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Community-based child care: household and health-facility perspectives

Dagu Baseline Survey, Ethiopia, December 2016 – February 2017

Ethiopian Public Health Institute

Dagu

Evaluate Strengthen Learn

Evaluation, mutual capacity strengthening and learning to increase child health service use in Ethiopia

Acknowledgments

The Dagu Project led by Professor Joanna Schellenberg and Professor Lars Åke Persson at the London School of Hygiene & Tropical Medicine (LSHTM) produced this publication. The intention was to get a baseline description of newborn and child health service utilisation in four regions of Ethiopia from household and service provider perspectives. The baseline survey was followed by interventions to Optimize the Health Extension Program (OHEP), which is implemented by Save the Children and L10K through UNICEF and by PATH.

The Dagu Team acknowledges the work of the Ethiopian Public Health Institute that implemented this baseline survey, and the fruitful collaboration of the universities in Gondar, Mekelle, Jimma and Hawassa, with special thanks to the Dagu PhD students. We are grateful to the Federal Ministry of Health, the Regional Health Bureaus of Tigray, Amhara, Oromia and SNNP regional states, UNICEF and PATH for support in the implementation of the survey, and to all households, facilities and individuals that contributed to this effort.

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Report edited by Yemisrach Okwaraji

Research supervised by the LSHTM Dagu team at the Ethiopian Public Health Institute: Della Berhanu, Yemisrach Okwaraji, Atkure Defar and Lars Åke Persson

Survey coordination: Atkure Defar, Yemisrach Okwaraji, Theodros Getachew and Della Berhanu

Regional coordinators: Alem Desta, Alemayehu Shimeka, Habtamu Beyene, Dawit Wolde, Habte Bolka, Fisseha Ashebir, Alemayehu Tadesse and Garuma Getahun

Data management and analysis: Yemisrach Okwaraji, Della Berhanu, Desta Worku Wolassa and Lars Åke Persson

Publication coordination: Suzanne Welsh and Noreen Seyerl

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Executive summary

Ethiopia successfully met the child mortality Millennium Development Goal. An increased utilisation of primary care services for pregnant women, newborns and children is a prerequisite for further improvement in newborn and child survival. To address this underutilisation of services, the Federal Ministry of Health, together with implementing partners UNICEF and PATH, initiated the 'Optimizing the Health Extension Program' (OHEP) in four regions in Ethiopia.

The Dagu Project aims at evaluating the effect of this intervention, combined with research capacity building and learning. London School of Hygiene & Tropical Medicine, the Ethiopian Public Health Institute, the universities in Gondar, Mekelle, Jimma and Hawassa, and the Regional Health Bureaus of these regions collaborate in this effort. This Dagu Baseline Survey Report describes the situation at the start of the intervention: the community-based newborn and child care in the study areas from household and care provider perspectives. The objectives of the survey were:

1. To estimate the proportion of children aged 2–59 months reported to have any illness in the past two weeks, including suspected pneumonia, diarrhoea or fever, for whom care was sought from an appropriate provider.

2. To estimate the proportion of children aged 2–59 months reported to have suspected pneumonia, diarrhoea or fever in the past two weeks who received appropriate treatment.

3. To estimate the proportion of neonates (0–28 days) born in the year prior to the survey reported to have had symptoms of severe neonatal infection for whom care was sought from an appropriate provider.

4. To estimate the proportion of neonates (0–28 days) born in the year prior to the survey with symptoms of severe neonatal infection who received appropriate treatment, and who completed appropriate treatment.

5. To estimate the knowledge of childhood illnesses and treatment services among caregivers of children under five years of age.

Design and methods

This survey was performed in a representative sample of 194 enumeration areas based on the 2007 Ethiopian Housing and Population Census, here labelled clusters, selected with probability proportional to size from 46 woredas (districts) across four regions (Amhara, Southern Nations, Nationalities, and Peoples [SNNP], Oromia, Tigray). In half the clusters, the OHEP intervention has thereafter been initiated. Within each cluster, 30 households were randomly selected giving a self-weighting sample. For every cluster of 30 households, the Women's Development Army (WDA) leader serving the cluster was interviewed. The health post and the health extension workers (HEWs) serving the selected cluster were also surveyed. The health-post's referral health centre and staff providing services for under-five children were also surveyed. Lastly, the woreda health office providing support to the selected facility was approached with a survey module. For every cluster, the interviewers also conducted community mobilisation to ensure that children from 2–59 months, who on the day of the survey were considered ill by their caregivers, were brought to the health post for assessment of case management of childhood illnesses by HEW. A maximum of six sick children per health post were included in this sub-study.

The household survey comprised of a household section on characteristics of the house and its assets; a women's section covering information from all women of reproductive age (13 to 49 years) about the healthcare available to them, their recent contact with health providers and about careseeking for their children born in the past 12 months preceding the survey; and a child section administered to caregivers of children aged 0–59 months, to collect information about their knowledge of major childhood sicknesses and of very severe disease (VSD) of newborns, and their careseeking behaviour for any recent illness episode.

The health-post and health-centre modules aimed at collecting information on overall facility-level preparedness to provide child health services, including data abstraction on the numbers and outcomes of all child health services provided from facility registers. The HEW module covered their knowledge related to child and newborn health, the training and supportive supervision they had received and the services they provided. The WDA module covered the WDAs' knowledge of danger signs in pregnancy and the training they received. The health-provider assessment module determined the competency and skills of HEWs to correctly assess and classify a sick child, to assess mother's understanding of the consultation and examination, and to assess caregivers' perception of the service delivery. The woreda contextual factor module collected data on demography, maternal and newborn health programmes, woreda resources and infrastructure, and recent natural disasters.

The survey was performed from December 2016 to February 2017. Sixty well-trained field workers performed the interviews, observations and other data collection. The quality of the information collected was maximised by using validated and pretested forms, a system of field supervision, and careful data quality control and management.

Household survey – utilisation of services

This baseline survey was performed in 194 clusters from 46 woredas

across four regions in Ethiopia (Amhara, SNNP, Oromia, and Tigray regions). The results were based on information from 5,714 households, 6,321 women of reproductive age, and 3,110 children below the age of five years.

Among women who had a live birth during the last year, 69% had attended antenatal care at least once. One-third had attended four antenatal visits. Few had prepared for birth at facilities, but 47% had delivered at health facilities. Four per cent of the newborns had a postnatal check within the recommended first two days of life. With regard to women's knowledge of danger signs during pregnancy, 54% of the women were able to state two or more pregnancy danger signs.

Eight per cent (N=69) of women who had a live birth in the 12 months preceding the survey reported that their child had symptoms of VSD in the neonatal period. Among these sick neonates, 66% had sought care from a healthcare provider.

Among all newborns (N=714), 4% reportedly had symptoms of local bacterial infection. Of these, care was sought for 66% of sick newborns. and 44% of those who sought care were reported to have received antibiotic treatment.

Among 2,873 children between the age of 2–59 months residing in the study area, 6% (N=166) reportedly had an illness episode during the two weeks preceding the survey. Of these, 55% (95% confidence interval [95% CI] 47–63) had sought care from a formal health provider (health post, health centre, hospital or private clinic). The most common illnesses during two weeks before the survey for children below the age of 2–59 months were fever, diarrhoea and suspected pneumonia. Among the 2,873 children, 5% (N=139) reported to have suspected pneumonia, diarrhoea or fever during the two weeks preceding the survey. Of these, 47% (95% CI 39–56) received antibiotics, oral rehydration solution (ORS), zinc or antimalarial treatment.

Register review – utilisation of services

Data from the Integrated Management of Newborn and Child Illnesses (IMNCI) and Integrated Community Case Management (iCCM) registers at health posts and health centres were abstracted. The diagnosis and treatment including referrals of 0–2-month babies and 2–59-month-old infants and children were reviewed from these registers. For babies aged 0–2 months, one-third of cases were diagnosed as having VSD. In terms of treatment for VSD cases, over half of the babies were treated with gentamicin and just over a quarter with amoxicillin. For sick children aged 2–59 months, the majority of cases were diagnosed as having pneumonia, diarrhoea or fever. In terms of treatment for these cases, amoxicillin was given for the majority of pneumonia cases. Four out of five cases of diarrhoea were treated with ORS. Just over a quarter of fever cases were treated with an antimalarial. An antibiotic was also given for over a quarter of fever cases.

Health-facility and health-provider survey

These results are based on 175 health-centre staff, 276 HEWs, 268 WDA leaders, and 620 sick children coming to HEWs as well as informants at the woreda health office.

Facility readiness
According to information received at the woreda health office, staff trained in the IMNCI were available at 85% of the health centres, and half had staff trained in Community-Based Newborn Care (CBNC). The survey at the health centres indicated that three-quarters of the staff had received in-service training or training updates in child health, usually more than one year previously. A bit less than half of the health-centre staff had received training in newborn care components; in most cases not in the last year. Eight out of ten HEWs surveyed had been trained at some point in time in the iCCM but only a fifth during the last year. Two-thirds of the HEWs had received training in the CBNC and a fifth had got this during the last year. Approximately two-thirds of the WDA leaders had received an orientation in maternal, newborn and child health in the 12 months preceding the survey.

Health workers and volunteers: knowledge and supervision
Health-centre staff knowledge of newborn care was generally lower than that of health problems and actions to take regarding children aged 2–59 months. This may be illustrated by a relatively low knowledge of key components of immediate newborn care, care of preterm babies, as well as what to do with health problems of the newborn. The unprompted responses regarding signs and symptoms of child health problems and actions to be taken were more satisfactory. An exception may be the management of severe acute malnutrition, where key components were missing for many responses.

The HEWs' unprompted knowledge of postnatal care (PNC) components was low. They had better knowledge of signs, symptoms, and management of sick children from 2–59 months of age. Three-quarters or more knew that cough with either difficult or fast breathing are signs of pneumonia, and most workers mentioned treatment with antibiotics. Around two-thirds mentioned sunken eyes as sign of dehydration, and less than half cited a skin pinch test to assess dehydration. Almost all mentioned treatment of moderate dehydration with ORS and zinc.

Around half or less of the WDA leaders had unprompted knowledge of each of the components of PNC, young infant danger signs and danger signs for children in the age interval 2–59 months. A similar assessment, using images from the family health guide, showed that one-third or less of WDA leaders were not able to correctly identify images relating to newborn danger signs. In contrast over 80% correctly identified images related to hand hygiene, breastfeeding and vaccination of infants.


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Two-thirds of the health-centre staff had received a supervisory visit in the last three months. Two-thirds of health posts had received a supervisory visit in the last month. Although most of the supervisory visits covered aspects of maternal care, less than 50% covered young infant care and around two-thirds covered care for children 2–59 months old. Eighty-five per cent of health-centre staff reported that they had observed HEWs' client interaction, while 58% of the HEWs said that their supervisors had observed their interaction with a client. Performance review and clinical mentoring (PRCM) meetings had been attended by less than half of the HEWs in the 12 months preceding the survey.

Service provision

Service provision data from health centres showed that postnatal coverage in the last three months was suboptimal; health centres on average had recorded providing PNC to 63 women within 24 hours of delivery, while on average 117 deliveries were recorded in the same time period.

Similar trends were seen at the health-post level. Almost all interviewed health-centre staff provided care of sick children 2–59 months, while around two-thirds to four-fifths provided different aspects of antenatal, delivery and post-delivery care.

Among the 620 children assessed by the HEWs, respiratory problems, diarrhoea and fever dominated. Danger signs were assessed in around three-quarters of the children. The assessments often missed crucial points: respiratory rates not counted when having respiratory complaints (one-quarter), dehydration not assessed when having diarrhoea (two-thirds), and temperature not measured when complaining about fever (four-fifths). There were problems with inconsistencies between assessment and classification (for example very low weight but not classified as malnutrition), and between classification and treatment (for example diarrhoea with dehydration not treated with ORS). Advice regarding home care and when to return to the facility was provided in most cases. The iCCM chart booklet and registration book were used in most encounters.

Woreda contextual factors

Antibiotics to treat pneumonia were available in two-thirds of the health posts, but combinations for sepsis treatment (amoxicillin plus gentamicin) in just over a third only. ORS was available at health-post level in two-thirds of the woredas, and ready-to-use therapeutic food for the malnourished children in nine out of ten woredas.

Less than one PRCM meeting per health centre per year was reported on average. In most cases this meeting included review of the iCCM registration book, a summary of the previous visit, a discussion on strengths and weaknesses, and planning for the next period.

Some conclusions and reflections on these baseline results are provided in the comment section.

1. Background

Ethiopia successfully met the target for the Millennium Development Goal 4; a two-thirds reduction of under-five mortality from 1990 to 2015. During that period, under-five mortality dropped from 205 per 1000 live births in 1995 to 59 per 1000 live births in 2015 (UNICEF 2015).

Neonatal mortality reportedly decreased from 60 deaths per 1,000 live births in 1990 to 28 per 1,000 live births in 2016.[1] In spite of these achievements, there has been a critical underutilisation of community-based child health services, hampering further improvements in neonatal, infant and child survival in Ethiopia. Only 30% of sick under-five children with lower respiratory tract infections were taken to the primary health services according to the latest demographic and health survey, and only 30% of sick children with diarrhoea were treated with oral rehydration solution (ORS) (DHS 2016).

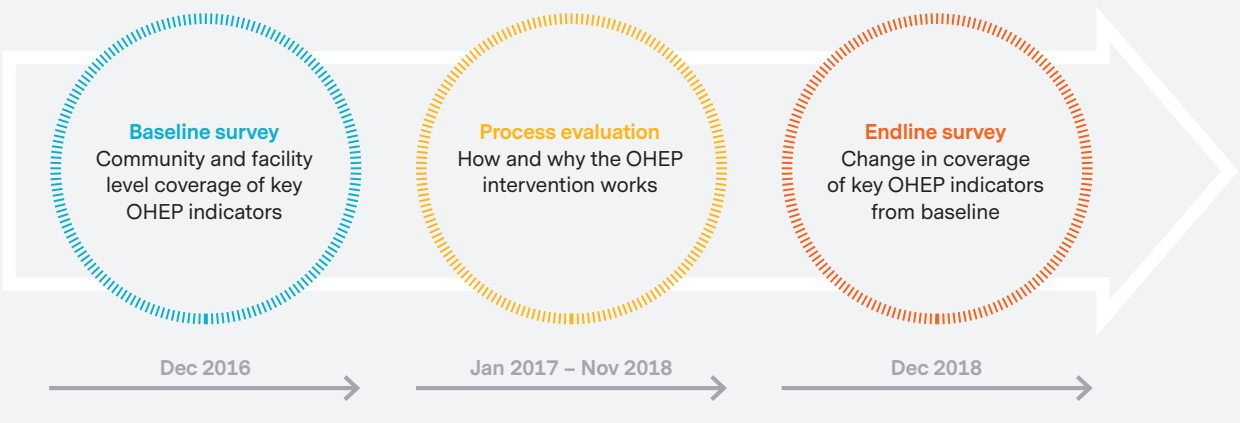
In an effort to address the critical underutilisation of community-based services the Federal Ministry of Health has initiated the 'Optimizing the Health Extension Program' (OHEP) in collaboration with its implementing partners UNICEF and PATH. The overall goal of OHEP is to contribute to the reduction of child deaths through increased utilisation of Integrated Community Case Management (iCCM) and Community-based Newborn Care (CBNC) services for newborns and children under five years of age. This would be achieved by improving child health practice at household and community level, improving availability of quality services and improving ownership and accountability which all lead to increased careseeking practices and increased coverage of high impact iCCM, CBNC and Integrated Management of Newborn and Child Illnesses (IMNCI) services. UNICEF and PATH have completed a review of the barriers to iCCM and CBNC careseeking in Ethiopia.[2] Based on that analysis they have developed innovative approaches to address these bottlenecks,[3] with the aim of increasing the use of primary newborn and child health services.

The OHEP Project is funded by the Bill & Melinda Gates Foundation and is being implemented in five zones within four regions of Ethiopia. PATH is supporting the implementation in Amhara and Oromia regions, and UNICEF is supporting the implementation through non-governmental organisation (NGO) partners in the Southern Nations, Nationalities, and Peoples (SNNP) and Tigray.

London School of Hygiene & Tropical Medicine in partnership with the Ethiopian Public Health Institute (EPHI) and the universities in Jimma, Mekelle, Hawassa and Gondar, have embarked in an effort to estimate the effects of the OHEP, ensure the validity of the approach, and provide ongoing support to UNICEF and PATH to ensure that the initiative is being implemented according to plan with ongoing monitoring of data for programme improvement and operational adaptation. This effort has been labelled the Dagu Project.[4] This report of the baseline survey describes the household and provider perspectives of newborn and child health services at the start of the OHEP implementation. Data from the baseline survey, and later from the endline survey after completion of the OHEP intervention, will be used to compare the situation before and after the intervention, in intervention

1. United Nations Interagency Group for Child Mortality Estimation (UN IGME). *Levels & Trends in Child Mortality: Report 2017, Estimates Developed by the UN Inter-agency Group for Child Mortality Estimation'.* United Nations Children's Fund, New York, 2017.
2. Barriers to uptake of iCCM and CBNC services in selected woredas of Amhara, Oromia, SNNP and Tigray regions, ETHIOPIA, UNICEF and PATH, 2015.
3. OHEP Progress Report, PATH, 2016.
4. For the Afar people in north-east Ethiopia who mostly live in mobile, pastoralist communities, Dagu is a traditional means of communication; a reliable verbal exchange for public news and information within the community. Menbere G, Skjerdal TS. The potential of dagu communication in north-eastern Ethiopia. *Media Dev* 2008;55(1):19–21.

Figure 1. Components in the Dagu evaluation of the OHEP intervention for improved utilisation of newborn and child health services in Ethiopia



and comparison areas. The assessment of effect will be based on a plausibility approach.[5] Additional data on the OHEP intervention will describe the implementation, mechanisms and context in a process evaluation that will address how and why the intervention worked (Figure 1). PhD students from the four Ethiopian universities focus on different parts of the Dagu evaluation and the OHEP interventions, leading to publications in peer-reviewed journals with more in-depth analyses.

1.1. Dagu Baseline Survey objectives

The Dagu Baseline Survey had the following main objectives:

1. To estimate the proportion of children aged 2–59 months reported to have any illness in the past two weeks, including suspected pneumonia, diarrhoea or fever, for whom care was sought from an appropriate provider.

2. To estimate the proportion of children aged 2–59 months reported to have suspected pneumonia, diarrhoea or fever in the past two weeks who received appropriate treatment.

3. To estimate the proportion of neonates (0–28 days) born in the year prior to the survey reported to have had symptoms of severe neonatal infection for whom care was sought from an appropriate provider.

4. To estimate the proportion of neonates (0–28 days) born in the year prior to the survey with symptoms of severe neonatal infection who received appropriate treatment, and who completed appropriate treatment.

5. To estimate the knowledge of childhood illnesses and treatment services among caregivers of children under five years of age.

5 Habicht JP, Victora CG, Vaughan JP. Evaluation designs for adequacy, plausibility and probability of public health programme performance and impact. *Int J Epidemiol* 1999;28(1):10-8.

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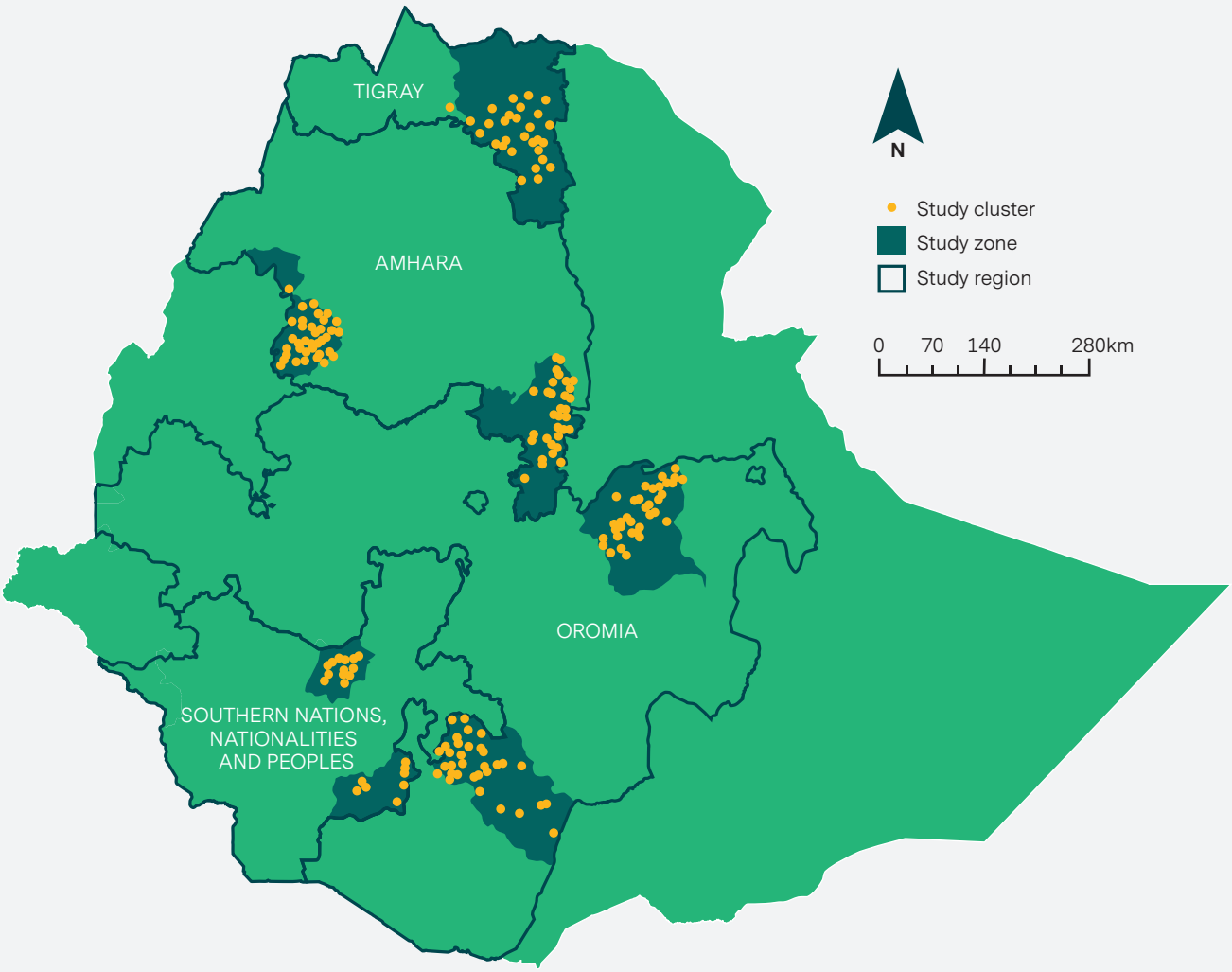
1.2. Organisation of this report

This report presents the main findings from the baseline survey performed from December 2016 to February 2017. Chapter 1 presents the background to the OHEP project and the Dagu evaluation. Chapter 2 presents the methodology used in the baseline survey. The results are presented in chapters 3 and 4. Chapter 3 presents results from the household survey and a review of health-post and health-centre registers. Participation in the study and characteristics of the household heads and women who were between the age of 13 and 49 years old are presented in section 3.1 and 3.2 respectively. Section 3.3 presents results of key indicators for utilisation of services along the continuum of care: pregnancy care, intrapartum care, postpartum care and newborn care. Section 3.4 presents utilisation of services for children under the age of five years old. This includes careseeking for children between the age of 2–59 months old who were ill two weeks prior to the survey, and vaccination coverage for children between the age of 12–23 months old. Section 3.5 covers caregiver's knowledge of child health issues. Section 3.6 presents utilisation of childhood services at health-post and health-centre level. This section provides results from review of the 0–2 months IMNCI or iCCM register and the 2–59 months IMNCI or iCCM register. Section 3.7 deals with summarising utilisation of services.

Chapter 4 provides results from the health-facility and health-provider survey. Section 4.1 describes facility readiness to provide iCCM and CBNC services. Section 4.2 includes results from the health extension workers (HEW) survey, staff at the health-centre survey, and Women's Development Army leaders (WDA) survey, describing their knowledge, the services they provided, and the training and supervision they had received. Further, it presents results regarding the HEWs' provision of services; their assessment, classification and treatment of children who seek care. Results from the health-provider assessment survey are presented in Section 4.3. Section 4.4 deals with results regarding the contextual factors of the woredas (districts) included in the survey. Chapter 5 presents some overall comments on the study findings.

2. Methods

Figure 2. Map of Ethiopia with the selected study areas



2.1. Setting

The Dagu Baseline Survey was conducted from December 2016 to February 2017 in selected areas in four regions of Ethiopia (Figure 2). The areas shaded in orange are the study zones. The list of study woredas is also presented in Annex 1.

2.2. Overall design

This survey was conducted from December 2016 to February 2017 in four regions (Amhara, SNNP, Oromia and Tigray) of Ethiopia. This was a baseline survey performed prior to the implementation of the OHEP, which was intended to increase the health service utilisation for newborns and children below the age of five years. The survey also included areas of comparison. An endline survey in the same areas is planned for the end of 2018. A household survey, and surveys of healthcare providers, health facilities and district (woreda) administrators were conducted.

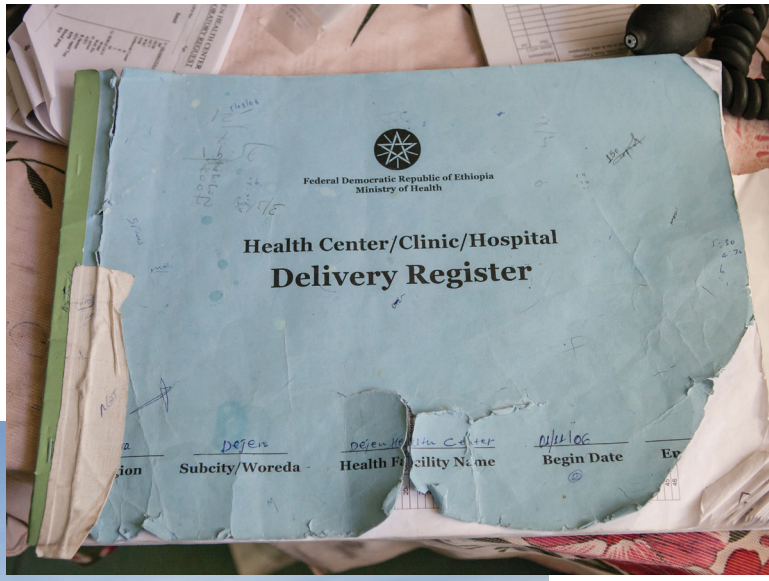
2.3. Sample selection

A two-stage stratified cluster sampling was applied in intervention areas, where the OHEP was to be implemented, and in the comparison areas, which were selected by the regional health bureaus for having similar key maternal, newborn and child health (MNCH) indicators as the intervention areas. The first stage used lists of enumeration areas (EA) from the 2007 Ethiopian Housing and Population Census as the sampling frame. The cumulative population size for clusters across the study areas was calculated, and 200 EAs were selected with probability proportional

to size. Each EA formed one cluster, and these clusters constituted the primary sampling unit.

In the second stage, a systematic random sampling technique was used. All households within each cluster were listed and a sampling interval calculated. A random start number between one and the sampling interval was selected. The household that matched the random start number in the list was then picked as the first household. This process was repeated until the targeted number of 30 households in each cluster was reached.

All women aged 13 to 49 years and children under the age of five years, who lived in the selected households, were included in the survey. For every cluster of 30 households, the WDA leader serving the cluster was interviewed. The health post and the HEWs serving the selected cluster were also surveyed. The health-post's referral health centre and staff providing services for under-five children were also surveyed. Lastly, the woreda health office providing support to the selected facility was approached with a survey module.



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For every cluster, the interviewers also conducted community mobilisation to ensure that children from 2–59 months, who on the day of the survey were considered ill by their caregivers, were brought to the health post. A maximum of six sick children per health post were included in this sub-study.

2.4. Sample size determination

The sample size was based on the requirement that the baseline and endline surveys should measure changes of a fixed number of percentage points between intervention and comparison areas at baseline and endline. A sample size of 3,000 households in both intervention and comparison groups (6,000 in total) would have 80% power to detect differences of 10–20 percentage points across a range of child health indicators on careseeking and appropriate treatment as statistically significant.

A sample survey of 400 sick children per group, from 100 health posts, each with case management observed for four children, would be expected to achieve a sample size of 800 children aged 2–59 months. This sample size of 400 per group (800 in total) would have 80% power to detect a difference of at least 15 percentage points as statistically significant.

2.5. Questionnaire modules

The household survey comprised of three sections. The first was a household section administered to the head of the family to collect household listing information: name, age and sex of all current residents; identification of primary caregiver to any child under five years of age; characteristics of the house and its assets; access to healthcare; recent interactions with healthcare providers; location of each household based on GPS assessment.

The second was a women's section covering information from all women of reproductive age (13 to 49 years) with information about the healthcare available to them; their recent contact with health providers; their birth history for children born since 2004 with more information about careseeking for children born in the past 12 months preceding the survey. This included careseeking and utilisation of health services during pregnancy, the intrapartum period, postpartum and for the first 28 days of life. The final section was a child section administered to caregivers of children aged 0–59 months, to collect information about their knowledge of malaria, diarrhoea and pneumonia; knowledge of danger signs of very severe disease (VSD), and of home management of illness, signs and symptoms of pneumonia, diarrhoea, and fever; careseeking and treatment for any recent illness episode; and preventive behaviours (including breastfeeding and immunisation).

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The health-post and health-centre modules aimed at collecting information on overall facility-level preparedness to provide child health services and comprised of five sections: (1) background information of the health facility; (2) an inventory of equipment and supplies available and functioning on the day of survey; (3) an inventory of staff employed at the facility, and the training they received; (4) an interview with the in-charge of the facility about the services offered at that facility, and about recent supervision visits they had received; (5) data abstraction from facility registers, including the numbers and outcomes of all child health services provided at the facility during the previous three months.

The HEW module covered their work to support child and newborn health, and their knowledge related to child and newborn health. The module comprised six sections: (1 – 3) background information about the HEW and the community they served; (4) the training or training updates they had received in the last 12 months; (5) the supportive supervision they had received in the last six months; (6) the services they provided in the last three months.

The WDA module had five sections: (1) WDAs' living area characteristics; (2) background information about the WDAs; (3) WDAs' knowledge about danger signs in pregnancy, including how to use the family health guide; (4) the material and training the WDAs received from the HEWs in the last 12 months; (5) planning practice and reporting meetings performed with the HEWs.

The health-provider assessment module comprised three sections: (1) observation of consultation sessions to assess the competency and skills of HEWs to correctly assess and classify a sick child; (2) exit interviews with caregivers, when mothers or caregivers were asked to assess their understanding of the consultation and examination, as well as to recall instructions given for treatment or advice on preventive behaviours. The client's perception of the service delivery environment was also assessed. Exit interviews were done with clients whose

consultations had been observed; (3) re-examination of the sick child: this was done to assess whether the HEWs correctly assessed, classified, treated, and referred the child with illnesses, and provided counselling to the caregiver based on the iCCM clinical guidelines.

The woreda contextual factor module was administered at the woreda level to collect data on demography, maternal and newborn health programmes, woreda resources and infrastructure, and recent natural disasters.

The questions and content of each survey module were based on existing large-scale survey tools, such as the Demographic and Health Surveys, the Service Provision Assessment, the Averting Maternal Death and Disability, and Safe Motherhood survey tools. All questionnaires had been extensively pretested and revised.

2.6. Study implementation

The EPHI coordinated the survey. The survey questionnaires were written to tablet computers (Toshiba Click 10 Lx5W-C-109) using the Census and Survey Processing System (CSPro), which is public domain software.[6] Data collectors were recruited. As a minimum, they had completed their first degree. Health officers trained in iCCM and CBNC were employed as team leaders.

There were 15 data collection teams, each comprised of two enumerators, one observer (of HEW's child consultation) and one re-examiner. The re-examiners were health officers trained in the iCCM of child diseases and CBNC, and served as team leaders; in total, there were 60 data collectors. All data, except for the re-examination tool, were collected using tablet computers. Data collectors were trained for ten days covering the study procedures, questionnaires, data collection techniques, clinical guidelines, quality-assurance procedures and study ethics. A field manual was provided to the data collectors. The survey tools were pilot-tested by the data collectors during three days of training in the field.

During fieldwork, the supervisors carried out at least two re-interviews per cluster, and observed each interviewer in his or her team during each day of data collection. These re-interviews and observations were used as a means of providing feedback to interviewers, ensuring consistency between interviewers and continuously improving the quality of the work.

2.7. Data management and analysis

When internet connection was available, and every day if possible, digital data were synchronised from the interviewer devices to the central data server at EPHI. In addition, when the supervisor had internet connectivity, data were uploaded from the supervisor laptop to a secure, dedicated central data server at EPHI. Data collected on paper (health-provider assessment survey) were checked for completeness by the team supervisor and the re-examiners entered the data into a tablet PDA in the evening of the day of the interview. In addition, completed and checked paper questionnaires were collected at weekly intervals and returned to Addis Ababa by senior supervisors making visits to the field teams. These data were double entered at Dagu Central Office and reconciled using the CSPro software.

The analyses presented in this report are descriptive. Findings were presented as frequencies (per cent), means, or medians, with 95% confidence intervals (95% CI) adjusted for the clustered nature of the data, as appropriate. Analyses were performed using STATA 14 (STAT Corp, Texas, USA) and SPSS version 24 (IBM Corporation, New York, USA).

2.8. Research ethics

Informed consent was obtained from all study participants. Ethical approval was obtained from the EPHI, and research permits were obtained from the Regional Health Bureaus in Amhara, Oromia, SNNP and Tigray. Ethical approval was also obtained from the London School of Hygiene & Tropical Medicine.


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6 https://www.census.gov/population/international/software/cspro/index.html

3. Results: Household survey – utilisation of services

3.1 Participation

A total of 52 woredas were purposefully selected. However, interviews were performed in 46 woredas; data from one zone (Konso) which comprises of 6 clusters was excluded since fieldwork could not be performed in that area because of civil unrest. A total of 5,773 heads of household from the 194 clusters were invited to participate in the survey, and 5,714 agreed (Figure 3). The average household size was 4.8 people. The total number of women aged 13–49 years living in surveyed households was 6,645, 95% of whom (N=6,321) were interviewed about their recent birth histories. Among these 6,321 women, 714 (11%) had a live birth in the 12 months preceding the survey, and completed a detailed module about that birth. The total number of children under the age of five years living in surveyed households was 3,194. Caregivers of 97% of these children (N=3,110) were interviewed about their knowledge on danger signs, careseeking behaviour, immunisation status of the child, and whether the child had been sick and treated in the past two weeks. The background characteristics of individuals interviewed in the households are shown in Table 1.


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Figure 3. Study flow: Household module

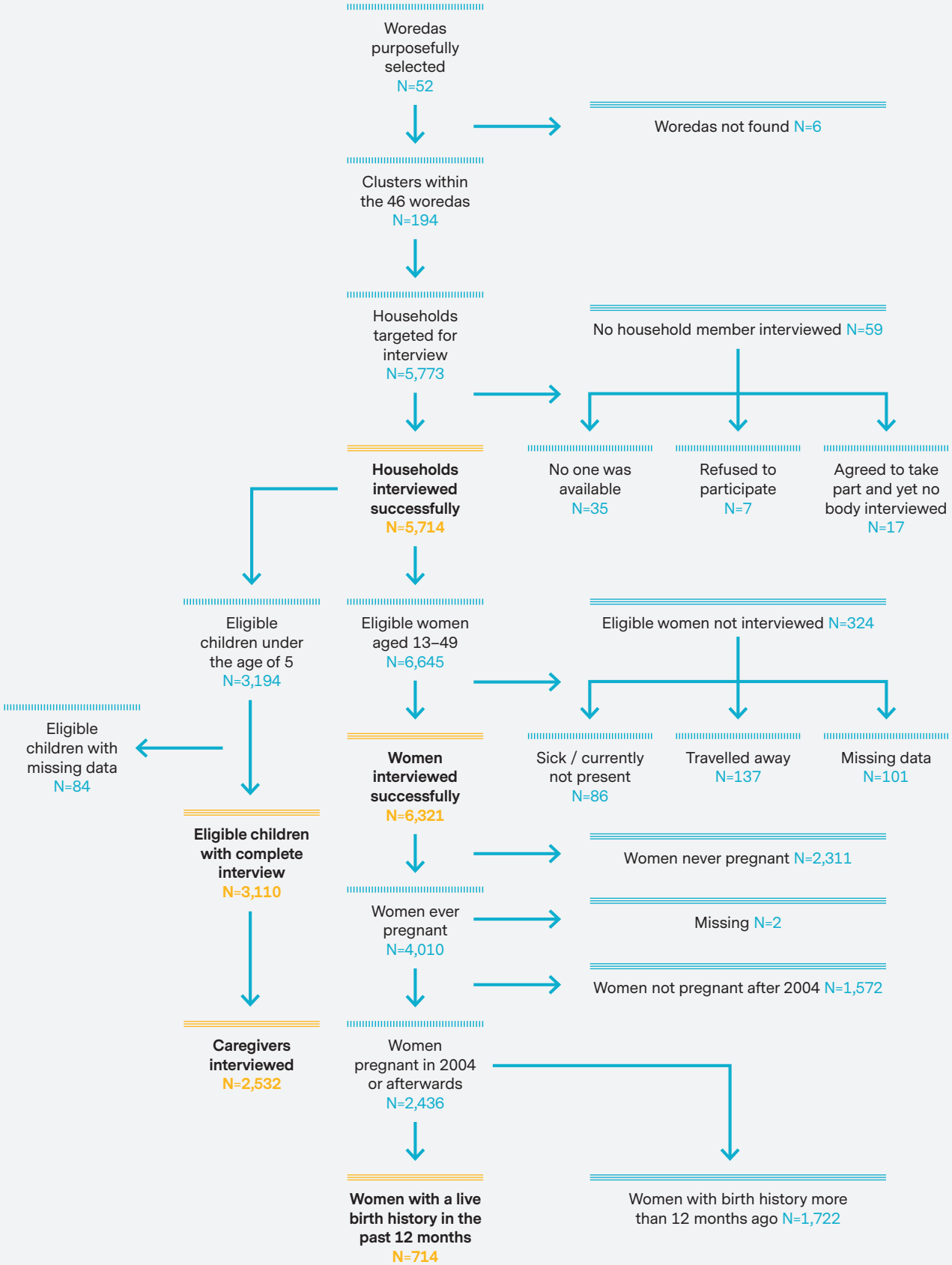
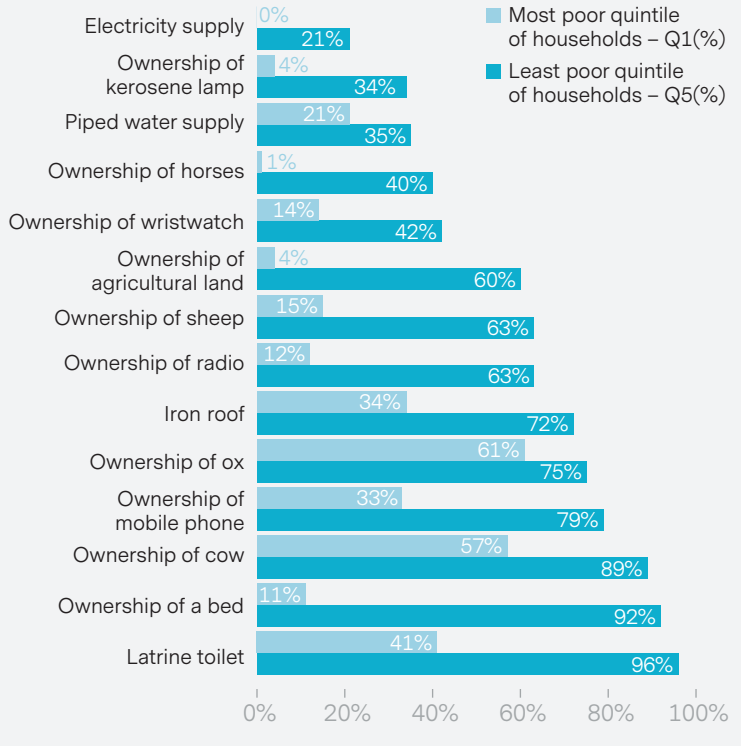


Table 1. Characteristics of household module respondents

	Household heads N=5,714 (%)	Women aged 13–49 years N=6,321 (%)	Women with a live birth in the 12 months preceding survey N=714 (%)
Region			
Amhara	37	37	23
Oromia	36	38	53
SNNP	12	11	14
Tigray	15	14	10
Religion			
Muslim	23	21	39
Orthodox	55	57	28
Protestant	20	20	31
Others	2	2	2
Socioeconomic status			
Q1 (most poor)	20	17	21
Q2	20	19	24
Q3	20	20	20
Q4	20	21	18
Q5 (least poor)	20	23	17
Marital status			
Currently married	46	59	96
Education			
None	59	46	53
Primary	30	40	37
Secondary	11	14	10

Figure 4. Building materials and ownership of assets in the poorest (Q1) and the least poor (Q5) households (N=5,714)



3.2. Characteristics

Socioeconomic status of the households

The household module included questions about household building materials (walls, roof and floor), utilities (water source, sanitation, cooking fuel and electricity), assets (radio, bicycle, fridge, television, mobile phone, bed, Bajaj, kerosene or pressure lamp and wrist watch) and animals owned (chickens, goats, sheep, cows, camels, donkeys, oxen and bulls). To examine the relationship between key outcomes and socioeconomic status, an index of the socioeconomic or wealth status was constructed for each household using principal component analysis. The continuous variable produced by the first principal component was divided into five equally sized groups (quintiles) of households from quintile 1 (poorest) to quintile 5 (least poor). The characteristics of the households in the poorest and the least poor quintiles are demonstrated in Figure 4.

3.3. Maternal and neonatal healthcare utilisation

Pregnancy care

This section presents the coverage of critical interventions provided during pregnancy. Sixty-nine per cent (95% CI 64–73) of the women interviewed (N=714) reported at least one antenatal care (ANC) visit during pregnancy, while only 30% (95% CI 26–34) reported to have four or more ANC visits. The average number of ANC visits was 2.4. The majority had had their weight measured (79%), 77% had had their blood pressure (BP) measured and 48% had been counselled on pregnancy danger signs (Figure 5). Only 7% (95% CI 5–10) of women who had a live birth in the 12 months prior to survey reported having received all eight components.

During the ANC visits women were advised how to prepare for delivery: to identify a birth attendant and a health facility, to put aside money for costs around delivery, to plan the transport to the place of delivery and to prepare food. Women's knowledge of birth preparedness was assessed among

Figure 5. Coverage of core components of pregnancy care among women with a live birth in the 12 months preceding the survey (N=714)

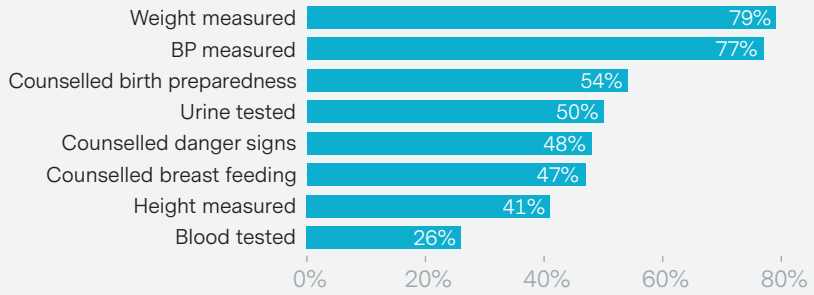


Figure 6. Preparedness for delivery during pregnancy among women with a live birth in the 12 months preceding the survey (N=714)

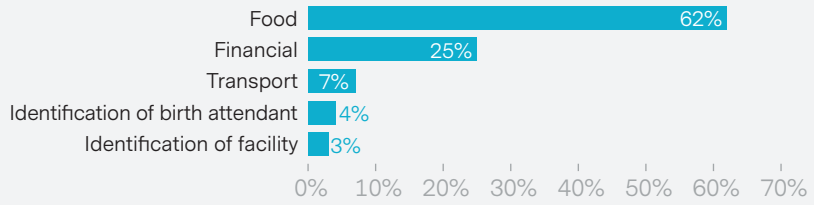
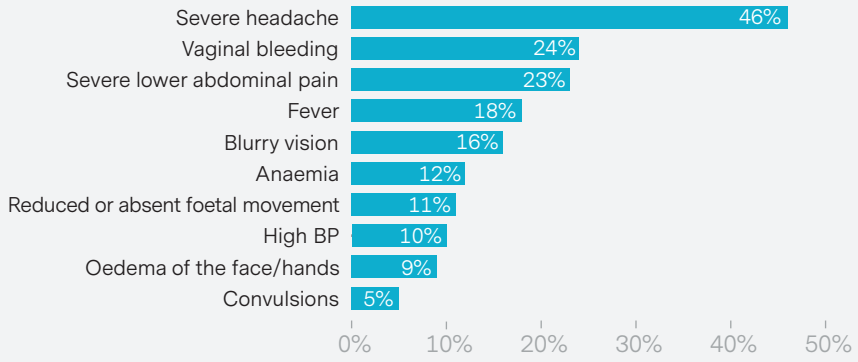


Figure 7. Unprompted knowledge of pregnancy danger signs among women with a live birth in the 12 months preceding the survey (N=714)



women who had had a live birth in the 12 months preceding the survey. Over 60% of these women cited the importance of preparing nutritious food, and a quarter mentioned the importance of financial preparedness (Figure 6). Transport, the identification of a birth attendant and facility were mentioned by very few.

With respect to the actual practice among women who had a live birth in the last 12 months, 61% (95% CI 55–66) reported that they had included at least one of the five components, while only two women reported that they had prepared all five components. Women were also asked about their unprompted knowledge of pregnancy-related danger signs and 54% (95% CI 50–58) were able to state two or more pregnancy danger signs. The average number of pregnancy-related danger signs was 1.7 (Figure 7).

Intrapartum care

Just below half of the women with a birth in the year preceding the survey gave birth in a health facility, 47% (95% CI 43–51) and 49% (95% CI 45–53) were attended by a skilled attendant (doctor, midwife, health officer or nurse). Fourteen per cent of the women had received advice to seek care at a higher level of the health system; out of those 44% followed the advice. Around two-thirds of the women giving birth during the last year preceding the survey had got the cord cut and tied in a hygienic manner. Four-fifths did not put anything on the cord. Most newborns had been dried immediately, half had delayed bathing (more than six hours) and almost all had initiated breastfeeding with an hour of birth.

Postpartum care

Few women with a birth during the last 12 months had received any postpartum care. Women were asked if anyone has checked their health after delivery; only 20% reported having any postpartum check in the first month after birth. Of those who received postnatal check, over half of the women (95% CI 51–67) reported that their health was checked within two days after birth. However, none had received all five components of postpartum care (danger sign counselling, family planning counselling, nutrition counselling, checking bleeding and checking breast). There was little variation between the different components of postpartum care, and the occurrence ranged from 2% to 4%.

Newborn care

Twelve per cent of mothers reported that their newborns had some postnatal check by a healthcare provider or traditional birth attendant during the first month of life. Just 4% of the newborns had been examined within the recommended first two days of life (95% CI 3–6). Information on history of illness during the first 28 days of life was collected from mothers who had given birth 12 months prior to the survey (N=714). Nine per cent (N=69) reported

that their newborns had symptoms of an illness and among these, 68% (95% CI 56–78) said they had sought care from a healthcare provider (figure 8).

Among all newborns (N=714), 8% (95% CI 6–10) were reported to have had symptoms of VSD (difficult/fast breathing, unable to suck, lethargy, chest in-drawing or convulsions). Of these neonates with symptoms of VSD, care was sought for 66% (95% CI 52–77) of the newborns and 64% (95% CI 48–79) of them had reportedly received antibiotic treatment. Among those who received antibiotics, 33% completed the seven days of gentamicin treatment and 90% completed the seven days amoxicillin treatment. Among all newborns, 4% (95% CI 3–7) had symptoms of local bacterial infection (LBI) (skin pustules, pus from cord, or red or discharging eyes). Of these, care was sought for 66% of the sick newborns and 44% had received antibiotic treatment and 36% of diarrhoea cases had received ORS/zinc for diarrhoea (Figure 9).


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Figure 8. Place of care sought for children 0–2 months old who reported to be sick in the first month of life (N=69)

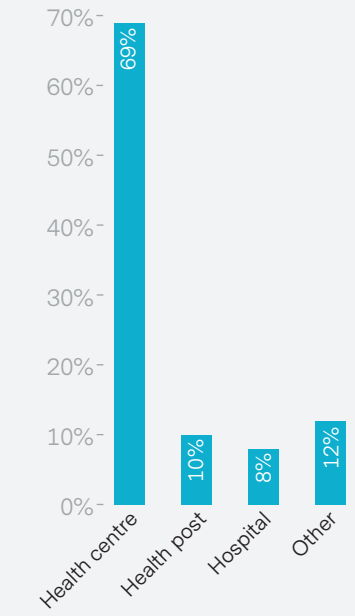
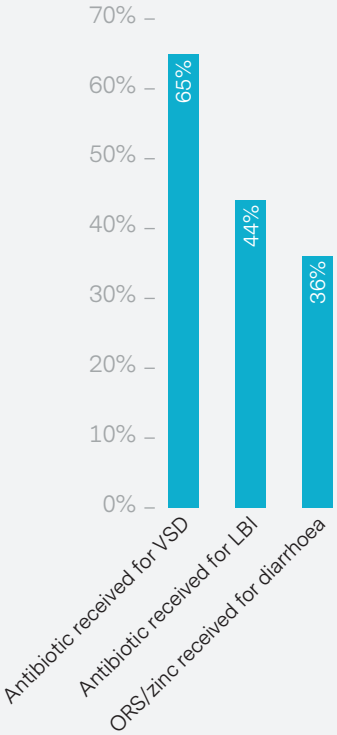


Figure 9. Treatment received for ill neonates among infants born in the 12 months preceding the survey (N=69)



3.4. Child healthcare utilisation

Careseeking for children aged 2–59 months

For each child between the age of 2–59 months, caregivers or mothers were asked if the child had experienced symptoms of illness including diarrhoea; a cough accompanied by fast breathing or difficulty breathing; or a fever in the two weeks preceding the survey. Caregivers were also asked if care was sought when the child was ill. Among 2,873 children between the age of 2–59 months residing in the study area, 6% (N=166) reportedly had an illness episode during the two weeks preceding the survey. Of these, 55% (95% CI 47–63) had sought care from a formal health provider (health post, health centre, hospital or private clinic).

Among 2,873 children residing in the study area, 5% (N=139) reported to have suspected pneumonia, diarrhoea or fever during the two weeks preceding the survey. Of these, 47% (95% CI 39–56) received antibiotics, ORS, zinc or antimalarial treatment.

Figure 10 shows the place care was sought for children who reported to be sick in the two weeks prior to survey. The most common place was from a health centre (41%), with 24% seeking care from a health post and 25% from a private clinic.

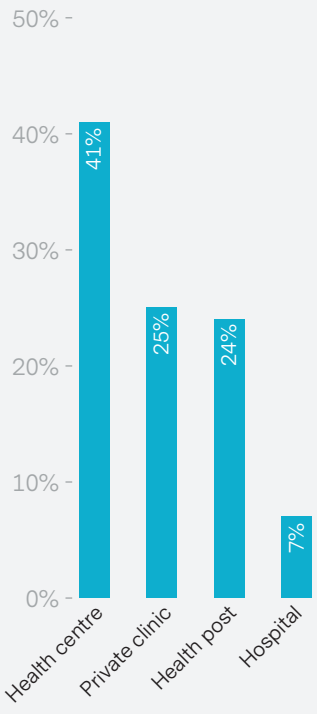
Table 2 Vaccination and vitamin A coverage among children between 12 and 23 months at the time of survey

Vaccination coverage	Coverage among children aged 12–23 months at the time of survey. **N=567** % (95% CI)
BCG	66 (60–71)
Polio 3	79 (74–83)
Pentavalent 3	64 (59–69)
PCV 3	84 (76–88)
Measles	61 (56–66)
Vitamin A	36 (27–45)

Vaccination coverage

Vaccination coverage among children between the ages 12 and 23 months at the time of the survey is presented in Table 2. More than three-quarters of these children had received polio 3 and PCV 3 vaccines, while around two-thirds had received bacille Camette–Guerin (BCG) and measles immunisation.

Figure 10. Place of care sought for children 2–59 months old who were reported to be sick two weeks prior to survey (N=166)



3.5. Caregivers' knowledge

Caregivers' knowledge of signs of newborn illness

The caregivers' knowledge of signs of illness in the newborn baby is shown in Figure 11. Seventy-four per cent of caregivers had unprompted knowledge of at least two or more danger signs of newborn illnesses. Out of eleven common signs or symptoms linked to newborn illnesses, the caregivers were most aware of reduced feeding, diarrhoea, unusually hot or cold baby, and difficult or fast breathing.

Caregivers' knowledge of health services and health service uptake

Eighty-nine per cent of the mothers or caregivers knew of a health post in their kebele. Thirty-four per cent of caregivers mentioned treatment seeking as the primary reason for contacting the health post in their last visit, while 14% stated family planning, 24% child immunisation, and 22% had attended the health post for pregnancy care (Table 3).

Caregivers were asked if they have heard messages regarding childhood services from any source. Around half of the caregivers had heard messages regarding bed nets and diarrhoea treatment, and around a fifth regarding malaria treatment or the rapid diagnostic test (RDT) of malaria. Less than a third had received messages regarding pneumonia treatment, and very few on rectal artesunate in malaria treatment (Table 4). Only 4% said that they had attended community meetings in the past 12 months to discuss maternal and child health issues.

The caregivers were asked to state their preferred places to seek care when their children were sick and multiple responses to this question were possible. Almost 90% preferred the health centre, while a quarter mentioned to seek care from a HEW, 20% of the caregivers stated that a HEW had visited them at home in the past six months. Seven per cent indicated that they were aware of the WDAs who visit people at home to talk about health issues. The breakdown of what had been discussed with the HEWs is shown in Figure 12.

Figure 11. Caregivers' knowledge of signs and symptoms of illness in the newborn baby (N=2,532)

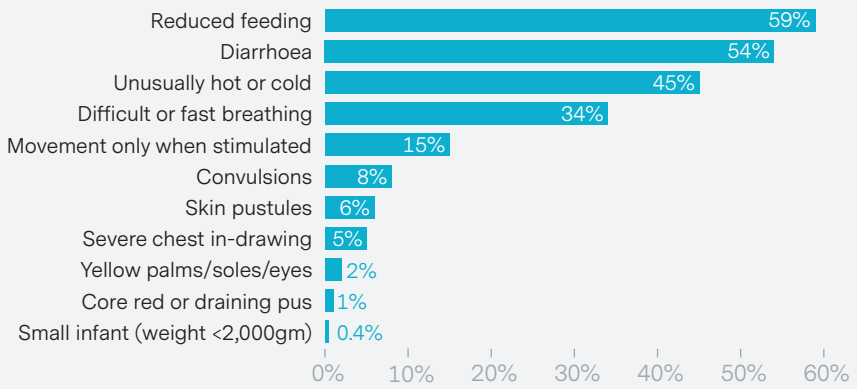


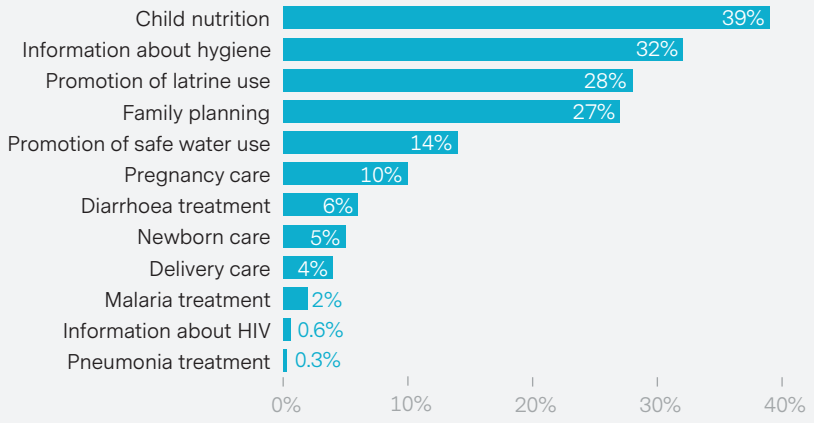
Table 3. Caregivers' primary reason for seeking care at the health post based on their last visit

Primary reason for seeking care:	Total N=2,532 % (95% CI)
Treatment seeking	34 (29–39)
Child immunisation	24 (21–28)
Pregnancy care	22 (19–26)
Family planning	14 (11–18)
Other	5 (3–8)

Table 4. Caregivers' perception of messages received regarding child health services

Heard messages about:	Total N=2,532 % (95% CI)
Diarrhoea treatment	54 (50–58)
Bed nets	51 (46–53)
Pneumonia treatment	28 (21–31)
ACT (malaria treatment)	21 (18–25)
RDT of malaria	21 (18–25)
Rectal artesunate	5 (4–6)

Figure 12. Topics discussed during the HEW visits at home (N= 2,532)



3.6. Register review: utilisation of services at health facilities

Utilisation of services at health facilities for 0–2months

Tables 5 and 6 show data abstracted from 0–2-month IMNCI and iCCM registers at health posts and health centres. The information on 0–2-month-old infants covers the three months preceding the survey. A total of 1,067 0–2-month-old infants were seen across 53 health posts and 113 health centres.

When checking the completeness of recorded data, information such as name, date of visit and gender of the baby were 100% complete while data for gestational age and respiratory rate were relatively little recorded with 46% and 54% completion rate respectively. Half of the babies were between 2–4 weeks old and birth weight was unknown for over half of the babies (58%). Eight per cent of the babies had a temperature 37.5°C or higher.

According to 0–2 months register review, 32% were classified as having a VSD in the last three months prior to survey. Among those with VSD, 51% received gentamicin, 28% received amoxicillin, 5% received other type of antibiotic or other treatment, while 16% did not receive any antibiotics. Of 87 sick babies who were referred, 34% were VSD cases. With regard to outcome of treatment for VSD cases, almost half of babies were reported to have their health improved and the health outcome was unknown for 47% of babies.

Table 5. Health centre and health post 0–2 months iCCM and IMNCI register review covering the last three months

	Health post N=225	Health centre N=842	Total (%) N=1,067
Completeness of record	**% (95% CI)**	**% (95% CI)**	**% (95% CI)**
First and last name	100	100	100
Address	21 (18–24)	–	21 (18–24)
Date of visit	100	100	100
Age of baby in weeks	99 (95–99)	98 (97–99)	98 (97–99)
Gender of baby	100	100	100
Gestational age in weeks	55 (49–62)	44 (40–47)	46 (43–49)
Temperature	92 (87–95)	80 (77–82)	82 (80–85)
Respiratory rate	64 (58–70)	51 (48–55)	54 (51–57)
Signs and symptoms	84 (79–88)	97 (95–98)	94 (93–96)
Recorded information			
Age of baby in weeks			
0–1 week	44 (37–51)	12 (9–14)	19 (16–21)
2–4 weeks	35 (28–41)	55 (51–58)	50 (47–53)
5–8 weeks	21 (16–27)	33 (30–37)	31 (28–34)
Gender of baby			
Male	56 (50–63)	57 (53–60)	56 (54–60)
Female	44 (37–50)	43 (39–46)	44 (40–46)
Birth weight of baby			
≤1,500g	–	–	–
1,500–2,500g	3 (1–5)	1 (0–1)	1 (0–2)
≥2,500g	52 (45–58)	38 (34–41)	41 (38–44)
Unknown	45 (39–52)	61 (57–64)	58 (55–61)
Temperature			
Low (<35.5°C)	2 (0–4)	2 (1–3)	2 (1–4)
Normal (<35.5–37.5°C)	83 (77–87)	72 (68–74)	74 (71–76)
High (>37.5°C)	7 (4–11)	6 (5–8)	6 (6–9)
Unknown	8 (5–12)	20 (17–22)	18 (15–20)

Table 6. Health centre and health post age 0–2 months iCCM and IMNCI register review covering the last three months

	Health post N=225	Health centre N=842	Total (%) N=1,067
Disease classification (N=518)	**% (95% CI)**	**% (95% CI)**	**% (95% CI)**
VSD	37 (29–46)	29 (25–34)	32 (28–36)
LBI	26 (19–34)	44 (39–49)	39 (35–44)
Diarrhoeal/dehydration	22 (15–29)	19 (15–23)	20 (16–23)
Feeding problem / LBW	10 (6–17)	7 (4–9)	8 (5–10)
Preterm / LBI	1 (0–5)	0 (0–2)	0 (0–2)
Other[a]	4 (1–9)	1 (0–2)	1 (0–3)
Treatment among those with VSD (N=164)			
Gentamicin	46 (32–60)	53 (43–62)	51 (43–58)
Amoxicillin	28 (17–42)	28 (20–37)	28 (22–35)
Other antibiotic	–	8 (4–15)	5 (3–10)
No antibiotic	26 (15–40)	11 (7–19)	16 (11–22)
Treatment among those with LBI (N=204)			
Gentamicin	14 (6–32)	4 (2–8)	5 (3–10)
Amoxicillin	83 (68–94)	86 (80–91)	86 (80–90)
Other antibiotic	–	6 (4–11)	5 (3–10)
No antibiotic	3 (0–19)	4 (2–8)	4 (2–7)
Referral			
Among those with VSD	40 (27–54)	32 (24–41)	34 (27–42)
Among those with LBI	6 (1–21)	–	1 (0–4)
Gentamicin treatment completed for VSD case	64 (41–82)	–	64 (41–82)
Outcome of treatment for VSD cases			
Health improved	76 (62–86)	37 (28–46)	49 (41–56)
Not improved	–	63 (54–72)	44 (36–52)
Worsened	–	–	–
Died	–	–	–
Unknown	24 (14–38)	–	7 (4–12)

a Other includes jaundice, malaria and classifications classified as other.

Utilisation of services at health facilities for 2–59-month-old children

Similar to the 0–2 month register review, the 2–59 months IMNCI and iCCM registers were reviewed and data on services to this age group were extracted (Table 7 and Table 8). A total of 2,749 children (2–59 months old) had attended 142 health posts and 149 health centres.

When checking the completeness of recorded data, information such as name, date of visit and temperature were 100% complete while data for respiratory rate was least recorded with 39% completion rate. The highest number of sick children were in the age group between 2–11 months old and 59% had a weight of 8,000g or more. Seventeen per cent of the children had a temperature 37.5°C or higher. According to the review of the 2–59 months register for the three months prior to the survey, 37% were diagnosed as having pneumonia, 19% as having fever and 24% as having diarrhoea. Among those with pneumonia, 1% received gentamicin, 69% received amoxicillin, 24% received co-trimoxazole and 5% did not receive any type of antibiotic.

Among those with fever, 27% received antimalarial, 29% received amoxicillin, 14% received co-trimoxazole. Among those with diarrhoea, 79% received ORS, 15% received zinc and 6% received another type of treatment. Of 101 sick children who were referred, 4% were pneumonia cases, while 6% and 5% cases were fever and diarrhoea respectively. With regard to outcome of treatment for pneumonia, fever or diarrhoea cases, three-quarters of children were reported to have improved and the health outcome was unknown for 29% of children.

Table 7. Health centre and health post age 2–59 months iCCM and IMNCI register review

	Health post N=1,259	Health centre N=1,490	Total (%) N=2,749
Completeness of record	**% (95% CI)**	**% (95% CI)**	**% (95% CI)**
First and last name	100	100	100
Address	100	100	100
Date of visit	99 (98–99)	80 (77–82)	88 (87–90)
Age of child	98 (97–99)	98 (97–99)	98 (97–99)
Gender of child	100	100	100
Weight of child	92 (90–94)	81 (79–84)	86 (85–87)
Temperature	100	100	100
Respiratory rate	35 (32–38)	43 (40–46)	39 (37–41)
Signs and symptoms	98 (97–99)	98 (97–99)	98 (98–99)
Recorded information			
Age of child in months			
2–11 months	35 (32–38)	35 (32–37)	35 (33–37)
12–23 months	29 (27–32)	28 (25–30)	28 (26–30)
24–35 months	18 (15–20)	17 (15–19)	18 (16–19)
36–59 months	18 (15–19)	20 (18–22)	19 (17–21)
Gender of child			
Male	54 (51–57)	55 (52–57)	55 (53–56)
Female	46 (43–48)	45 (42–47)	45 (43–47)
Weight of child			
≤6,000g	16 (14–18)	15 (13–17)	15 (14–17)
6,000–8,000g	27 (24–30)	23 (21–26)	25 (23–27)
>8,000g	57 (54–60)	62 (59–64)	60 (27–61)
Temperature			
Low (<35.5°C)	3 (2–4)	3 (2–4)	3 (2–4)
Normal (<35.5–37.5°C)	78 (75–80)	63 (60–65)	70 (77–80)
High (>37.5°C)	11 (9–13)	18 (16–20)	15 (14–16)
Unknown	8 (6–9)	16 (14–18)	12 (11–13)

Table 8. Health centre and health post age 2–59 months iCCM and IMNCI register review

	Health post N=1,259	Health centre N=1,490	Total (%) N=2,749
Disease classification (N=2,040)	**% (95% CI)**	**% (95% CI)**	**% (95% CI)**
Pneumonia[a]	33 (30–36)	40 (37–43)	36 (34–38)
Fever[b]	19 (16–21)	20 (17–22)	19 (17–21)
Diarrhoea[c]	28 (26–31)	21 (18–23)	24 (22–26)
Malnutrition	14 (12–17)	2 (0–4)	9 (7–10)
Other[d]	6 (5–8)	17 (15–20)	12 (10–13)
Treatment for those classified as:			
Pneumonia (N=739)			
Gentamicin	–	2 (1–4)	1 (0–3)
Amoxicillin	64 (58–69)	73 (68–76)	70 (65–72)
Co-trimoxazole	34 (29–39)	18 (14–22)	24 (21–27)
No antibiotic	2 (1–5)	7 (5–10)	5 (4–7)
Diarrhoea (N=489)			
ORS	76 (70–81)	83 (78–89)	79 (75–83)
Zinc	21 (16–26)	8 (4–12)	15 (12–18)
ORS-Zinc	–	–	–
Other	3 (2–6)	9 (6–14)	6 (4–8)
Fever (N=384)			
Antimalarial	38 (27–50)	22 (15–29)	27 (22–34)
Amoxicillin	10 (5–19)	39 (31–47)	29 (23–35)
Co-trimoxazole	3 (1–11)	19 (13–27)	14 (9–19)
ORS/zinc	46 (35–58)	18 (12–25)	28 (22–34)
Other	3 (1–11)	2 (0–7)	2 (1–6)
Referral			
Among cases of pneumonia	7 (5–10)	1 (0–3)	4 (2–5)
Among cases of fever	12 (8–18)	1 (0–4)	6 (4–9)
Among cases of diarrhoea	7 (5–11)	1 (0–4)	5 (3–7)
Among cases of malnutrition	5 (2–11)	13 (4–35)	6 (3–11)
Outcome of treatment for pneumonia, fever or diarrhoea cases			
Health improved	88 (85–90)	55 (52–58)	70 (68–72)
Same	–	–	–
Died	–	–	–
Unknown	12 (10–14)	45 (41–48)	30 (27–32)

a Pneumonia includes severe pneumonia
b Fever includes those classified as malaria too.
c Diarrhoea includes dehydration.
d Other classification includes measles, ear infection and anaemia.

3.7. Summary of utilisation of services

This baseline survey was performed in 194 clusters from 46 woredas across four regions in Ethiopia (Amhara, SNNP, Oromia, and Tigray regions). The results were based on information from 5,714 households, 6,321 women of reproductive age and 3,110 children below the age of five years.

Among women who had a live birth during the last year, 69% had attended ANC at least once. One-third had attended four antenatal visits. Few had prepared for birth at facilities, but 47% had delivered at health facilities. Four per cent of the newborns had a postnatal check within the recommended first two days of life. With regard to women's knowledge of danger signs during pregnancy, 54% of the women were able to state two or more pregnancy danger signs.

Eight per cent (N=69) of women who had a live birth in the 12 months preceding the survey reported that their child had symptoms of VSD in the neonatal period. Among these sick neonates, 66% had sought care from a healthcare provider. Among all newborns (N=714), 4% reportedly had symptoms of LBI. Of these, care was sought for 66% of sick newborns and 44% were reported to have received antibiotic treatment.

Among 2,873 children between the age of 2–59 months residing in the study area, 6% (N=166) reportedly had an illness episode during the two weeks preceding the survey. Of these, 55% (95% CI 47–63) had sought care from a formal health provider (health post, health centre, hospital or private clinic). The most common illnesses during two weeks before the survey for children below the age of 2–59 months were fever, diarrhoea and suspected pneumonia. Among the 2,873 children, 5% (N=139) reported to have suspected pneumonia, diarrhoea or fever during the two weeks preceding the survey. Of these, 47% (95% CI 39–56) received antibiotics, ORS, zinc or antimalarial treatment.

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Data from the IMNCI and iCCM registers at health posts and health centres were abstracted. The diagnosis and treatment including referrals of 0–2-month babies and 2–59-month-old infants and children were reviewed from these registers. For babies aged 0–2 months, one-third of cases were diagnosed as having VSD. In terms of treatment for VSD cases, over half of the babies were treated with gentamicin and just over a quarter with amoxicillin. For sick children aged 2–59 months, the majority of cases were diagnosed as having pneumonia, diarrhoea, or fever. In terms of treatment for these cases, amoxicillin was given for the majority of pneumonia cases. Four out of five cases of diarrhoea were treated with ORS. Just over a quarter of fever cases were treated with an antimalarial. An antibiotic was also given for over a quarter of fever cases.

4. Results: Health-facility and health-provider survey

4.1. Facility readiness to provide services

This section presents the characteristics and infrastructure of the 155 health centres and 169 health posts sampled in the Dagu Baseline Survey, Ethiopia, December 2016 – February 2017. The availability of drugs, supplies, and equipment in these facilities is also presented below.

Health centres

Facility characteristics: health centres

The health centres in this study were staffed by, on average, 14 individuals with a mean number of seven nurses, two health officers, two midwives, one pharmacist and one laboratory technician.

By design, a health centre and, on average, its five satellite health posts comprise a Primary Healthcare Unit (PHCU). Two HEWs, in turn, staff each health post. Data from the PHCUs sampled in this study indicated that health posts were adequately staffed, having on average five health posts and 11 HEWs per PHCU.

Facility infrastructure: health centres

This study included an observation of infrastructure at the health centres (Table 9). Running water and electricity were not available in 18% and 39% of the health centres, respectively. Almost all had a patient toilet.

Drugs, supplies and equipment: health centres

The observed availability of child health related drugs at health centres is shown in Figure 13. More than 10% of health centres did not have ORS, zinc, ampicillin and Coartem on the day of the survey. Gentamicin was available in 90% of health centres and amoxicillin in 98%. Over 90% of the health centres had Plumpy Nut (ready-to-use therapeutic food [RUFT]).

Among health centres that did not have drugs (shown in Figure 13), the average number of stock out days were: 16 days for polio vaccine, 42 days for BCG, 44 days for ORS, 50

Table 9. Observation of infrastructure at health centres

Available and functional on the day of the survey:	Total N=155 % (95% CI)
Patient toilet	97 (93–99)
Water[a]	82 (75–87)
Cell phone signal	79 (72–85)
Fridge	77 (70–83)
Steriliser	66 (59–74)
Electricity	61 (53–68)

a Missing data from five health centres

Table 10. Observed availability of child health related equipment and supplies at health centres

Equipment	Total N=155 % (95% CI)
Stethoscope	100
Digital thermometer	99 (95–100)
MUAC tape measure	99 (95–100)
Infant scale	96 (92–98)
Ambu bag for ventilation	94 (89–97)
Weighing sling	91 (85–95)
Supplies	
Sharps container	99 (95–100)
Clean gloves	97 (92–99)
Syringes with needles	97 (93–99)
Hand sanitiser (alcohol)	79 (72–85)
Soap	77 (70–83)

Figure 13. Observed availability of drugs for treatment of childhood illnesses at health centres (N=155)

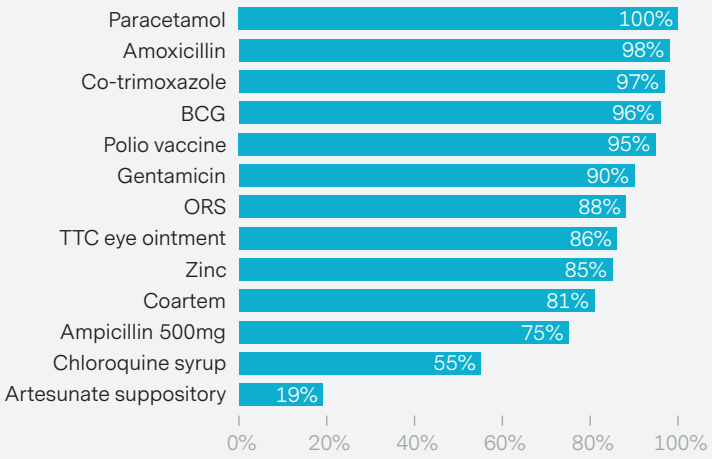
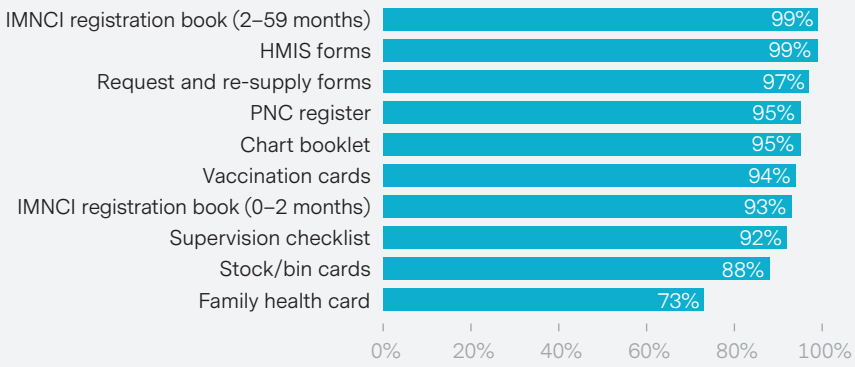


Figure 14. Observation of job aids in health centres (N=155)



days for gentamicin and co-trimoxazole, 67 for amoxicillin, 70 days for ampicillin, 91 days for chloroquine, 139 days for Coartem, 177 days for artesunate and 181 days for zinc.

Table 10 shows the observed availability of equipment and supplies at health centres for the provision of services to under-five children. Except for the availability of hand sanitiser (79%) and soap (77%), the under-five departments within health centres were well equipped and supplied.

The availability of job aids at the health centre, necessary to provide MNCH care is displayed in Figure 14. The findings were satisfactory, although 7% of the health centres did not have the IMNCI 0–2 month register.

Health posts

Facility characteristics: health posts
As indicated from the staffing profile of the PHCUs, the majority (84%) of health posts had two or more HEWs. A quarter of the health posts were open less than five days a week. Hours and days of operation were displayed in less than a third of the health posts (Table 11).

Facility infrastructure: health posts
This study also conducted an observation of infrastructure at the health post (Table 12). Amplifying the findings at the heath-centre level, water and electricity were not available in 38% and 82% of health posts, respectively.

Drugs, supplies and equipment: health posts
Drug availability for treatment of childhood illnesses at the health posts (Figure 15) indicates that there was a shortage of essential drugs at the time of survey. A third or more of the health posts did not have ORS, 43% did not have Coartem and 57% did not have gentamicin. A fifth of the health posts had no zinc or amoxicillin. There was poor availability of RUTF, such as Plumpy Nut (1.1%) and BP-100 (6.5%). Two-thirds of the health posts had expired Plumpy Nut. RDT for

Table 11. Characteristics of the health posts

	Total N=169
Number of HEWs per health post:	**% (95% CI)**
One	16 (12–21)
Two	57 (49–64)
More than two	27 (21–35)
Health posts:	
Open less than five days a week	25 (19–32)
Operational days posted	33 (26–40)
Operational hours posted	26 (20–33)

Table 12. Observation of health-post infrastructure

	Total N=169
Available and functional on the day of the survey:	**% (95% CI)**
Patient toilet	83 (77–88)
Water	62 (55–69)
Cell phone signal	72 (65–78)
Electricity	18 (13–24)
Fridge	9.4 (5.8–15)
Steriliser	8.2 (4.9–14)

Figure 15. Observed availability of drugs for treatment and prevention of childhood illnesses at health posts (N=169)

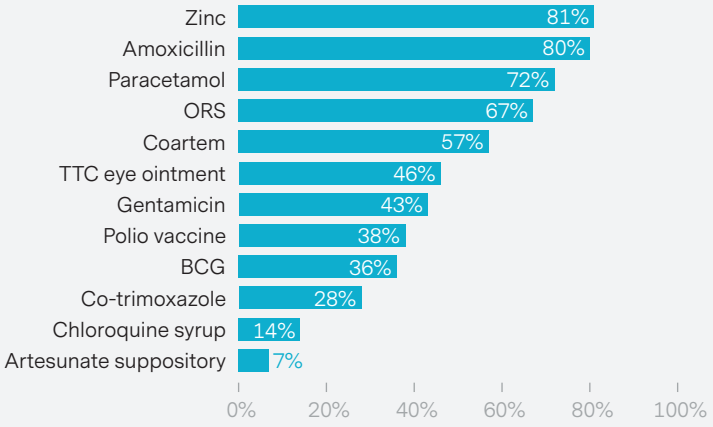
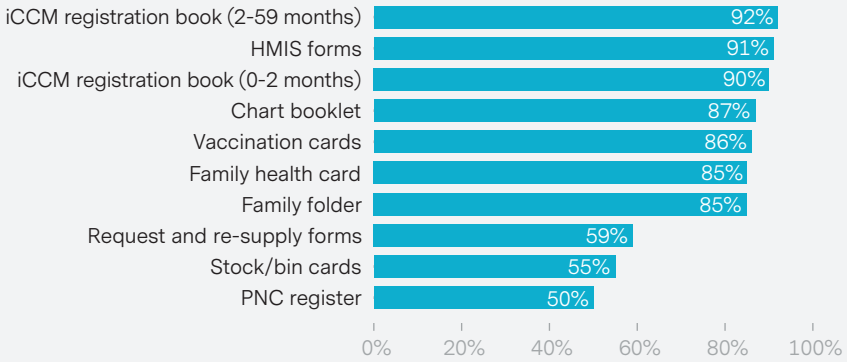


Figure 16. Observation of job aids at health posts (N=169)



malaria was available in 62% of the health posts, while chloroquine and artesunate were available in less than a fifth of the health posts.

Among health posts that did not have some drugs (shown in Figure 15), the average number of stock out days were: 23 days for BCG vaccine, 24 days for polio vaccine, 71 days for ORS, 72 days for gentamicin, 82 days for paracetamol, 88 days for co-trimoxazole, 92 days for amoxicillin, 93 days for Coartem, 105 days for zinc, 110 days for artesunate and 126 days for chloroquine.

Table 13 shows that most health posts had essential child health related equipment and supplies, although 27% did not have a weighing sling. Like health centres, soap and hand sanitiser were available in only a third of the facilities.

An assessment of job aids and administrative forms at the health-post level (Figure 16) showed that approximately 10% did not have iCCM 0–2 and 2–59 month registers. A chart booklet was available in 87% of the health posts. Furthermore, approximately half of the health posts did not have request and re-supply forms and stock and bin cards, which are essential for tracking and ensuring supply of drugs.

Table 13. Observed availability of child health related equipment and supplies at health posts

	Total N=169
Equipment	**% (95% CI)**
MUAC tape measure	99 (95–100)
Digital thermometer	86 (80–91)
Infant scale	80 (74–86)
Stethoscope	78 (71–83)
Weighing sling	73 (66–80)
Supplies	
Sharps container	98 (94–99)
Clean gloves	80 (73–85)
Syringes with needles	83 (76–88)
Soap	37 (30–45)
Hand sanitiser (alcohol)	37 (30–45)

Summary of facility readiness to provide services

This chapter described the 155 health centres and the 169 health posts that were included in the Dagu Baseline Survey, with respect to infrastructure and availability of drugs, equipment and supplies.

Water was not available in 18% of the health centres and 38% of the health posts. Electricity was not available in 39% and 82% of health centres and health posts, respectively.

Availability of drugs at health centres was less than optimal. Gentamicin was available in 90% of the health centres and 98% had amoxicillin. Zinc and ORS were not available in 12% and 15% of the health centres, respectively, and a quarter did not have ampicillin. At health posts, around 80% had zinc and amoxicillin, two-thirds had ORS, over half had Coartem and less than half had gentamicin. Most health posts and health centres had the necessary equipment and non-medicine related supplies, except for alcohol and hand sanitizer, particularly at health posts, where only 37% had either of these. With respect to job aids, approximately 10% of the health posts and health centres did not have 0–2 months iCCM/IMNCI registers. Chart booklets were available in 95% of the health centres and 87% of the health posts.

4.2. Health workers and volunteers: training, knowledge, supervision and service provision

This section presents results on the MNCH training, knowledge, service provision and supervision of the 175 health-centre staff, 276 HEWs and 268 WDA leaders included in the Dagu Baseline Survey (December 2016 – February 2017). Under the section on service provision we also present data from registers excerpted from the 155 health centres and 169 health posts.

Training

The Dagu Baseline assessed the level of training in MNCH care provided to health-centre staff, HEWs and WDA leaders.

Training: health-centre staff

IMNCI-trained staff at the health centre are important for the provision of appropriate treatment of children at health centres and support to HEWs treating at the health-post level. According to information provided at the woreda health offices, 85% of the facilities had an IMNCI-trained staff.

Overall, there was an average of two IMNCI-trained staff members at each health centre. Half of the health centres also had CBNC-trained trained staff.

Seventy-four per cent of the interviewees had received in-service training or training updates on topics related to child health or childhood illnesses at some point in time. Around three-quarters had received training in IMNCI, diarrhoea management, breastfeeding, nutritional assessment and micronutrient deficiencies, and complementary feeding. Around two-thirds had been trained in malaria and acute respiratory tract infection treatment. Around half had received training regarding malaria and the use of RDT of malaria, and the expanded program of immunisation and the cold chain. In most cases, this training had been received before the last year and only around a quarter to a fifth had received such training during the last 12 months.

Forty-four per cent of health-centre staff perceived that there were opportunities for promotion in their work. Most staff mentioned that they received some extra payments: salary supplement (51%), per diem when on training (35%), duty allowance (77%) and some payment for special non-standard activities (8%). Nine per cent stated that they did not get any extra payments. Among non-monetary incentives they stated that they received vacations (30%), uniform, backpack, caps or similar (35%), training (25%), and subsidised housing (10%).

Training: HEWs

The HEWs had a median education of 12 years and 35% reported having received level-IV training. HEWs had been at their current position for a median of 2.3 years and 83% of HEWs reported residing in the kebele where they worked (229/276). Among these 229, 46% had been provided with government housing.

The HEWs in this study were asked about the training they had received. Training in iCCM and CBNC had been provided to 83% and 65% of HEWs, respectively. This training had in most cases been provided before the last year. At the facility level, 75% of health posts had at least one HEW trained in CBNC, while in 56% all HEWs had been trained.

Integrated refresher training on MNCH was cascaded to HEWs in of 2015. One-fifth of the HEWs in this survey reported receiving such training between December 2015/ February 2016 and December 2016/ February 2017.

The 262 HEWs who had received some form of training in the last 12 months on the management of sick young infants were asked about their level of satisfaction. Only 50% were fully satisfied with their training. Over 80% wanted post-training supervision, further training, practice sessions and training aids.

Table 14. Orientation received by WDA leaders on MNCH

	Total N=164 % (95% CI)
Pregnant woman identification[a]	87 (81–91)
PNC home visits	82 (75–87)
How to counsel or promote on:	
Pregnant women's danger signs	85 (78–90)
ANC at health facility	88 (82–92)
Birth preparedness plan	84 (78–89)
Institutional delivery	95 (90–98)
PNC at health facility	77 (70–83)
Young infant danger signs	79 (71–84)
Careseeking for child (2–59 months)	72 (65–79)
Danger signs for child (2–59 months)	77 (70–84)

a Missing data from two WDA leaders

Table 15. Unprompted listing by health-centre staff of main components of immediate newborn care

Components mentioned in frequency order	Total N=175 % (95% CI)
Tie and cut cord appropriately	79 (73–85)
Dry and wrap baby	73 (67–81)
Assess breathing	70 (62–76)
Deliver onto mother's abdomen	54 (46–62)
Skin-to-skin contact	37 (29–43)
Apply TTC eye ointment	33 (26–40)
Delay cord clamping three minutes	30 (23–37)
Initiate breastfeeding	29 (23–35)
Give vitamin K	23 (17–29)
Weigh baby	14 (8.6–19)
Apply chlorhexidine on cord	5 (1.7–8.0)

Training: Women's Development Army leaders

WDA leaders on average were 35 years old, had very little education (median of one year) and had served as network leaders for three years.

WDA leaders were expected to counsel and carry out social mobilisation activities to increase the knowledge, attitude and health-seeking behaviour of mothers. In addition, they were expected to notify HEWs of pregnancies and births. Further, they should visit newborns, refer sick children to the health posts and counsel families to follow-up on referrals.

WDA leaders were asked if they had received any formal or informal MNCH orientation from an HEW in the last 12 months. Sixty-one per cent (164/268) had received an orientation and they were asked for further details of the components that had been covered (Table 14). Their orientation focused on pregnant women, particularly on the promotion of institutional delivery. Approximately one-quarter of the WDA leaders stated that their orientation did not cover any aspects of promotion of child healthcare in the community.

The WDA leaders' satisfaction with their MNCH care orientation in the last 12 months was also assessed. Among the WDA leaders who had received an orientation (164/268), 65% said they were fully satisfied.

Knowledge

In this section, we present the assessment of health-centre staff, HEW and WDA leader knowledge on MNCH care. Specifically, for health-centre staff and HEWs we assessed their knowledge on general care, signs of illness, and management of illness for under-five children. It is important to note that HEWs are instructed to use the iCCM chart booklet, which provides the specific steps that a HEW should follow when assessing under-five children. This survey assessed the HEWs' unprompted knowledge of danger signs, classification and treatment for children between 0–59 months. For WDA leaders we assessed their knowledge on general MNCH care as well as their understanding of the family health guide. Figures of health-centre staff, HEW and WDA leader's knowledge on management of children are shown in Annex 2.

Knowledge of newborn and child health: health-centre staff

The health-centre staff were asked to mention the different components of immediate newborn care (Table 15). The majority mentioned to assess breathing, dry and wrap the baby, tie and cut the cord appropriately. Around half of them mentioned to deliver the baby on the mother's abdomen. Around a third mentioned skin-to-skin contact, to apply eye ointment, delayed cord clamping for three minutes, and early initiation of breastfeeding. A fifth mentioned to give vitamin K, fewer included weighing of the baby, and very few mentioned chlorhexidine application on the cord.

Postnatal care

Similarly, the interviewees were asked to list, unprompted, the main components of the first postnatal visit for the newborn babies. Overall the key components were mentioned by a low proportion of the health workers. A bit less than two-thirds mentioned to encourage breastfeeding and around half to check for danger signs and to vaccinate. Around a third mentioned to measure weight and temperature and apply eye ointment.

When asked what special care you should provide to the very small (<1.5 kg) or preterm (<32 weeks) baby, the majority mentioned urgent referral with

the mother to health centre or hospital, and around half also included to cover the baby, including head, and hold it close to the mother. Fewer commented on feeding with expressed breast milk.

The staff were also asked about what special care they should provide to moderate preterm or underweight babies with a birth weight of 1.5–2.5 kg or gestational age at birth from 32 to 36 weeks. Most interviewees mentioned the necessity to keep the baby warm and to enable and monitor breastfeeding.

Breastfeeding

Most health-centre staff mentioned the main characteristics of a good attachment to the breast during breastfeeding. Around three-quarters mentioned that more areola was visible above, that the baby's mouth was wide open and that the lower lip was turned out. Half of the interviewed staff mentioned that the chin was touching the breast. Unprompted they also listed how to determine breastfeeding problems. Effective suckling and attachment were primarily mentioned.

Very severe disease in the newborn

Significantly reduced feeding, fast breathing and convulsions were among the danger signs for VSD in the newborn that were mentioned by the health-centre workers. About half of them mentioned an increased body temperature, but the common low temperature of the very sick newborn was only mentioned by a few. A bit more than a third listed severe chest in-drawing and a quarter included limited or no movement on stimulation.

When a newborn presents signs of a VSD the following immediate actions were mentioned: urgent referral (83%), a pre-referral dose of gentamicin (58%), a pre-referral dose of amoxicillin (45%), and continue breastfeeding or give expressed breast milk (27%). If referral was not possible, 13% mentioned a week-long treatment with gentamicin and 8% included amoxicillin.

Omphalitis

The health-centre staff were asked to mention the main signs of an LBI, that is an omphalitis or umbilical infection. They listed a red umbilicus (69%), umbilicus draining pus (66%) and skin pustules (58%).

When diagnosing an umbilical infection, the majority (87%) mentioned that amoxicillin syrup should be provided for five days. It was less common to mention when to return (29%), to give advice to breastfeed more frequently (20%) or to provide advice to keep the baby warm (9%).

Jaundice

The health-centre staff mentioned yellow skin (74%) and yellow eyes (77%) as signs of jaundice. Relatively few had suggestions on what to do when a newborn had jaundice. Breastfeeding more frequently was mentioned by 41%, keeping the baby warm by 31%, exposing to sunshine 20–30 minutes every day by 15%,

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advice to return if getting worse by 13% and 12% mentioned a follow-up after two days.

The interviewees listed the following symptoms and signs of severe jaundice: palms yellow (62%), soles yellow (54%), jaundice also after 14 days (23%) and jaundice in a newborn less than 24 hours of age (13%). The majority (83%) knew that these newborns with severe jaundice should urgently be referred to health centre or hospital. The staff also mentioned breastfeed more frequently (30%) and keeping the baby warm (17%).

Diarrhoea and dehydration

The unprompted listing of symptoms and signs of a newborn with dehydration due to diarrhoea included sunken eyes (85%), skin pinch going back slowly (84%), and the baby being restless and irritable (55%). When asked about the suggested actions to take when a newborn has some dehydration due to diarrhoea, almost all suggested provision of ORS, but only half included advice on more frequent breastfeeding.

The staff mentioned that the symptoms and signs of severe dehydration included a skin pinch that goes back very slowly (91%), sunken eyes (86%) and limited or no movement even when stimulated (55%). With respect to the actions suggested to be taken when a newborn has symptoms and signs of severe dehydration, relatively few listed the appropriate actions apart from referral to higher level in the health system that was mentioned by two-thirds.

Pneumonia in a child aged 2–59 months

The health-centre staff mentioned the signs and symptoms of pneumonia in an infant or young child: fast or difficult breathing (92%), cough (89%), chest indrawing (75%), and stridor (39%).

Almost all (99%) stated that antibiotics should be provided, while fewer mentioned other initial steps, such as advice on when to return (43%), advice on administration of the antibiotics (37%) and to keep the child warm (26%).

Diarrhoea in a child aged 2–59 months

Almost all (90%) mentioned loose stools or diarrhoea as the main symptom of diarrhoeal diseases. For actions to be taken when a child has diarrhoea almost all (97%) said give ORS and 84% said treat with zinc for 10 days.

Malaria

Almost all (99%) mentioned fever as a possible symptom of malaria. As initial steps when suspecting malaria, 86% said use RDT and 94% said treat with Coartem/artemisinin-based combination therapy.

Acute malnutrition

The health-centre staff listed the signs and symptoms of acute malnutrition: mid-upper arm circumference (MUAC) measurement <11 cm if six months

or older (91%), visible severe wasting (76%), or pitting oedema on both feet (67%).

The unprompted listing of initial steps to take when a child presents with acute malnutrition showed that eight out of ten mentioned the provision of RUFT, such as Plumpy Nut or BP-100. Seven out of ten included an appetite test from six months of age.

General danger signs
The interviewees mentioned general danger signs of children aged 2–59 months: convulsions (83%), child unable to drink or breastfeed (82%), and the child having very limited or no movement even when stimulated (51%). The initial steps mentioned were referral to health centre or hospital (83%), pre-referral dose of antibiotics and referral (53%) and ensuring fluids by giving ORS during transport to higher levels (15%).

Knowledge of newborn and child health: HEWs

Postnatal care
The HEWs were asked about their knowledge on providing care in the postnatal period as part of the first and subsequent postnatal care (PNC) visits. The following PNC counselling components were mentioned: exclusive breastfeeding (73%), delayed bathing (32%), skin-to-skin contact (28%), cord care (21%), washing hands before touching baby (18%) and danger signs (16%). With respect to PNC activity, HEWs mentioned the following: BCG and polio vaccination (55%), measuring weight (45%), checking for danger signs (44%), measuring temperature (34%), providing cord care (28%), tetracycline (TTC) eye application (25%) and checking for congenital abnormalities (9%).

Very severe disease in newborns
HEWs had unprompted knowledge of the following VSD signs: stopped or reduced feeing (67%), high temperature (50%), convulsions (50%), fast breathing (42%), no or limited movement (25%), severe chest in-drawing (24%) and low temperature (22%). For management of VSD, 87% correctly cited the need to refer urgently, while less than a third of HEWs cited the correct treatment with antibiotics (Figure A2.1, part A).

Local bacterial infection in newborns
HEWs mentioned the following three signs of an LBI: omphalitis umbilicus draining pus (59%), red umbilicus (56%) and skin pustules (50%). Prescribing of amoxicillin for five days was cited by 44% of HEWs. The remaining management steps were cited by less then 15% of HEWs (Figure A2.1, part B)

Breastfeeding
HEWs had knowledge of the following key signs for a baby with a feeding problem: not well attached to breast (67%), not suckling effectively (64%), underweight for age (46%), less than eight breastfeeds in 24 hours (38%), switching breast before one is emptied (30%), receives other foods or drinks (14%) and thrush (5%). With respect to steps to follow when managing a baby with a feeding problem, 72% said teaching correct position and attachment, while 70% said educating on exclusive breastfeeding. The remaining steps were known by less than 50% of HEWs (Figure A2.1, part C).

Jaundice
HEWs stated the signs for jaundice: yellow skin (63%) and yellow eyes (62%). Less than a quarter cited each of the five different management steps (Figure A2.1, part D). The following signs for severe jaundice were known by HEWs: yellow palms (43%), yellow soles (34%), age 14 days or more (9%) and age less than 24 hours (7%). With respect to management of severe jaundice, three-quarters knew that the baby had to be referred urgently. Very few HEWs stated the importance of breastfeeding more frequently (14%) and keeping the baby warm (8%).

Diarrhoea and dehydration
HEWs knew the following signs of moderate dehydration: sunken eyes (62%), skin pinch that goes back slowly (54%) and restless and irritable (31%). For severe dehydration, HEWs mentioned the following: skin pinch that goes back very slowly (61%), sunken eyes (61%) and limited or no movement (31%). Ninety-three per cent stated that a young infant with moderate dehydration would need ORS and 78% stated treatment with zinc for 10 days (Figure A2.2, part A). Similarly, for an infant with severe dehydration, 77% said to refer urgently and 58% to give ORS on the way to the referral facility. Only 8% said to give a pre-referral dose of amoxicillin (Figure A2.2, part B).

Pneumonia in a child aged 2–59 months
HEWs had the following unprompted knowledge of illness signs: difficult or fast breathing (84%), cough (76%), chest in-drawing (41%) and stridor (23%). Eighty-nine per cent suggested treatment with antibiotics (Figure A2.3, part A).

Diarrhoea in a child aged 2–59 months
HEWs mentioned the following signs: diarrhoea (84%), sunken eyes (61%), skin pinch that goes back slowly (45%), restless or irritable (37%) and blood in stool (37%). Ninety-seven per cent suggested treatment with ORS and 83% mentioned zinc treatment (Figure A2.3, part B).

Malaria
Fever and chills were mentioned as signs of malaria by 92% and 72% of the HEWs, respectively. Around 80% suggested use of RDT and to treat with Coartem/ACT (Figure A2.3, part C).

Acute malnutrition
Most HEWs (90%) listed a MUAC measurement <11 cm if six months or older as a sign of acute malnutrition. Visible severe wasting and pitting oedema on both feet were listed by 65% and 57% of HEWs, respectively.

Eight out of ten HEWs mentioned the provision of RUFT, such as Plumpy Nut or BP-100, as an initial step to take when a child presents with acute malnutrition. Appetite test, advise to mother on how to take RUTF and when to return were each listed by less than half of the HEWs (Figure A2.3, part D).

General danger signs
Though knowledge of general danger signs for children 2–59 months, such as limited movement (39%), convulsions (61%) and inability to drink/breastfeed (73%) was sub-optimal, over 85% mentioned that they would refer the child to the health centre urgently.

Knowledge on newborn and child care: WDA leaders

WDA leaders were asked about the timing of PNC visits. A quarter or less knew that visits should take place on day one, three and seven. However, more WDA leaders (40%) had better knowledge of PNC visit number four, which should take place six weeks after birth. Like HEWs, over half of the WDA leaders mentioned promoting breastfeeding (56%), while less than half stated other key areas for counselling (hygiene, thermal care and danger signs) required during PNC visits (Figure A2.4, part A).

WDA leaders' knowledge of danger signs in a young infant and a child aged 2–59 months

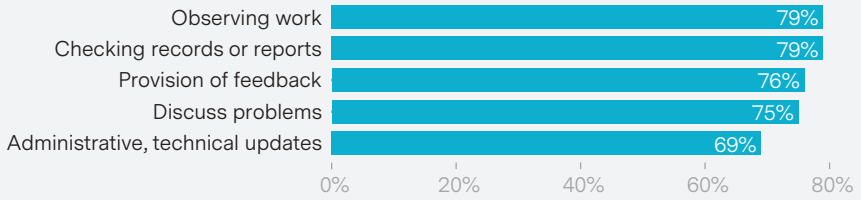
The WDA leaders were asked about their knowledge on young infant danger signs and 55% mentioned fever (Figure A2.4, part B). Similarly, a little over half of WDA leaders mentioned fever and vomiting as key danger signs for children 2–59 months of age. Each of the remaining five signs were cited by 40% or less of the WDA leaders (Figure A2.4, part C).

WDA leaders' knowledge and understanding of the family health guide

The WDA leaders' knowledge of the family health guide was also assessed. The family health guide is a job aid used for health education in the community. It consists of key behaviour change communication images, which aim to convey messages regardless of the user's literacy status. The WDA leaders were shown a range of images on the continuum of care without any linked text. Of the 268 WDA leaders, 169 (63%) reported using the family health guide at some point in the past and half reported owning a copy. The WDA leaders, who reported using the family health guide, were asked to describe images shown as flashcards.

The majority did not correctly identify the messages from images on pregnancy care and danger signs. Fifty-nine per cent identified high temperature and 41% oedema in a pregnant woman. Around one-third of WDA leaders correctly identified the remaining pregnancy-related images (Figure A2.5, part A).

Figure 17. Health-centre staff report on components in the supervision they received (if any) (N=175)



Most WDA leaders identified some images with respect to newborn care: hand hygiene (85%) and breastfeeding at night time (67%). However, only a quarter identified images of delayed bathing and clean cord care (i.e. not applying things such as butter and grease) (Figure A2.5, part B).

For images associated with signs of illness, the WDA leaders were not able to recognise the danger signs for young infants. However, they had more knowledge of the nutritional management of children both less than or greater than six months old (Figure A2.5, part C). Many WDA leaders identified the images linked to vaccination (84%), vaccination completion (59%) and vitamin A supplement (67%) (Figure A2.5, part B).

Supervision

This section deals with the frequency and content of supportive supervision, and performance review and clinical mentoring (PRCM) meetings.

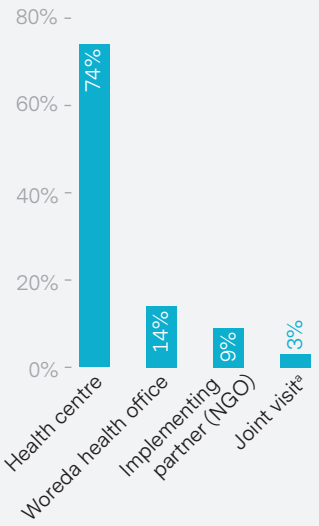
Supervision: health centre

Two-thirds of the health-centre staff had received technical supervision during the last three months, another fifth before that, and a bit less than a fifth had not received any supervision.

Table 16. Content of supervision in the last six months

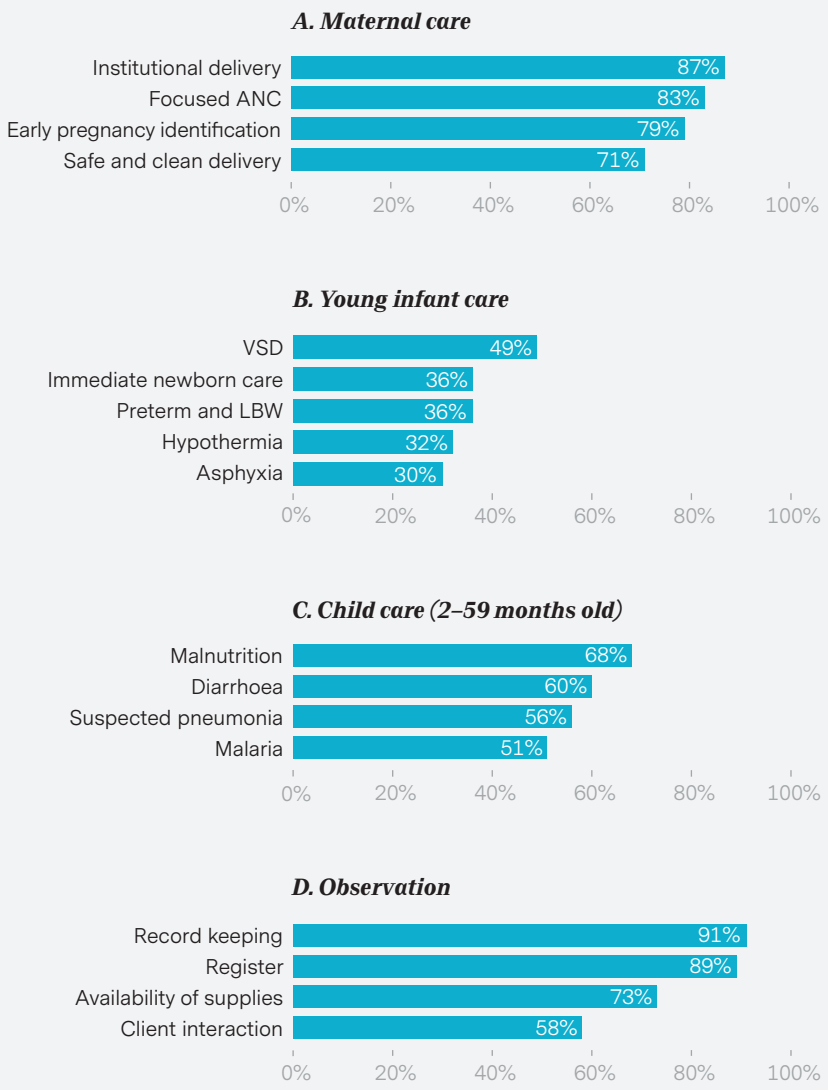
Content of supervision among those providing supportive supervision in the last six months	Total N=147
A. Discussion	**% (95% CI)**
Under-five children	
Newborn care	95 (90–98)
Management of childhood illness	90 (84–94)
Staff	
Written feedback on HEWs' work	97 (92–99)
HEW activity with WDA	95 (90–98)
B. Observation	
Record keeping	97 (93–99)
Register	97 (93–99)
Availability of supplies	92 (86–95)
HEW interaction with mother and child	84 (77–89)
C. Provision	
Supplies	91 (85–95)

Figure 18. Provider of the most recent supportive supervision visit to health posts during last month (N=163)



a Joint visit: woreda health office, health centre and/or implementing partner (NGO).

Figure 19. Content of supportive supervision discussion and observations reported by HEWs (N=163) in the last six months



The median number of supervision visits in the past six months was two. The components of supervision received are shown in Figure 17.

Almost all (91%) health centres had provided supervision to one or more health posts in their catchment areas in the last three months, and 78% in the last month. Among those providing supervision in the last month, on average they had provided visits to four health posts in their catchment areas. Eighty-five per cent of health centres had participated in a PRCM meeting in the last 12 months.

The health-centre staff that provided supportive supervision in the last six months (N=147) were provided with a list of maternal and child health themes and were prompted to pick topics they had covered during their supervisory visit (Table 16). Over 90% of the supervisors reported discussing care of newborns and sick children. A similar proportion had reviewed registers, supplies and record keeping. A very high proportion (97%) said they had provided written feedback to the HEWs. The HEWs' interaction with a client had been observed by 84% of the supervisors.

Supervision: health post

Three-quarters of the health posts had received supervision during the last three months, and only 59% in the last one month. Among those receiving supervision in the last one month, on average they had been visited two times. Although 85% of the health centres reported organising a PRCM meeting in the last 12 months, only 43% of the HEWs reported participating in such a meeting during the same period. Among those receiving a visit in the last month, three-quarters said that staff from a health centre provided the most recent visit (Figure 18).

The HEWs who received supportive supervision in the last one month (N=163) were also prompted to select the maternal and child health themes covered during the supervisory visit (Figure 19). Although different aspects of maternal care were discussed with over 70% of the HEWs, less than half of the HEWs reported that the supervisory visit discussed young infant care. Discussion on care of children 2–59 months old was better covered.

The HEW activities with WDA leaders were also discussed with most health posts visited (85%). Data collectors verified that 66% of the HEWs had received written feedback from their last supervisory visit.

Table 17. WDA activities carried out together with the HEWs

Activities	Total N=158[a] % (95% CI)
Plan together[b]	91 (85–94)
Discuss pregnant woman referrals[c]	87 (80–92)
Provide household visits[c]	86 (79–91)
Organise pregnant women's conference[b]	84 (77–89)
PNC for new babies and their mothers[c]	83 (76–88)
Conduct health related campaigns[c]	82 (74–88)

a Among WDA leaders that had met with HEWs in the last three months.
b Missing data for three WDA leaders.
c Missing data for two WDA leaders.

Figure 20: Health-centre population profile

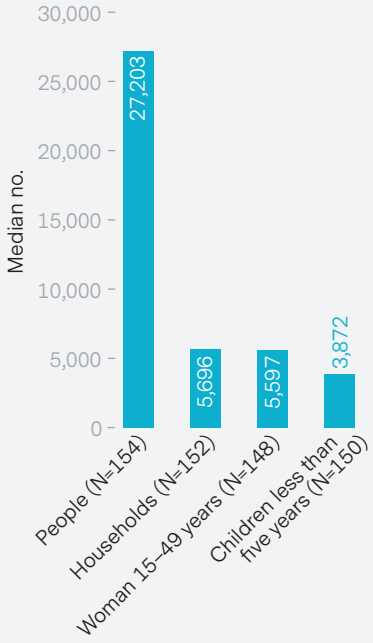
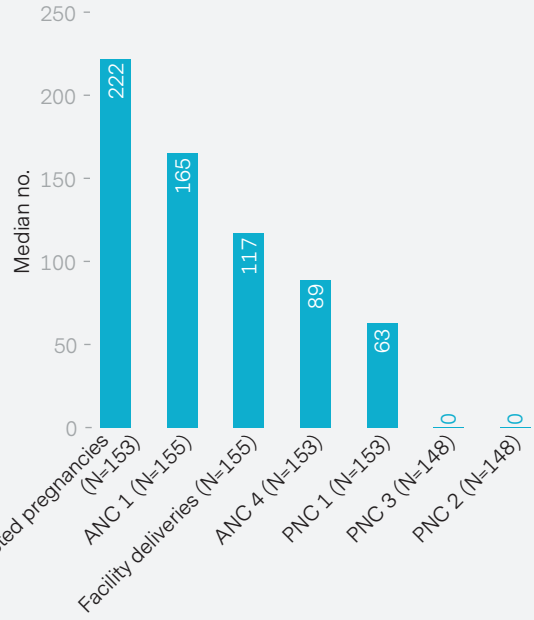


Figure 21. Register review of services provided for pregnant women by health centres in the last three months.



Supervision: WDA leader

Over half of the WDA leaders reported that they had met with the HEWs during the last three months. The median number of meetings was three.

The WDA leaders who had met with HEWs in the last three months (N=158) were asked about their joint activities (Table 17). Over 80% mentioned planning and conducting MNCH-related activities jointly with the HEWs. When asked about their interaction with HEWs, 83% of the WDA leaders who had had such meetings said that they were fully satisfied.

Service provision

In this section the health-centre staff, the HEWs and the WDA leaders were asked background questions about the community they served, and the MNCH care-related services they had provided.

Service provision: health centre

The health-centre staff was asked about the PHCU level population, and services provided during the quarter preceding the date of the baseline survey. The health centres had a median population of 27,203. There were 5,696 households, 5,597 women between the ages of 15–49 years, and 3,872 children less than five years of age (Figure 20).

The health centres had projected to have a median of 222 pregnancies in their catchment population for the three months preceding the survey. In the same period, health centres had recorded providing a median of 165 first ANC visits and approximately half as many (median 89) recorded a fourth ANC visit. Although there was a median of 117 facility-based deliveries, a first PNC visit was infrequent (median 63) (Figure 21).

Service provision: health-centre staff

Fifty-seven per cent of the interviewed health-centre staff said they provided ANC, 51% provided PNC, but only 8% had received any in-service training or training updates on topics related to ANC and PNC.

Sixty-six per cent (116/175) had provided delivery services. Among those providing delivering services, the majority had only delivered one or a few women the past month. Among those that provided delivery services 47% had never used a partograph, while 28% had used it during the past month. Only 7% had received any in-service training or training updates on topics related to delivery care.

Eighty-four per cent had provided care of the newborn. Forty-seven per cent had received some in-service training or training updates on topics related to newborn care. Among those who had received training (82/175) most

Figure 22. Health-centre staff personal participation in child health services (N=175)

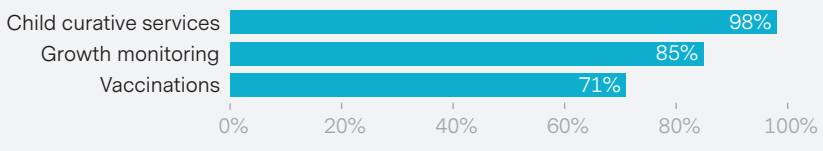


Figure 23: Health-post population profile

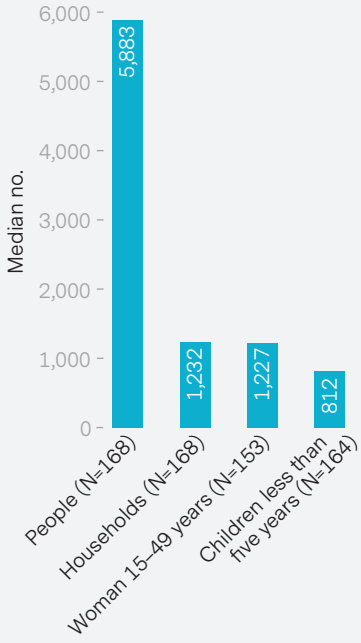
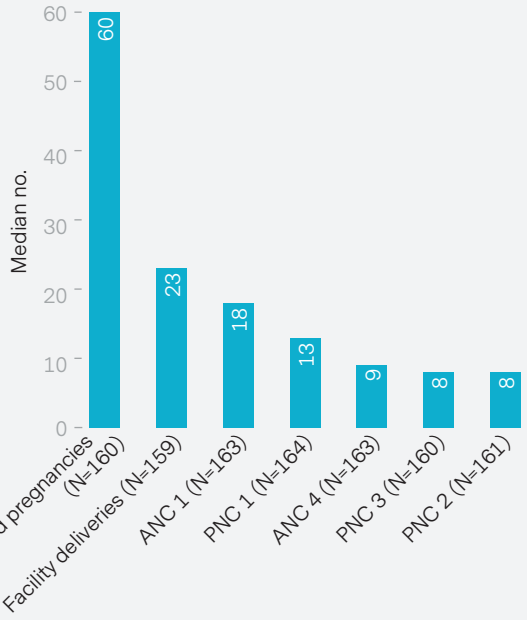


Figure 24. Register review of services provided for pregnant women by health posts in the last three months



had received training in neonatal resuscitation using bag and mask, early and exclusive breastfeeding, newborn infection management, thermal care including skin-to-skin, sterile cord cutting and cord care, and Kangaroo Mother Care for low birth weight (LBW) babies. Very few had received training in emergency obstetric care including lifesaving skills.

Their participation in selected child health activities is shown in Figure 22.

With respect to health-centre staff working conditions, the staff estimated that an average work week was 50 hours (median), whereof 39 hours were spent in MNCH, and 20 of those hours were antenatal services. The estimated time spent per woman in antenatal services varied a lot, but the mode figure was 30 minutes. Similar ranges and modes of estimates were given for postnatal check up at the health centre, or provision of child health services

Service provision: health post

In this study, the median population in the health-post catchment area was 5,981. Health posts had a median of 1,266 households, 1,261 women aged from 15 to 49 years and 831 children less than five years of age (Figure 23).

The HEWs were also asked about the expected services and the actual services provided at the health post during the quarter preceding the date of the survey (Figure 24). The health posts had projected a median of 60 pregnancies in their catchment population in three months. On average, the health posts had recorded 18 (median) women who had received a first ANC visit. Like the health centres, half as many (median 9) fourth ANC visits were recorded. There was a median of 23 health centre / hospital deliveries during the three months preceding the survey. The PNC coverage was low, but higher than that recorded at the health centres (Figure 24).

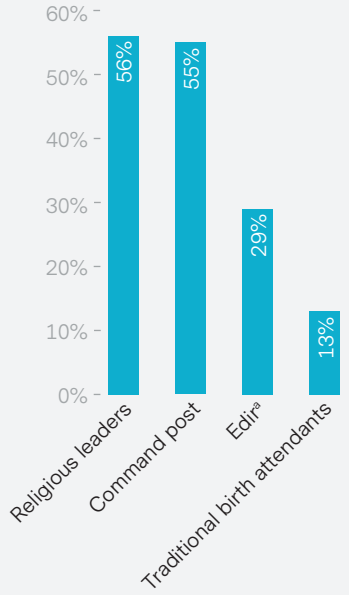
Service provision: HEW

The HEWs were asked about their performance during the last three months (Table 18). Over 70% had provided ANC or PNC services. Among those providing these services, the average number of women receiving ANC and PNC were 24 and 17, respectively. Young infants with VSD had been identified by 6% of the HEWs, with a mean number of three cases per HEW. Seventy per cent of HEWs mentioned that they had provided diarrhoea treatment for children 2–59 months of age, and 53% had treated pneumonia cases. Among HEWs seeing cases, on average there were nine pneumonia and 13 diarrhoea cases seen.

Table 18. Services delivered in the last three months by HEWs

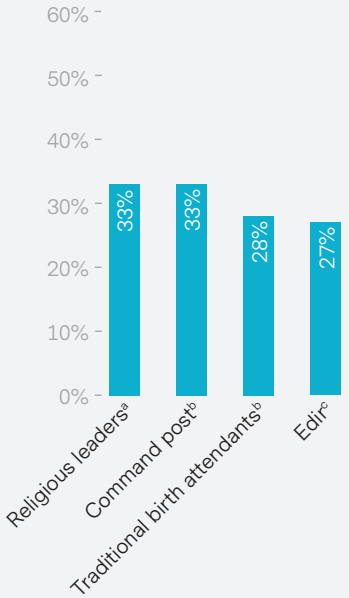
Services provided	Total N=276 % (95% CI)
Mother	
PNC for mother	84 (79–89)
ANC	76 (69–82)
ANC referral	70 (64–76)
Young infant (0–2 months)	
PNC for newborn	76 (69–81)
Diarrhoea	19 (12–25)
PNC referral for newborn	12 (8–17)
VSD cases identified	6.2 (3.7–9.9)
Jaundice	1.4 (0.4–4.6)
Children (2–59 months)	
Diarrhoea	70 (63–77)
Suspected pneumonia	53 (46–60)
Malnutrition	43 (36–51)
Refer to health centre	20 (15–26)
Malaria	12 (8–18)

Figure 25. Linkage between HEWs and key community figures or forums to discuss MNCH in the last three months



a Edir is a traditional 'burial society' to which community members make monthly contributions and when someone dies the family receive a payment to help cover funeral expenses in return.

Figure 26. Linkage between WDA leaders and key community figures or forums to discuss MNCH in the last six months



a Missing data from four WDA leaders
b Missing data from one WDA leader
c Missing data from two WDA leaders

Table 19. MNCH services delivered by WDA leaders in the community in the last three months

Activity	Total N=268 % (95% CI)
ANC counselling[a]	57 (50–63)
Pregnancy identification	54 (47–60)
PNC counselling[b]	45 (39–51)
Labour identification	30 (25–36)
Sick child (2–59 months) identification	22 (17–28)
Pregnancy danger sign identification[b]	14 (10–19)
Sick young infant identification[b]	13 (9–18)

a Missing data from one WDA leader
b Missing data from two WDA leader

The HEWs are expected to organise pregnant women's conferences in the community. In this study, a third of the HEWs did not organise such an event during the last three months. Among those that had organised such conferences (N=212), 97% reported monthly conferences. In the past three months, around half of the HEWs reported meeting with religious leaders and the kebele command post to discuss maternal and child health issues (Figure 25).

Service provision: WDA

The survey also assessed services provided by the WDA leaders in the three months preceding the survey (Table 19). Around half had provided ANC counselling, pregnancy identification and PNC counselling. Less than a quarter had identified a child or young infant that was sick.

The WDA leaders, who were engaged in MNCH care in the community, were asked if they reported their findings to a HEW for further follow-up. The response varied by activity. For example, 81% said that they reported the pregnant women they had identified to the HEWs. In contrast, only 40% of the WDA leaders reported that if they had identified a pregnant woman with danger signs they informed the HEW. A third of the WDA leaders reported receiving data collection forms from HEWs.

The WDA leaders were asked if they had supported the organisation of a pregnant woman's conference in the last three months; 42% reported that they had. Of these, 68% reported that they organised monthly conferences.

The WDA leaders were also asked if they had engaged with key community figures and forums in the last six months to discuss maternal, newborn and child healthcare. A third of leaders reported meetings with religious leaders and the kebele command post (Figure 26).

Summary

This section dealt with MNCH training, knowledge, as well as the supervision and service provision of 175 health-centre staff, 276 HEWs and 268 WDA leaders. IMNCI-trained staff were available at 85% of the health centres and half had CBNC-trained staff. Of the 175 health-centre staff interviewed, three-quarters were nurses and most of the rest health officers. The majority had received in-service training regarding child health, less so regarding antenatal and perinatal care. For the HEWs, 83% had been trained in iCCM and 65% in CBNC. Approximately two-thirds of the WDA leaders had received an MNCH orientation in the 12 months preceding the survey.

The knowledge level of newborn care was generally lower than that of health problems and actions to take regarding children 2–59 months of age. This may be illustrated by a relatively low knowledge of key components of immediate newborn care, care of preterm babies, as well as what to do with health problems of the newborn. The unprompted responses regarding signs and symptoms of child health problems and actions to be taken were more satisfactory. An exception may be the management of acute malnutrition, where key components were missing in many responses.

The HEWs' unprompted knowledge of PNC components was low. Around half or less of the HEWs did not mention most of the danger signs for VSD, LBI and severe jaundice. The HEWs showed more unprompted knowledge of signs of feeding problems, jaundice and dehydration. With respect to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management of young infants with danger signs, the HEWs had good knowledge on the importance of referring urgently for severe jaundice, VSD and severe dehydration, teaching and advising on breastfeeding for babies with feeding problem, and providing zinc and ORS for moderate dehydration. The remaining management protocols for the different illnesses were not well known by the HEWs. Around a quarter mentioned treatment of VSD with antibiotics.

The HEWs had better overall knowledge of illness signs and management of children in the ages from 2–59 months. Three-quarters or more knew cough with either difficult or fast breathing as signs of pneumonia, and 89% mentioned the treatment with antibiotics. Around two-thirds mentioned sunken eyes as a sign of dehydration, and less than half cited a skin pinch test as an examination of dehydration. Almost all mentioned treatment with ORS and 85% with zinc. However, less than half mentioned advising on continued breastfeeding. Signs of malaria and its management were also known by most HEWs.

Around half or less of the WDA leaders had unprompted knowledge of each of the components of PNC, young infant danger signs and danger signs for children in the age interval 2–59 months. A similar assessment, using the family health guide images, showed that their knowledge of pregnancy danger signs, hand hygiene related to immediate newborn care, breastfeeding, child nutrition during illness and vaccination of infants was relatively good. Less than a quarter of the WDA leaders described images related to delayed bathing, clean cord care, a lethargic newborn and a newborn with breathing problems.

Service provision data from health centres showed that PNC coverage in the last three months was suboptimal. Health posts for the same period also recorded a few PNC visits. For example, across the health centres visited, there were a median of 117 deliveries in the three months preceding the survey and a median of 63 women had received a first PNC visit. Almost all interviewed health-centre staff provided care of sick children 2–59 months, while around two-thirds to four-fifths provided different parts of antenatal, delivery and post-delivery care. Over three-quarters of HEWs had provided ANC and PNC in the previous three months. Half had provided care for children with pneumonia and 70% for diarrhoea.

The assessment of supervision showed that two-thirds of the health-centre staff had received supervision in the last three months, and less than half saw prospects for promotion within their work. For HEWs, only 59% of health posts had received a supervisory visit in the last month. Although most of the supervisory visits covered aspects of maternal care, less than 50% covered young infant care and around two-thirds covered care for children 2–59 months old. PRCM meetings were attended by 43% of the HEWs in the 12 months preceding the survey.

4.3. Assessment, classification and treatment provided by the health extension worker

These findings were based on the health-provider assessment module in the Dagu Baseline Survey performed from December 2016 to February 2017. Field workers observed when the HEW received, assessed, classified and provided treatment for infants and children below five years of age. There was also an exit interview with caregivers of these children. The field workers also performed a re-examination of the attended children (the results of the re-examination are not included in this report).

The HEWs

Almost all HEWs were women; only four out of the 186 HEWs were men. On average nine out of every ten HEWs had been trained in the iCCM of childhood illnesses, and half had received this training during the past four years.

The children that were assessed

There were 620 children included in this study. On average four children were assessed at each of the 147 health posts included in this sub study, ranging from one to six. Fifty-four per cent of the children were boys, 46% girls. One-third were infants, slightly less than a third were 12–23 months, and the remaining third were aged 24–59 months.

The health problems presented

Among the reasons to bring the child to the health post, respiratory problems, diarrhoea and fever dominated (Table 20). Only one caretaker stated malaria as the reason to attend the health post. Among the 'other' reasons presented, pain in various parts of the body dominated, especially abdominal pain.

The assessment, classification and treatment

Assessing danger signs

According to the iCCM principles, all sick children should be assessed regarding 'danger signs' (Table 21). In three-quarters of the cases the HEW checked whether the child was able to drink, breastfeed and that she/he did not vomit everything. Almost all children were assessed not to be lethargic or unconscious. Just over half of the consultations included questions about whether the child had had convulsions.

Table 20. Complaints presented as reason to seek care at the health post.

Reason to seek care at the health post:	Total N=620 % (95% CI)
Cough, difficult breathing, suspected pneumonia	58 (55–61)
Diarrhoea	36 (33–39)
Vomiting	14 (11–16)
Fever	26 (24–29)
Ear problem	6 (4–7)
Other	11 (9–13)

Table 21. Assessment of all danger signs by the HEWs at the health post.

Assessment done:	Total N=620 % (95% CI)
Being able to drink or breastfeed	78 (76–81)
Whether the child vomits everything	74 (72–77)
Whether the child has had convulsions	59 (57–61)
Being lethargic or unconscious	97 (96–98)

Table 22. Assessment, classification and treatment by the HEWs of 360 children presenting respiratory symptoms at the health post.

Action or lack of action:	Total N=360 % (95% CI)
Not assessed including counting respiratory rate	26 (22–29)
Assessed as fast breathing rate	24 (21–28)
Assessed as normal breathing rate	50 (46–54)
Classified as pneumonia	26 (23–29)
Treated with antibiotics	31 (27–34)

Assessing and treating respiratory complaints

There were 360/620 children presenting with cough, rapid or difficult breathing or symptoms that the caretaker labelled possible pneumonia (Table 22). For one-quarter of the children with such symptoms, the respiratory rate was not counted. Out of the children with fast breathing, 88% were classified with possible pneumonia. A further 9% of children that were not assessed or assessed to have normal respiratory rate were classified as possible pneumonia. Out of those classified as having pneumonia, 68% received antibiotics. Among children with respiratory complaints that were classified as not having pneumonia, 15% received antibiotics. Eighteen per cent of the children classified to have pneumonia were referred to a health facility.

Assessing and treating diarrhoea

Diarrhoea was the second most common presenting symptom of children attending the health post. In all, caretakers of 224 children reported such complaints (Table 23). Only one-third were assessed for dehydration. In spite of this, 15% of those assessed were classified as dehydrated and 14% of those not assessed were also classified as dehydrated. Overall, 60% received ORS, in most cases combined with zinc therapy. It should be noted that out of the 31/224 diarrhoea cases classified as dehydrated only 45% received rehydration therapy. Ten per cent of children with diarrhoea were referred to a health facility.

Assessing and treating fever

In total, 164 children were presented with fever as a reason to seek care. Only one caretaker mentioned malaria. Less than one in five of children with fever complaints had their temperature assessed. Relatively few were examined for stiff neck, rash, or pus or clouding of eyes. Respiratory rate was assessed in half of the children, and an RDT for malaria was done in over one-third. Antibiotics were provided to a bit less than a third, and only one child was treated for malaria.

Assessing and treating malnutrition

Most children (84%) had their weight measured and age was registered in all cases (Table 25). One per cent were classified as having severe acute malnutrition, and 4% with moderate malnutrition. The weight-for-age and sex revealed that 11% were severely underweight with a weight-for-age below -3SD of the WHO reference. The majority (81%) of these severely underweight children were not classified as severe acute or moderate acute malnutrition. Ten per cent of children from six months and above had a MUAC <12.0 cm. Five out of seven children with MUAC <11.0 were classified as severe acute malnutrition. Among 38 children with a MUAC between 11.0 and 11.9, four were classified as severe acute malnutrition, 24 as moderate acute malnutrition and 10 as no malnutrition.

Six out of the seven children classified with severe acute malnutrition received

Table 23. Assessment, classification and treatment by the HEWs of 224 children presenting with diarrhoea at the health post.

Action:	Total N=224 % (95% CI)
Diarrhoea confirmed in assessment	94 (91–97)
Assessed for dehydration	32 (27–37)
Classified as dehydrated	14 (10–17)
Treated with ORS	60 (55–64)

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RUFT. Seven out of the 21 children classified as having moderate malnutrition received RUTF. Only nine out of the 67 children with measured weight-for-age below -3SD were supplied with RUTF. One out of the seven children classified as severe acute malnutrition was referred to a health facility.

Treatments, referrals and provision of advice

Two-thirds of the children received some treatment (Table 26). Vaccinations were only provided to two children (160 children were nine months or younger, and potentially eligible for vaccinations).

Just over one-tenth were referred to another health facility. Nine out of ten caretakers accepted the referral. The reasons were severe illness in just under two-thirds, and drug stock-out in one-third. In almost all cases the reasons for referral were explained to the caregiver. Only in half of the referrals was a referral note written, and transport was arranged for one out of ten referrals.

Nine out of ten encounters with children ended with advice for home care. In most cases this included advice on fluids, feeding and breastfeeding. They were advised to return to the health facility if getting difficulties with supply of fluids or getting worse. Information was provided on when to return. Most HEWs used the iCCM chart booklet and registration book in the encounters.

Exit interview with the caregiver

The caregiver of the child in most cases confirmed the treatment that had been offered. The agreement regarding antibiotics (Kappa 0,95), and ORS (Kappa 0,92) was very good. For five out of the 15 children who were given RUTF at the encounter with the HEW, the caregiver did not mention this in the exit interview. Two-thirds of the caregivers stated that they had been told of specific day to return to the facility for follow-up.

Almost all caregivers and children had walked to the health post. The estimated time to get to the health post was on average 15 minutes (median), with a range from just a minute to 3.5 hours. Most caregivers (95%) did not spend any money on travel, consultation or treatment. The remaining had costs from 5–70 Birr in conjunction with the consultation.

Summary of the assessment, classification and treatment provided by the HEW

Among the 620 children assessed by the HEWs, respiratory problems, diarrhoea and fever dominated. Danger signs were assessed in around three-quarters of the children. The assessments often missed crucial points: respiratory rates not counted when having respiratory complaints (one-quarter), dehydration not assessed when having diarrhoea (two-thirds), and temperature not measured when complaining about fever (four-fifths). Assessment and classification were not always related (for example very low weight but not classified as malnutrition), and neither were classification and treatment (for example diarrhoea with dehydration not treated with ORS). Advice regarding home care and when to return to facility was provided in most cases. The iCCM chart booklet and registration book were used in most encounters.

Table 24. Assessment, classification and treatment by the HEWs of 164 children presenting with fever at the health post.

	Total N=164
Assessment:	**% (95% CI)**
Fever (asked or measured)	96 (93–98)
Measured temperature	18 (14–23)
Stiff neck	9 (5–13)
Rash	17 (12–21)
Mouth ulcers	9 (5–12)
Pus or clouding in eyes	11 (7–15)
Respiratory rate	51 (45–57)
RDT for malaria	38 (32–43)
Treatment:	
Antibiotics	27 (21–33)
Coartem (malaria treatment)	1 (0–3)

Table 25. Assessment, classification and treatment of malnutrition by the HEWs of 620 children seeking care at the health post.

	Total N=620
Assessment:	**% (95% CI)**
Weight	84 (83–86)
MUAC	84 (82–86)
Oedema	37 (35–39)
Findings:	
Weight for age <-3SD	11 (9–13)
Weight for age >-3SD	73 (71–76)
MUAC <12.0 cm[a]	10 (8–12)
MUAC >12.0 cm[a]	2 (1–3)
Classification:	
Severe acute malnutrition	1 (0.5–2)
Moderate acute malnutrition	4 (3–5)
Treatment:	
RUFT	4 (3–5)

a MUAC in children six months and above

Table 26. Treatment, referral and provision of advice by the HEWs to 620 children seeking care at the health post.

	Total N=620
Treatment and referral:	**% (95% CI)**
Any treatment	65 (62–68)
Referred to health facility	13 (11–15)
Advise:	
Home care	89 (88–91)
Seek care if cannot drink	80 (78–82)
Seek care if getting worse	82 (80–84)
Increase fluids	82 (80–84)
Continue feeding	85 (83–87)
Continue breastfeeding	77 (75–80)
When to return	82 (80–85)
Tools used:	
iCCM chart booklet	92 (91–93)
iCCM registration book	93 (93–94)


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4.4. Woreda contextual factors

These findings were based on the woreda contextual factor module in the Dagu Baseline Survey performed between December 2016 and February 2017. Field workers interviewed different informants, such as the woreda health office head, the focal persons for maternal and newborn health, the health information system, the budget officer, the surveillance officer and the public health emergency management officer. Three-quarters of the woredas reported major infrastructure projects during the past year, such as new roads, new major water supply investments, and large electricity supply projects or new hospitals.

Selected demographic and health data

The median population size of the woredas was 133,000 inhabitants with a range from 43,000 to 248,000. The average household size was 4.8 persons. Just under a quarter were women aged 15–49 years (23%) and 15% were under fives.

The total number of pregnancies across all 46 woredas per last year estimated by the Central Statistical Agency was bigger than that reported by health institutions (health posts, health centres and hospitals) in the area (Table 27). The total number of live births reported was lower than expected given the total number of pregnancies reported in the woreda.

Table 27. Reported demographic data for one year before interview (approximately 2016) across the 46 woredas.

Demographic data across all woredas:	Total woredas N=46 N
One-year pregnancies estimated by Central Statistical Agency	210,368
Pregnancies reported by health posts	81,822
Pregnancies reported by health centres	116,387
Pregnancies reported by hospitals	2,708
Total pregnancies reported	200,917
Total live births reported by health institutions	112,391

Table 28. Availability of different treatments as part of community case management at health posts across the 46 woredas

Treatment available:	Total woredas N=46 % (95% CI)
Amoxicillin tablets 250mg	65 (52–78)
Amoxicillin tablets 125mg	41 (26–54)
Amoxicillin syrup	57 (44–72)
Gentamicin injectable	39 (26–52)
TTC eye ointment	65 (52–78)
ORS	65 (52–78)
Coartem (malaria treatment)	83 (70–94)
Co-trimoxazole	70 (54–83)
Zinc	76 (63–87)
ORS-zinc	13 (4.3–24)
Paracetamol	67 (54–80)
RUFT	87 (76–96)
Vitamin A	89 (78–98)

The information about reported number of cases of sepsis in different age groups during the first two months of age was lacking in a major part of the woredas, which implies that no estimates of incidence can be made. Similarly, data on sepsis treatment and referral were lacking in most cases. The total number of diarrhoea cases treated in the woredas was reported in most cases: 73,123 cases or 8 treatment episodes per 100 children per year. Information on pneumonia treatment was also available in most cases: 66,202 treatments had been registered, which corresponds to 7 pneumonia treatment episodes per 100 children per year. The information on HIV-positive women in antenatal services was also incomplete.

Health posts, health centres and staff in the woredas

Sixteen out of the 46 woredas had a hospital within its boundary. On average, there were a just under four health centres and 18 health posts per 100,000 population. This implies that the health centres on average served 26,000 and the health post served 5,500 people. There were on average 1.8 health officers and 2.3 midwives per health centre. Most of these midwives had a three-year midwifery diploma. There were 2.1 HEWs per health post. Three of the 46 woredas had no functional ambulance. One-quarter of the woredas stated that no ambulance was available for sick children.

CBNC and iCCM of childhood illnesses in the woredas

Ninety-one per cent of the woredas had a scorecard system. CBNC program indicators were found in a scorecard for 80% of the woredas, and iCCM program indicators in 83%. However, the survey did not ascertain which CBNC indicators were included in the scorecard.

There was an average of eight health-centre staff per woreda trained in CBNC, and 5.5 trained in the iCCM of common childhood illnesses. The CBNC training had been given during the last two years in 83% of the woredas; in most cases a four-day training course. The HEWs had been offered CBNC training to the same extent. Fifty-seven per cent of the health posts had received post-training follow-up after the CBNC training. Seventy-one per cent of the HEWs had received iCCM training.

The availability of different drugs for the iCCM activities at the health posts is displayed in Table 28. Two-thirds of the woredas reported that amoxicillin tablets 250mg were available; less so the syrup preparation or the 125mg tablet. Gentamicin injection was available in a bit more than a third of the reporting woredas. ORS was available for two-thirds as well as zinc, but the new ORS-zinc was only available in a few woredas. The RUFT was available in a bit less than nine out of ten cases.

On average, there were two PRCM meetings organised per year per woreda, corresponding to 0.5 per health centre per year. In eight out of ten cases, the proceedings had been documented. In all or most cases this included iCCM registration book review, follow-up from last meeting and discussions on strengths, weaknesses, challenges and solutions. Discussions on case scenarios and clinical practice exercises were not so common. In the majority of meetings these also included planning and distribution of supplies.

Natural disasters in the woredas during the past year

Seventy per cent of the woredas had experienced one or more disasters during the past 12 months. Epidemic outbreaks were most frequent, occurring in more than half of the woredas. One-third had experienced drought, and seven woredas had floods. Two woredas had suffered from landslides.

Summary of woreda contextual factors

This chapter was based on reports from 46 woredas with an average population size of 133,000 inhabitants. The average household size was 4.8 persons. A bit less than a quarter were women of reproductive ages and 15% were under-five children. The health centres served on average 26,000 and the health posts served 5,500 people. Child morbidity data and treatment data at the woreda level were often missing or unreliable.

Most woredas had a scorecard system with information on CBNC and iCCM programmes. On average, there were eight health-centre staff per woreda trained in CBNC and six trained in iCCM. CBNC training had been offered to health-centre and health-post staff to a large extent during the past two years. Seven out of ten HEWs had received iCCM training.

Antibiotics to treat pneumonias at the health post were available in two-thirds, but combinations for sepsis treatment (amoxicillin plus gentamicin) only in a bit more than a third. ORS was available at health-post level in two-thirds of the woredas, and RUTF for malnourished children in nine out of ten woredas.

Less than one PRCM meeting per health centre per year was reported. In most cases this meeting included iCCM registration book review, summary of previous visit, discussion on strength and weakness, and planning for the next period.

5. Comment

This Dagu Baseline Report describes community-based newborn and child healthcare in a representative sample of households from 46 woredas in Amhara, SNNP, Oromia, and Tigray regions. The results form the background to the OHEP intervention that is being implemented during a two-year period following the baseline survey. The results neither represent Ethiopia as a whole, nor the four regions. Results represent the selected geographic areas of the OHEP interventions and the selected comparison areas. Still, it is of interest to compare some of the results with the findings from earlier large surveys.

Booking for ANC occurred in about the same proportion as reported in the Ethiopian Demographic Health Survey (EDHS) 2016.[5] This Dagu Baseline Survey showed that roughly half of births during the 12 months prior to survey took place at health facilities, while the corresponding figure in EDHS 2016 was 26%. The EDHS results are representative of the whole country and include deliveries during the last five years. The average EDHS result of the four regions that were represented in the Dagu Baseline was 32%.

Half of the under-five children in the survey who had been sick during the last two weeks had been taken to health post, health centre, hospital or private clinic for examination and treatment. The signs and symptoms they had were mainly fever, diarrhoea and respiratory symptoms. This level of careseeking was higher than that reported in the EDHS 2016.

Overall, health centres and health posts were well staffed. However, not all relevant staff had been trained in the IMNCI, iCCM and CBNC. All facilities should have qualified trained staff in these programmes to provide good quality services for newborns and under-five children.

The assessment of infrastructure showed that facilities had a shortage of water. This was more evident at health posts, where around a third did not have water on the day of the survey. Furthermore, two-thirds did not have soap, which has implications for maintaining good hygiene.

The availability of drugs was better at health centres than at health posts, in particular the availability of appropriate antibiotics were often lacking at health posts. Rehydration therapy was not available in a third of the health posts. RUFT was available in less than 10% of the health posts, although this was not reflected in the information provided at the woreda level.

The HEWs had better knowledge of illness signs and management for children than for newborns and young infants. They often lacked sufficient knowledge of signs of VSD, local

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bacterial infection and severe jaundice. This forms a background to the low frequency of newborns and young infants being managed at the health posts. The assessment, classification, and treatment of sick children was relatively well functioning but with some quality problems. Key assessments of the sick child were often missed, the assessment was not always logically linked to the corresponding classification, and the appropriate treatment was quite frequently not provided.

The WDA leaders are key in raising awareness in the community regarding danger signs for young infants and under-five children. The findings of this survey suggest that they need more orientation and support to gain sufficient knowledge for this task.

Supportive supervision from health centres to health posts is key to ensure that child health services are provided to the community with the required quality. A bit less than two-thirds of the health posts had been visited in the last month. Furthermore, when looking at the content of the supervision, appropriate emphasis was not given to newborn and child health services.

There are important limitations to this study. Survey data collection approaches to estimate the prevalence of behaviours during pregnancy and newborn periods may be susceptible to recall error which we tried to limit by only analysing data on births from the 12 months prior to the household survey. The results on assessment and treatment that are based on interview in the households have limitations. This information relies on respondents' ability to recognise, recall, and report signs and symptoms correctly, and to be able to accurately recall and report careseeking patterns, where treatments were obtained, and both when and how often they were given to the child. The findings from the observations of HEWs assessing and treating 620 sick children may provide a more accurate picture. The finding that only 6% of children aged 2–59 months were reported to have had an illness in the two weeks prior to the survey was lower than reported in other household surveys such as EDHS 2016.[5] Another limitation is that due to security reasons we were not able to collect data from one woreda.

Towards the end of 2018, it is planned to repeat this household, health facility, and health-provider survey, returning to the same study zones. At that time, an analysis of change between baseline and endline indicators in careseeking for important childhood illnesses will be carried out, comparing intervention and comparison areas, and adjusting for potential confounding factors. Results will be interpreted with particular care given that interventions other than OHEP may be in place throughout the study area. Information from the implementation of the OHEP intervention package will form the basis for process evaluation that could shed light on the findings from baseline and endline surveys.

5 Central Statistical Agency/CSA/Ethiopia and ICF. 2016. Ethiopia Demographic and Health Survey 2016. Addis Ababa, Ethiopia, and Rockville, Maryland, USA: CSA and ICF.

6. Abbreviations and acronyms

95% CI	95% confidence interval
ANC	Antenatal care
BCG	Bacille Calmette Guerin
BP	Blood pressure
CBNC	Community-based newborn care
CSA	Central Statistics Agency
EDHS	Ethiopia Demographic and Health Survey
EA	Enumeration area
EPHI	Ethiopia Public Health Institute
HEW	Health extension worker
HMIS	Health information management system
iCCM	Integrated Community Case Management
IMNCI	Integrated Management of Newborn and Childhood Illnesses
L10K	Last Ten Kilometres Project
LBI	Local bacterial infection
LBW	Low birth weight
LSHTM	London School Of Hygiene & Tropical Medicine
MNCH	Maternal, newborn and child health
MUAC	Mid-upper arm circumference
OHEP	Optimizing the Health Extension Program
ORS	Oral rehydration solution
PNC	Postnatal care
PRCM	Performance review and clinical mentoring
RDT	Rapid diagnostic test
RUTF	Ready-to-use therapeutic food
SNNP	Southern Nations, Nationalities and Peoples
TTC	Tetracyclines
UNICEF	United Nations Children's Fund
VSD	Very severe disease
WDA	Woman Development Army
WHO	World Health Organization

7. Annexes

Annex 1: Study area presented by region, zone and woreda name, Dagu Baseline Survey

Region	Zone	Woreda
AMHARA	AWI	DANGILA
AMHARA	AWI	BANJA SHEKUDAD
AMHARA	AWI	ANKASHA GUANGUSA
AMHARA	AWI	GUANGUA
AMHARA	AWI	FAGITA LEKOMA
AMHARA	AWI	JAWI
AMHARA	AWI	GUAGUSA SHIKUDA
AMHARA	NORTH SHEWA	MENZ GERA MIDIR
AMHARA	NORTH SHEWA	ANTSOKIAYANA
AMHARA	NORTH SHEWA	EFRATANA GIDIM
AMHARA	NORTH SHEWA	TARMA BER
AMHARA	NORTH SHEWA	KEWET
AMHARA	NORTH SHEWA	ANGOLALA TERA
AMHARA	NORTH SHEWA	ANKOBER
AMHARA	NORTH SHEWA	BASONA WERANA
OROMIA	GUJI	ADOLA
OROMIA	GUJI	WADERA
OROMIA	GUJI	ODO SHAKISO
OROMIA	GUJI	LIBEN
OROMIA	WEST HARERGE	DOBA
OROMIA	WEST HARERGE	TULO
OROMIA	WEST HARERGE	BOKE
OROMIA	GUJI	URAGA

Region	Zone	Woreda
OROMIA	GUJI	BORE
OROMIA	GUJI	QERCHA
OROMIA	GUJI	HAMBELA WAMENA
OROMIA	WEST HARERGE	HABRO
OROMIA	WEST HARERGE	DARO LEBU
OROMIA	WEST HARERGE	GEMECHIS
OROMIA	WEST HARERGE	CHIRO ZURIA
SNNP	SEGEN	BUJI
SNNP	SEGEN	AMARO
SNNP	SEGEN	DERASHE
SNNP	DAWURO	TOCHA
SNNP	DAWURO	MAREKA
SNNP	DAWURO	LOMA
SNNP	DAWURO	GENA BOSA
SNNP	DAWURO	ISARA
TIGRAY	SOUTH EAST .T	SEHARIT SAMRE
TIGRAY	SOUTH EAST. T	ENDERTA
TIGRAY	SOUTH EAST. T	HINTALO WAJIRTA
TIGRAY	SOUTH EAST. T	DEGUA TEMBEN
TIGRAY	SOUTHERN	ALAJE
TIGRAY	EASTERN	KILTE AWLALO
TIGRAY	CENTRAL	KOLA TEMBEN
TIGRAY	CENTRAL	TANQUA ABERGELE

Annex 2: Additional graphs and figures

This section presents additional graphs and figures as well as information pertaining to MNCH care not included in the main text.

Figure A2.1
HEWs' (N=276) unprompted listing of how to manage newborns with: A) VSD, B) LBI, C) breastfeeding problems and D) jaundice.

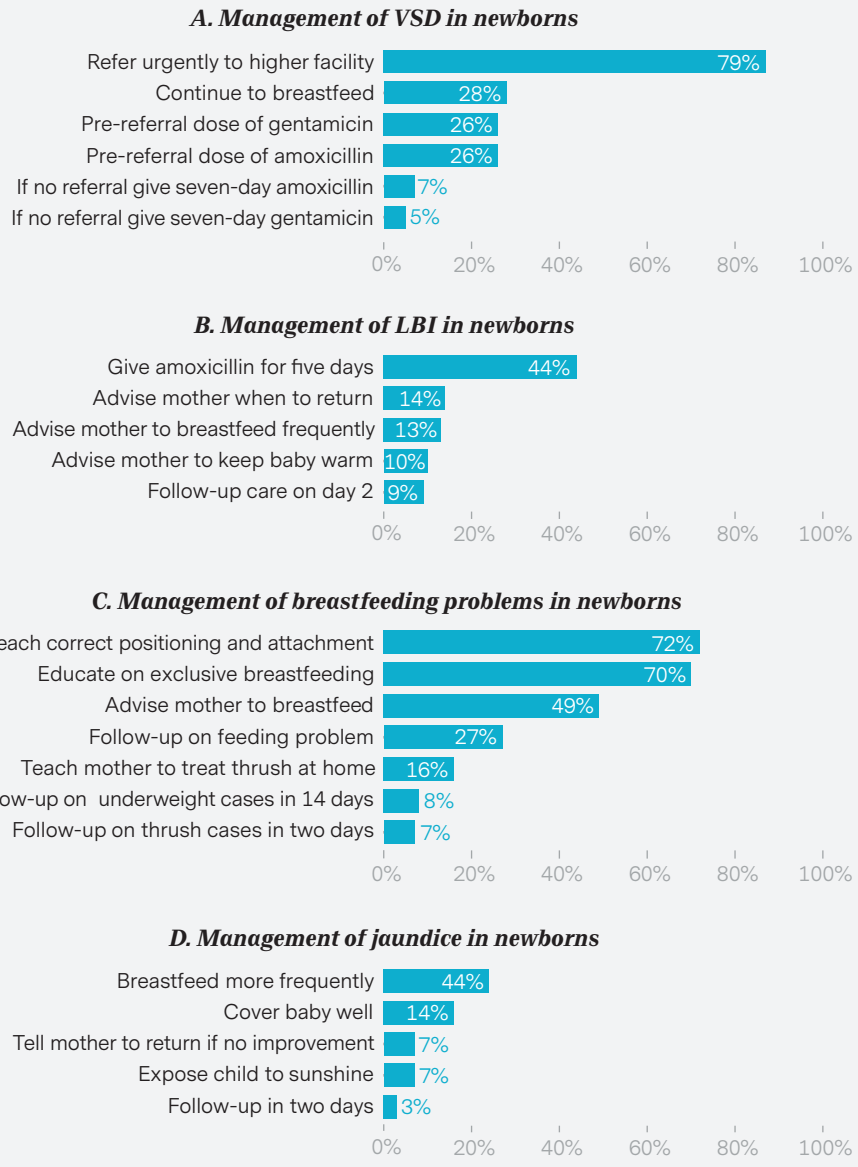


Figure A2.2 HEWs' (N=276) unprompted listing of how to manage newborns who have A) moderate dehydration and B) severe dehydration.

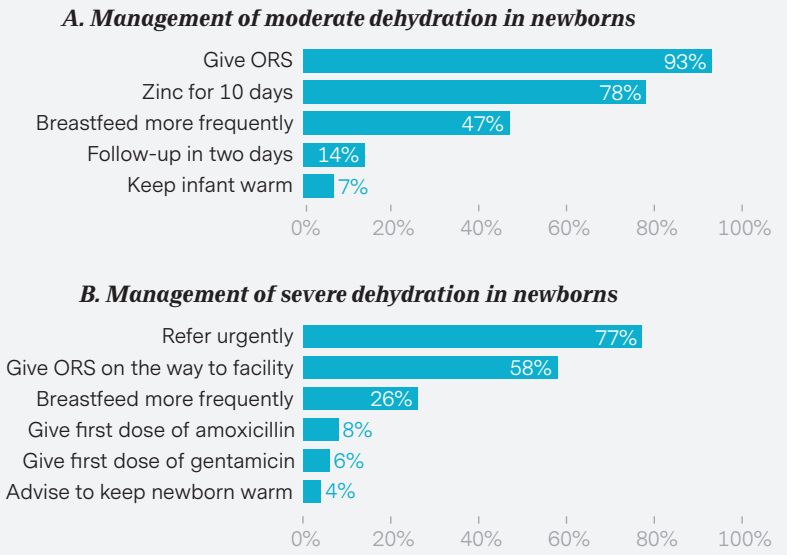
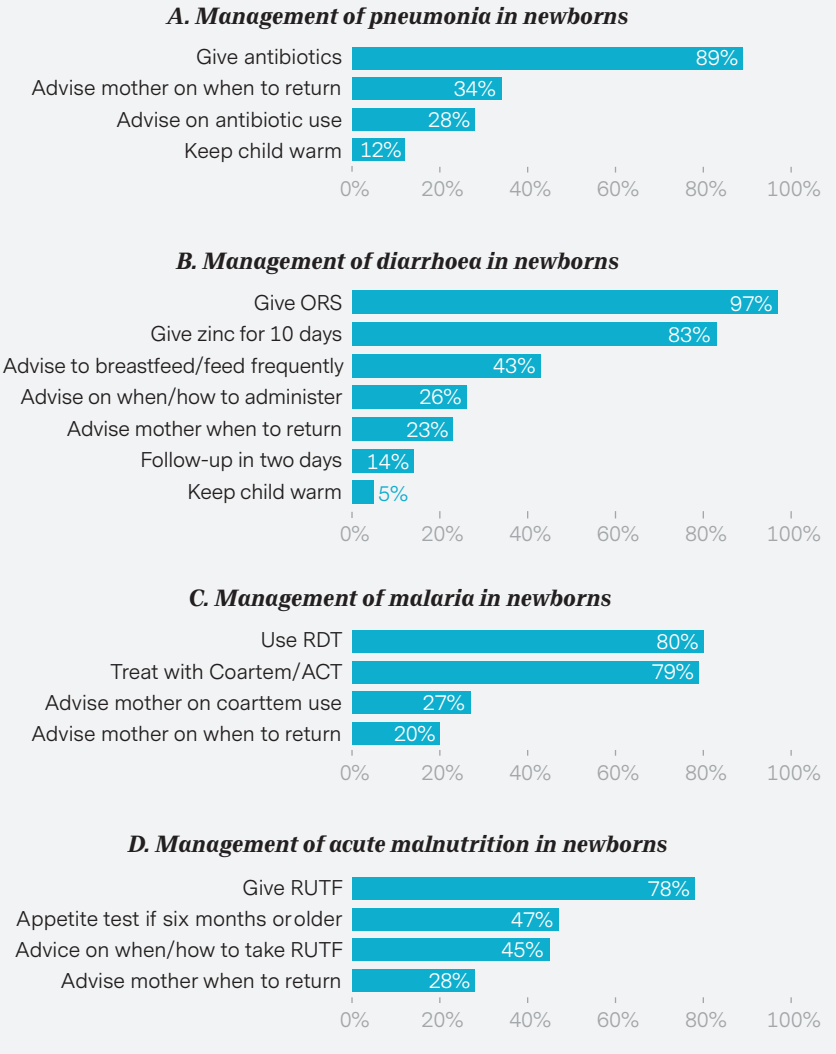


Figure A2.3. HEWs' (N=276) unprompted listing of how to manage children 2–59 of months of age with A) pneumonia, B) diarrhoea, C) malaria and D) acute malnutrition.



WDA leaders' perception of community cultural norms
WDA leaders were asked about the community's cultural norms with respect to contact with newborn soon after birth (Tables A2.1 and A2.2).

Table A2.1. Community newborn cultural norms.

	Total N=268 % (95% CI)
Baby kept at home by mother[a]	58 (51–65)
Prevention of visitors	20 (15–26)
Physical contact with mother only	19 (14–26)

a Missing data from one WDA leader

Table A2.2. Length of community newborn cultural norms.

	Total Mean days (95% CI)
Time baby is kept at home (N=156)	37 (32–42)
Time without visitors (N=54)	39 (30–47)
Time with physical contact limited to mother (N=52)	43 (33–53)

Figure A2.4. WDA leaders' (N=268) unprompted listing of: A) PNC councelling for a newborn, B) young infant danger signs and C) danger signs for a child 2–59 months of age.

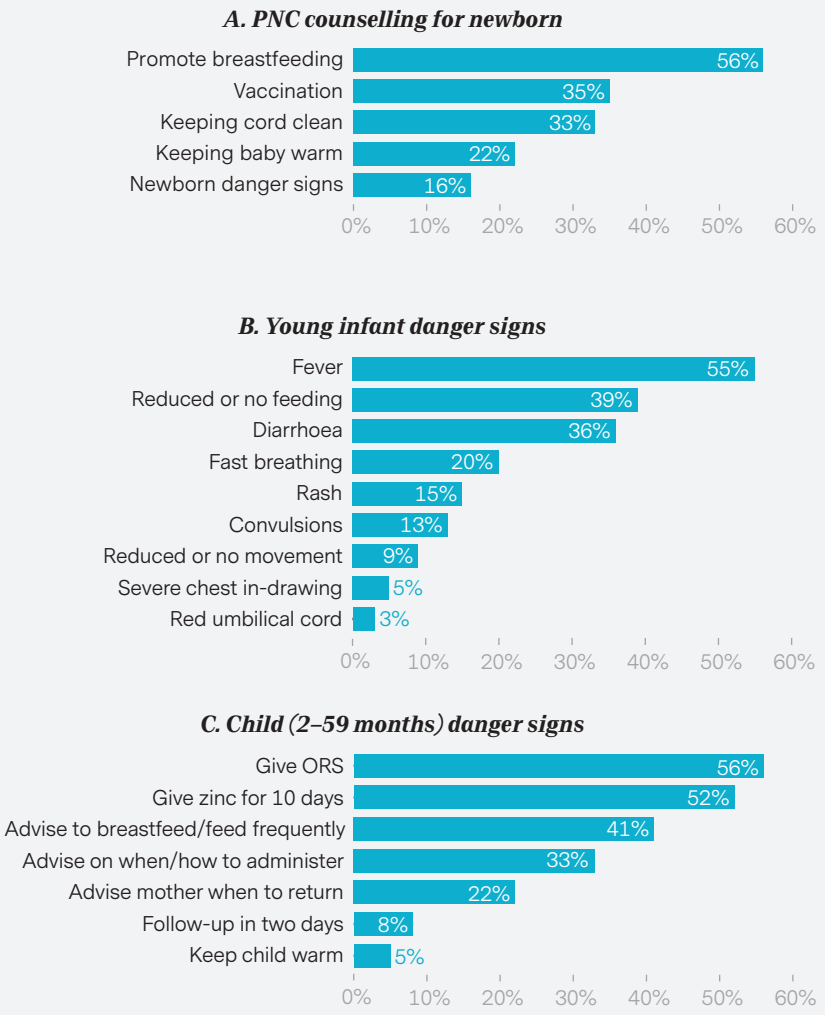
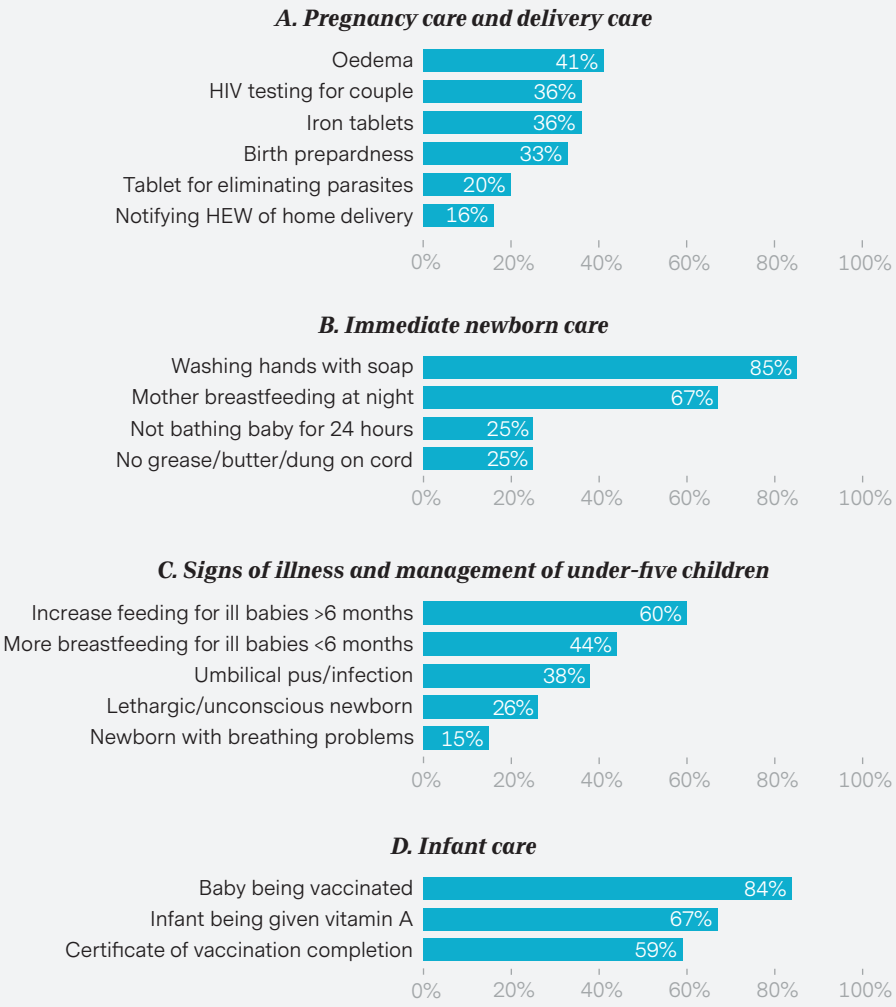


Figure A2.5. WDA leaders (N=169) knowledge of the family health guide images on: A) pregnancy and delivery care, B) immediate newborn care, C) signs of illness and management in children under five and D) infant care.

The WDA leaders' knowledge of key MNCH behaviour change messages was assessed using images from the family health guide. The WDA leaders, who reported using the family health guide (169/268), were asked to describe images shown as flashcards. Their understanding of a range of images on the continuum of care without any linked text is shown in Figure A2.5.



The Dagu project evaluates the Optimising the Health Extension Program in Ethiopia (OHEP) project that is addressing the critical under-utilisation of community-based services, particularly the use of Integrated Community Case Management (iCCM) services and Community Based Newborn Care (CBNC) services. OHEP is led by the Ethiopian Federal Ministry of Health and implemented by UNICEF, PATH, Save the Children, and the Last 10 Kilometers Project, and Dagu is providing support for measurement, learning and evaluation.

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