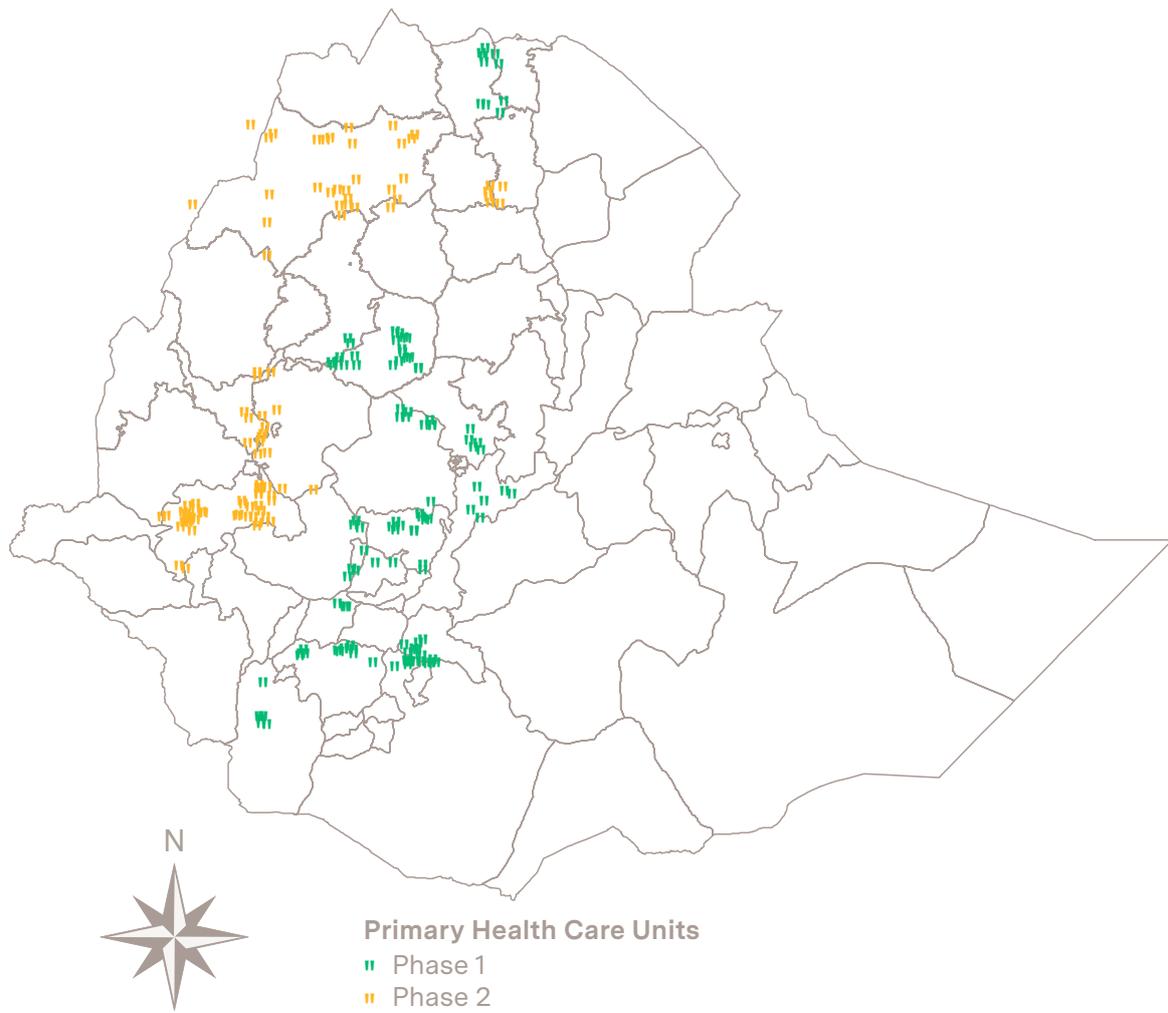


Table A2a: Range of distances mothers have to travel for health care with newborns

		Phase 1 Distance range in km	Phase 2 Distance range in km	Total Distance range in km
Public Healthcare Unit	Health Post to Health Centre	0-11.7	0-15.0	0-15.0
Mothers with a birth in the previous 3-15 months	Household to health post	0-10.0	0-7.1	0-10.1
	Household to health centre	0-15.5	0-16.5	0-16.5
Sick newborns	Household to health post	0-10.0	0-3.1	0-10
	Household to health centre	0.1-10.4	0-16.0	0-16.0
Sick newborns sought care	Household to health post	0.1-9.7	0-3.1	0-9.7
	Household to health centre	0.1-10.4	0-16.0	0-16.0
Sick newborns did not seek care	Household to health post	0-9.9	0.3-1.2	0-9.9
	Household to health centre	0.1-10.3	1.0-11.0	0.1-11.0

Range (minimum to maximum) distances in km.

Table A2b: Median distance mothers have to travel for health care with newborns

		Phase 1 Median Distance in km (IQR)	Phase 2 Median Distance in km (IQR)	Total Median Distance in km (IQR)
Sick newborns	N	42	61	103
	Household to health post	0.98 (0.22-1.55)	0.25 (0.07-0.66)	0.41 (0.12-0.99)
	N	45	70	115
	Household to health centre	2.77 (1.12-5.67)	1.08 (0.22-3.47)	2.14 (0.56-4.46)
Sick newborns sought care	N	29	55	84
	Household to health post	0.92 (0.22-1.50)	0.18 (0.07-0.61)	0.28 (0.10-0.93)
	N	30	61	91
	Household to health centre	2.23 (1.09-5.13)	0.91 (0.17-3.13)	1.50 (0.34-3.58)
Sick newborns did not seek care	N	13	6	19
	Household to health post	1.25 (0.38-1.97)	0.67 (0.61-0.86)	0.86 (0.38-1.51)
	N	15	9	24
	Household to health centre	5.16 (1.12-7.04)	3.30 (2.71-4.46)	3.83 (1.95-6.74)

Median (inter-quartile range) distances in km

Community Based Newborn Care programme Evaluation and Resources

The Community Based Newborn Care (CBNC) programme is a key milestone of the Ethiopian Health Extension Program. The goal is to reduce newborn mortality through strengthening the primary health care unit approach and the Health Extension Program.

CBNC Products



Berhanu D., Avan B.I. (2017) Community Based Newborn Care: Quality of CBNC programme assessment - midline evaluation report, March 2017. London: IDEAS, London School of Hygiene & Tropical Medicine



Berhanu D., Avan B.I. (2017) Community Based Newborn Care: Quality of CBNC programme assessment - midline evaluation Executive Summary, March 2017. London: IDEAS, London School of Hygiene & Tropical Medicine



Berhanu, D., Avan, B.I., (2014) Community Based Newborn Care: baseline report summary, Ethiopia October 2014. London: IDEAS, London School of Hygiene & Tropical Medicine

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