

**OUTCOMES AND ASSOCIATED FACTORS OF INTEGRATED
COMMUNITY CASE MANAGEMENT OF CHILDHOOD ILLNESSES IN
DAWRO ZONE, SOUTH WEST ETHIOPIA**

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June, 2017

Jimma, Ethiopia

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June, 2017

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Abstract

Background: After its scale up in March 2011 integrated community case management (ICCM) was provided in about 86% national geographic coverage; 88% health extension workers (HEWs) were trained; and care seeking for under-five children at health posts was increased. However, no study was found on under-five children health outcomes and associated factors following management of common childhood illnesses by HEWs using ICCM protocol in Ethiopia including the study area.

Objective: To assess outcomes and associated factors of integrated community case management of childhood illnesses service in Dawro zone, southwest Ethiopia, 2017

Methods: Community based retrospective cross-sectional study design was employed in this study. The study was conducted from March 15 to April 12, 2017 in Dawro zone, southwest Ethiopia. Caregivers of 791 randomly selected under-five children treated by using ICCM protocol from July 08, 2016 to January 09, 2017 in sampled kebeles were participated in this study. Multinomial logistic regression analysis was used to fit a model and identify variables associated with outcomes of ICCM. Summary of the result was presented descriptively by frequency tables and graphs; and analytically by p-value, adjusted odds ratio, and confidence interval.

Result: Seven hundred ninety one child-caregiver pairs of under-five children were participated in this study yielding about 98 percent response rate. Among the 791 under-five year children managed by health extension workers for common childhood illnesses, 89.1%, 7.3%, and 3.5% were cured, their illnesses worsen, and died respectively. Caregiver's educational status, household wealth, age of the child, travel time from home to health post, age of the caregivers, caregiver's knowledge of childhood danger signs, and harmful traditional practices were significant predictors of outcomes of children managed by HEWs through ICCM strategy.

Conclusion: This study revealed that most of the under-five children cured following the management of common childhood illnesses by health extension workers. Attention should be given to infants, children far from health posts, educating caregivers about childhood danger signs, eliminating harmful traditional practices on under-five children to gain better child health outcomes.

Key words: Outcome, integrated community case management (ICCM), health extension workers, health post, Dawro zone

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List of Acronyms

ACT: Artemesin Combination Therapy

AOR: Adjusted Odds Ratio

CBNC: Community Based Newborn Care

CHW: Community Health Workers

C.I: Confidence Interval

COR: Crude Odds Ratio

EDHS: Ethiopian Demographic Health Survey

HDA: Health Development Army

HEW: Health Extension Workers

HIV: Human Immunodeficiency Virus

HO: Health Office

ICCM: Integrated Community Case Management

IMNCI: Integrated Management of Newborn and Childhood Illnesses

MDG: Millennium Development Goal

MNCH: Maternal, Neonatal and Child Health

NGO: Non-Governmental Organizations

ORS: Oral Rehydration Salt

PRCMM: Performance Review and Clinical Mentoring Meeting

RDT: Rapid Diagnostic Test

RUTF: Ready to Use Therapeutic Food

SDG: Sustainable Development Goals

SNNPR: Southern Nations, Nationalities, and Peoples' Region

SRS: Simple Random Sampling

UNICEF: United Nations International Children's Education Fund

USAID: United State's Aid for International Development

VHT: Voluntary Health Team

WHO: World Health Organization

WorHO: Woreda Health Office

ZHD: Zone Health Department

Chapter One: Introduction

1.1. Background

Integrated community case management (ICCM) is a strategy to train, supply, support, and supervise community health workers (CHWs) to provide diagnostics and treatments for common childhood illnesses for sick children near their households [1]. An integrated approach to common childhood illnesses is expected to have the following characteristics: Community health workers are trained to systematically detect signs of the major causes of mortality among children under five years of age in the area where they are working; then they classify the child as having one or more of these conditions using an integrated algorithm or other decision-making tool; if the area is endemic to malaria, the algorithm or tool should take into consideration the clinical overlap of malaria and pneumonia; they provide treatment for all of the conditions identified, or refer if the child is severely ill or requires a treatment the CHW does not keep in stock; and finally they counsel the caregiver of the sick child on how to administer all of the treatments provided [2].

Case management of malaria, pneumonia, and neonatal sepsis can be provided by community health workers. And also changing health beliefs and improving access to health services can be accomplished through community health workers where there is active community involvement and empowerment [3]. ICCM is recommended by World Health Organization (WHO) and United Nations Children's Fund (UNICEF) as a strategy to improve equity in access to health care. In developing countries community health workers are trained, supplied, and supervised by UNICEF, WHO and other partners to treat pneumonia, diarrhea, malaria and severe acute

malnutrition. Oral antibiotics, oral rehydration salt (ORS) and zinc, artemisinin based combination therapy (ACT) are used to treat pneumonia, diarrhea, and malaria respectively. Rapid diagnostic test (RDT) enables CHWs to test malaria while mid-upper-arm circumference (MUAC) used to identify severe acute malnutrition in the community [4].

The beginning of health extension program (HEP) in 2002/03 in Ethiopia [5] trained more than 38,000 health extension workers (HEWs) to extend basic health services to rural parts of the country where about 84 percent of its population reside [6]. One health post is run by two HEWs and expected to serve about 5,000 populations and it gets supervision from nearby health center [7]. The Ethiopia ICCM program has been scaled up in February 2011 after a national policy change supporting community based treatment of childhood pneumonia by HEWs in early 2010. The program allows HEWs to counsel caregiver for homecare, treat common childhood illnesses, and refer severe under-five children illnesses [8].

Since its launch in 2011 Ethiopia's major achievements through ICCM were 86.4 percent national geographic coverage, training 29,911 (88 percent) of HEWs on ICCM, and distribution of essential ICCM drugs and job aids for about 14, 500 health posts (HPs). Additionally 4,671 supervisors were trained to supervise HEWs and also 3,346 health workers (HWs) were trained in integrated management of new-born and childhood illness (IMNCI) to strengthen the referral linkage from health posts to health centers. Due to afore mentioned activities performed care seeking for under-five sick children at health post indicates an increment; for acute respiratory infection from 5 to 14 percent, for fever 4 to 15 percent, and for diarrhea 7 to 20 percent from 2010 to 2012 [8]. Based on study conducted in three regions, of under-five children visited health posts 100%, 91%, and 90% in SNNP, Tigray, and Amhara regions, respectively got drugs form health posts [9].

After the start of ICCM about 4.6 million 0-59 months' old children received lifesaving care through ICCM. Community based newborn care (CBNC) was also launched in March 2013 which allowed HEWs to treat new-born sepsis after its confirmation by national policy in order to contribute to the reduction of neonates and 1-2 months aged infants due to infection [10].

1.2. Statement of the problem

Even though there was substantial reduction in under-five mortality from 2000 to 2015 with the 3.9 annual rate of reduction, this earth is losing about 16,165 under-five children every day mostly because of preventable childhood illnesses. From the 5.9 million under-five deaths in the year 2015 worldwide the main killers of children under age five include pneumonia, preterm birth complications, neonatal intrapartum-related complications, diarrhea, neonatal sepsis, and malaria accounts 17, 16, 11, 8, 7, and 5 percent respectively [11]. Globally the average annual rate of reduction in under-five mortality was 3.9 percent between 2000 and 2015. Sustainable Development Goals (SDG) target 3.2 aims to attain neonatal death below 12 and under-five death below 25 per 1000 live births by 2030. Africa continent should decrease 70 percent under-five death that is mostly contributed by pneumonia, diarrhea, malaria, and malnutrition to achieve the target [12].

To reduce under-five mortality caused by major killers such as pneumonia, diarrhea, and malaria integrated community case management (ICCM) is recommended by WHO and UNICEF [4]. The challenges to ICCM scale up in sub-Saharan Africa include deployment of CHWs, inadequate supervision of CHWs, motivation and retention of CHWs, maintaining reliable supply chains, it demand side barriers to utilization, weak monitoring and evaluation systems, and the need for supportive government policies and engagement to achieve sustainable progress [13].

In the year 2015 pneumonia and diarrhea alone caused about quarter i.e. 1.4 million of under-five death which is more than sum of all other infectious childhood killers. Exact diagnosis of pneumonia, the leading cause of children needs set ups with x-rays, sputum culture, and blood tests which are rare in developing nations where most of childhood death occur. ICCM is

adapted from integrated management of childhood illnesses (IMCI) in order to allow community health workers to assess, classify, and treat common childhood illnesses. ICCM is important especially in developing countries because children in these countries are underserved by formal health facilities [14].

In the last 25 years, Ethiopia has exhibited substantial reduction in under-five year's mortality; with the trend 205, 145, and 59 deaths per 1,000 live births with the average annual rate of reduction of 5 percent in the years 1990, 2000, and 2015 respectively. The trend in neonatal mortality remained stagnant and contributed a large proportion (nearly half) of the under-five mortality rate. From about 184,000 under-five deaths occurred in 2015, neonatal death shares 87,000 (47%), thus increasingly accounting for a larger proportion of the under five death [11]. The nation has met Millennium Development Goal 4 by reducing under-five mortality to 68 deaths per 1,000 live births in 2012 three years ahead of time. Pneumonia, diarrhea, malaria, malnutrition, and neonatal conditions are among the leading causes of childhood mortality in the country. On February 2011 the country started national scale up of integrated community case management of childhood illnesses (ICCM) particularly pneumonia, diarrhea, malaria and severe acute malnutrition to accelerate under-five morbidity and mortality reduction [8].

Easily preventable conditions especially pneumonia, diarrhea, malaria, neonatal conditions and malnutrition consists of over two-thirds of childhood deaths in Ethiopia. Under nutrition is a major underlying cause contributing to nearly half of childhood deaths [15]. In the implementation of ICCM in Ethiopia, the common problems identified were assessment error, inaccurate classification, and inappropriate treatment. Inability to correctly examine convulsion, edema, and lethargy were frequent assessment mistakes. Children with pneumonia and severe illness were frequently misclassified; while not providing cotrimoxazole, ORS, and first dose

amoxicillin and vitamin A for pneumonia, diarrhea, and severe complicated respectively were frequent treatment gaps. There was also a problem of not referring children to health centers [7]. Any of the above errors may cause poor outcome of ICCM service. No study was found on outcomes and its associated factors of ICCM of childhood illnesses nationally including the study area.

1.3. Significance of the study

Evidence on the ICCM program is necessary to further improve the service being provided to save under-five children lives. This thesis has assessed the outcomes and associated factors of ICCM service in Dawro zone; that is it has generated knowledge on how many of the children managed by health extension workers were cured, their illnesses worsen, and dead and what factors contributed to the observed outcomes. The findings will help the health extension workers, program implementers and developmental partners to further improve ICCM service in order to contribute to the reduction of under-five mortality. The generated knowledge will also help other researchers to investigate more on the area.

Chapter Two: Literature Review

2.1. Outcomes of integrated community case management of childhood illnesses

A study conducted in rural Bangladesh on effectiveness of home-based management of newborn infections by community health workers has shown that the case fatality rates for very severe disease were 14.2 percent among cases treated by medically qualified providers, 4.4 percent among those treated by CHWs, 32 percent among those treated by local untrained providers and 27.6 percent among those who received no care [16].

Another study undergone in Oromia, Amhara, and SNNPR regions found from children between 2 and 59 months managed by HEWs for common childhood illnesses pneumonia, diarrhea, malaria, and severe uncomplicated malnutrition using ICCM protocol treatment outcome for about 87.3% improved, 11.9% unknown, and 2.1% died [17].

2.2. Factors associated with outcomes of ICCM of childhood illnesses

2.2.1. Socio demographic and economic factors

Children with mothers who had no education were about 3 times at higher risk of having worse malnutrition than that of highly educated mothers' children [18]. There was decreased risk of pneumonia with increased father's education [19]. Children with educated mothers and urban residents were less likely to die before their fifth birthday compared to children with uneducated mothers and rural residents although their association was statistically insignificant [20].

The distribution of household wealth and risk factors differed by treatment type; the poorest third of households were more likely to be treated by CHWs and newborns who received treatment

from unqualified and non-CHW providers were more likely to be preterm or twins or multiple births. Among newborns diagnosed with very severe disease, care seeking from CHWs increased from 35 percent in 2004 to 44 percent in 2005, while the proportion of newborns treated by unqualified providers or receiving no treatment declined from 28 percent to 16 percent in the same period [16]. The risk of children having worse nutrition was 2 and 1.3 times higher for poorest and richer household respectively compared to the children of the richest households [18].

Mothers within 16-25 age groups had a lower risk of child death compared to older mothers [21]. Children born to households that are located more than 60 minutes from a health facility have 1.26 times higher odds of dying in the neonatal period than children who are born to households that are within 10 minutes from a health facility [22]. In Kenya travel time and health outcome of children was not associated [23].

A cross sectional survey done in Oromia region found that there was low utilization of health extension workers with 9.3 percent of caregivers of a child sick with diarrhea, fever, and/or pneumonia in the past two weeks taking their child to HEWs in both ICCM and routine areas. There was a higher likelihood of utilization of HEWs in ICCM areas than comparison areas. Utilization of health extension workers was associated with maternal education, illness type, and distance from health post in ICCM areas. Perceptions of illness severity and service quality were the primary reasons for caregivers not utilizing ICCM service in the health post by HEWs [24]. Another study on implementation of ICCM found that the Ethiopian government led a strong ICCM partnership that attracted development partners in implementation, monitoring, evaluation, and research but service utilization and weak supply chain remain major challenges [25].

In Ethiopian Demographic Health Survey (EDHS) 2011, it was shown that place of residence, mother's education, and wealth was related with under-five children death. Under-five children death in rural areas was about 1.4 times higher than that of urban areas and 1.6 times higher in lowest wealth quintile than highest wealth quintile. Concerning mother's education, under-five children death among mothers with no education was about five times higher than that of mothers with more than secondary education [26].

2.2.2. Caregiver related factors

Under-five children cared by housekeeper and their relatives were at higher odds of developing pneumonia as compared to child cared by their parents. Children having history of diarrhea and household history of acute lower respiratory infection were at higher odds of developing pneumonia compared to their counterpart [19]. Another study on impact of community management of fever on childhood mortality in Ghana found that treatment of uncomplicated fever episodes among children 2–59 months of age with the anti-malarial drugs, or in combination with the antibiotic at community level by trained community health workers resulted in reduction of all-cause mortality in comparison to those treated with standard care that includes treatment at home, by traditional healers, care from drug retail shops, or from the formal health sector. The anti-malarial drug reduced mortality by 30% and anti-malarial with antibiotic by 44%, both significantly different in comparison to standard care [27].

In a study conducted in Liben district of Oromia region community health workers have seen a total of 4787 cases, of which 41 were referred within one year. Malaria (36%), pneumonia (26%), conjunctivitis (14%), and acute watery diarrhea with some dehydration (12%) were among the most common classifications. Community health workers reported no severe

dehydration while bloody diarrhea was common (24%). They have seen two and half folds of malaria, pneumonia, and diarrhea cases when compared with cases seen by all the district's health facility staffs. From the total cases seen young infants contributed less than one percent, probably because cultural norms confined mothers and infants at home for two months postpartum. For competency checkup, the workers were tested and 80 percent of them scored more than 80 percent of the test. Between 1997 and 2006 care givers' awareness of fast or difficult breathing as signs of pneumonia increased from 39% to 92%, and nearly all mothers (94%) knew at least two childhood danger signs by 2006. Specifically care seeking for cough and difficult or rapid breathing increased from 30% to 54% when communities were trained to recognize danger signs and seek care at health facilities and up to 84% when community case management (CCM) workers were deployed [28].

Health development army (HDA) was a mechanism introduced in 2010/11 by Federal Ministry of Health (FMOH) which organizes community and health care workers in order to mobilize women and other family members to utilize key health interventions especially maternal and child health services [6].

2.2.3. Obstetric history of caregivers

Mothers who received no postnatal care had 1.62 times greater risk of having malnourished children compared to those received sufficient care [18]. When compared to mothers with few children, mothers with 5-6 children had a lower risk of child death [21].

2.2.4. Child related factors

Children aged 0-12 months were 16% to 23% and 11% to 20% more likely to acquire diarrhea and acute respiratory infections respectively compared to children aged above one year and

below five years [29]. Harmful traditional practices (HTPs) such as female genital mutilation, milk teeth extraction, and uvulectomy are performed mostly at infancy and early childhood in Ethiopia. In SNNPR female genital mutilation, milk teeth extraction, and uvulectomy are 54%, 94%, and 54% prevalent respectively. These harmful traditional practices are usually performed by untrained local practitioners using unhygienic materials such as blade, knife, sharp iron, horsetail, and others. This opens a way of entry to microorganisms leading to diarrhea, excessive bleeding, and other infections [30].

As we can see from above discussion most of studies on integrated community case management of childhood illnesses were focused on its implementation strength, quality, performance review meeting and supervision effectiveness, care seeking behavior, and utilization. Hence, this study was conducted to assess the outcomes and associated factors of integrated community case management of childhood illnesses.

Conceptual framework

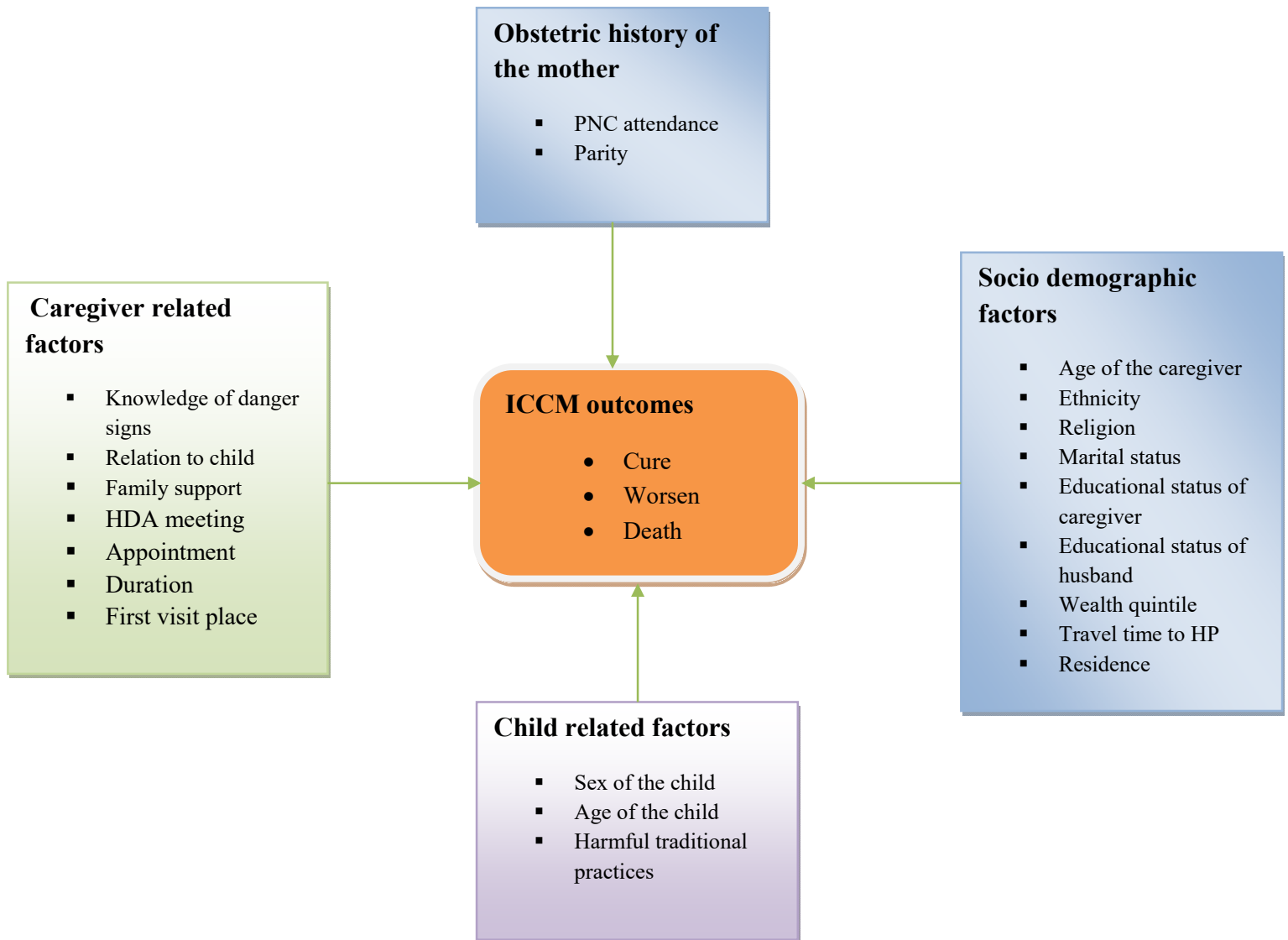


Figure 1: A Conceptual framework developed from literatures reviewed for outcomes and associated factors of ICCM of childhood illnesses in Dawro zone, south west Ethiopia, 2017.

Chapter Three: Objectives

3.1. General objective

- ✚ To assess outcomes and associated factors of integrated community case management of childhood illnesses in Dawro zone, southwest Ethiopia, from March 15-April 12, 2017

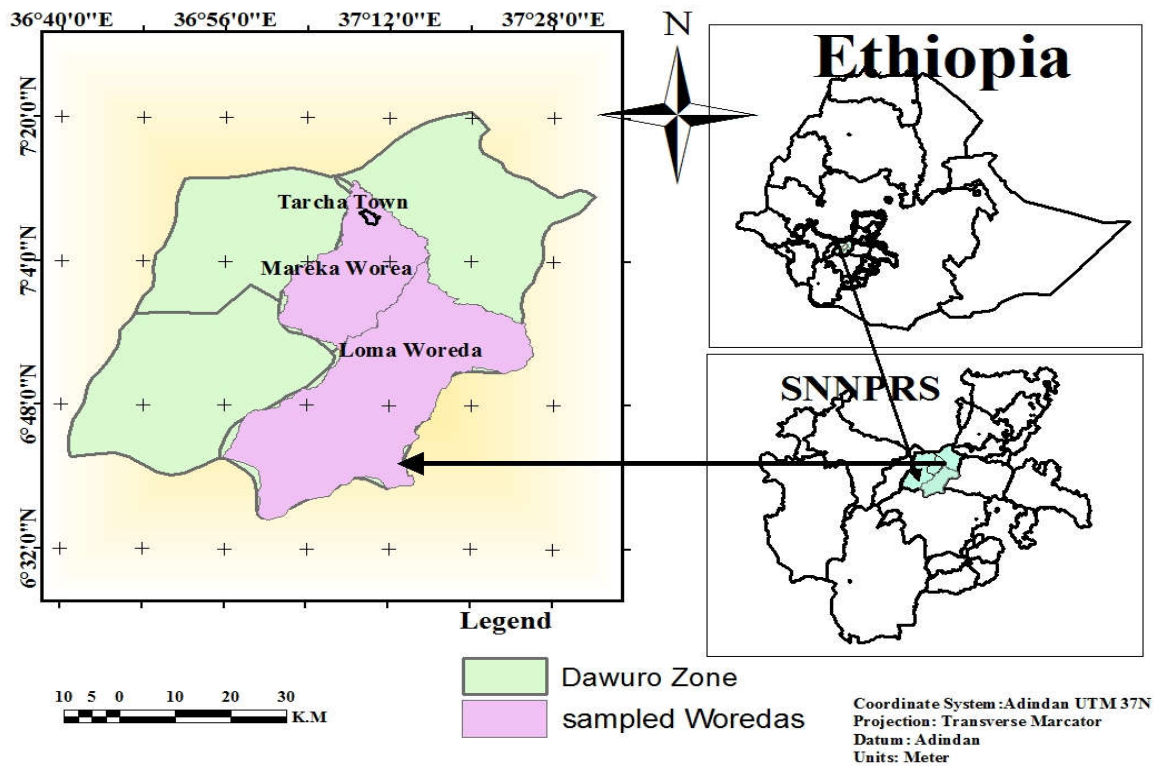
3.2. Specific objectives

- ✚ To determine outcomes of ICCM in Dawro zone, southwest Ethiopia, from March 15-April 12, 2017
- ✚ To identify factors associated with ICCM outcomes in Dawro zone, southwest Ethiopia, from March 15-April 12, 2017

Chapter Four: Methods and Materials

4.1. Study area and period

The study was conducted in Dawro Zone, SNNPR, Ethiopia. Dawro is one of the 14 zones in SNNPR, located in south west of Ethiopia 554 Km far from Addis Ababa, 327 Km from regional city Hawassa and 160 Km from Jimma. Dawro zone has five woredas and one town administration. Based on central statistics agency report of 2007, the projected total population in 2016/17 was 642,409 from which 100,280 (15.61% of total population) were under-five children. In Dawro zone there was one general hospital, one primary hospital, 22 health centers, 174 health posts, 3 medium and 20 lower clinics, 6 drug stores, and 4 rural drug vendors. The study was conducted from March 15 to April 12, 2017.



Source: Ethiopian GIS 2004

4.2. Study design

Community based retrospective cross-sectional study design was employed.

4.3. Source population

All child-caregiver pairs of under-five children managed by ICCM protocol from July 08, 2016 to January 09, 2017 in Dawro zone

4.4. Study population

Sampled child-caregiver pairs of under-five children managed by ICCM protocol from July 08, 2016 to January 09, 2017

4.5. Study unit

A sampled child-caregiver pair of under-five child

4.6. Inclusion criteria

Under-five children who have lived for at least six months in the sampled kebele

4.7. Exclusion criteria

Under-five children whose caregivers were severely ill and unable to respond

4.8. Variables

4.8.1. Dependent variable

Outcome of ICCM of childhood illnesses

4.8.2. Independent variables

I. Socio demographic characteristics

- Age of the mother
- Ethnicity

- Religion
- Marital status
- Educational status of mother
- Educational status of husband
- Travel time from home to health posts
- Household wealth
- Residence

II. Child related characteristics

- Sex
- Age
- Harmful traditional practice

III. Caregiver related characteristics

- Knowledge of danger signs
- Relation to child
- Family support
- HDA meeting attendance
- Number of days the child stayed at home
- Place where the child has been taken first during illness

IV. Obstetric history of the mother

- PNC attendance
- Parity

4.9. Sample Size Determination

Since the proportion of outcomes and associated factors of ICCM of childhood illnesses in Ethiopia is unknown, proportion of 50% for worsen illness was taken to calculate the sample size. Considering 95% confidence interval with 5% margin of error, and employing single population proportion formula the sample size was calculated as follows:

$$n = \frac{(Z_{1-\alpha/2})^2 P (1-P)}{d^2}$$

Where, n – minimum optimum sample size

$Z_{1-\alpha/2}$ – is standard normal value at 95% C.I which is 1.96

P – The estimate of proportion of worsen illness of ICCM of childhood illnesses =0.5

d – Possible margin of sampling error tolerated which is 5%

$$n = \frac{(1.96)^2(0.5)(0.5)}{(0.05)^2} = 384$$

Considering design effect of 2 the sample size became 768 and by adding 5% non-response rate the sample size was equal to 806.

4.10. Sampling technique and procedure

Multi stage sampling technique was used to select study participants. First two woredas were selected randomly and one town administration was included. The total sample size of the study was divided to each woreda and town administration based on their number of children. Total population was Mareka woreda (144,580), Loma woreda (138, 462), and Tercha town (13,351).

Number of under-five children was calculated by using regional proportion which was 15.61% of total population.

Next 30% kebeles of selected woredas (11 kebeles from Mareka and 12 kebeles from Loma woredas) and two kebeles from Tercha town administration were selected by simple random sampling. And then the allocated sample to the woredas and town administration was divided to selected kebeles proportionally based on their number of under-five children. Then the list of total number of under-five children managed in each health posts in the kebeles from July 08, 2016 to January 09, 2017 was taken from the ICCM register in the health posts and the participants were selected by simple random sampling.

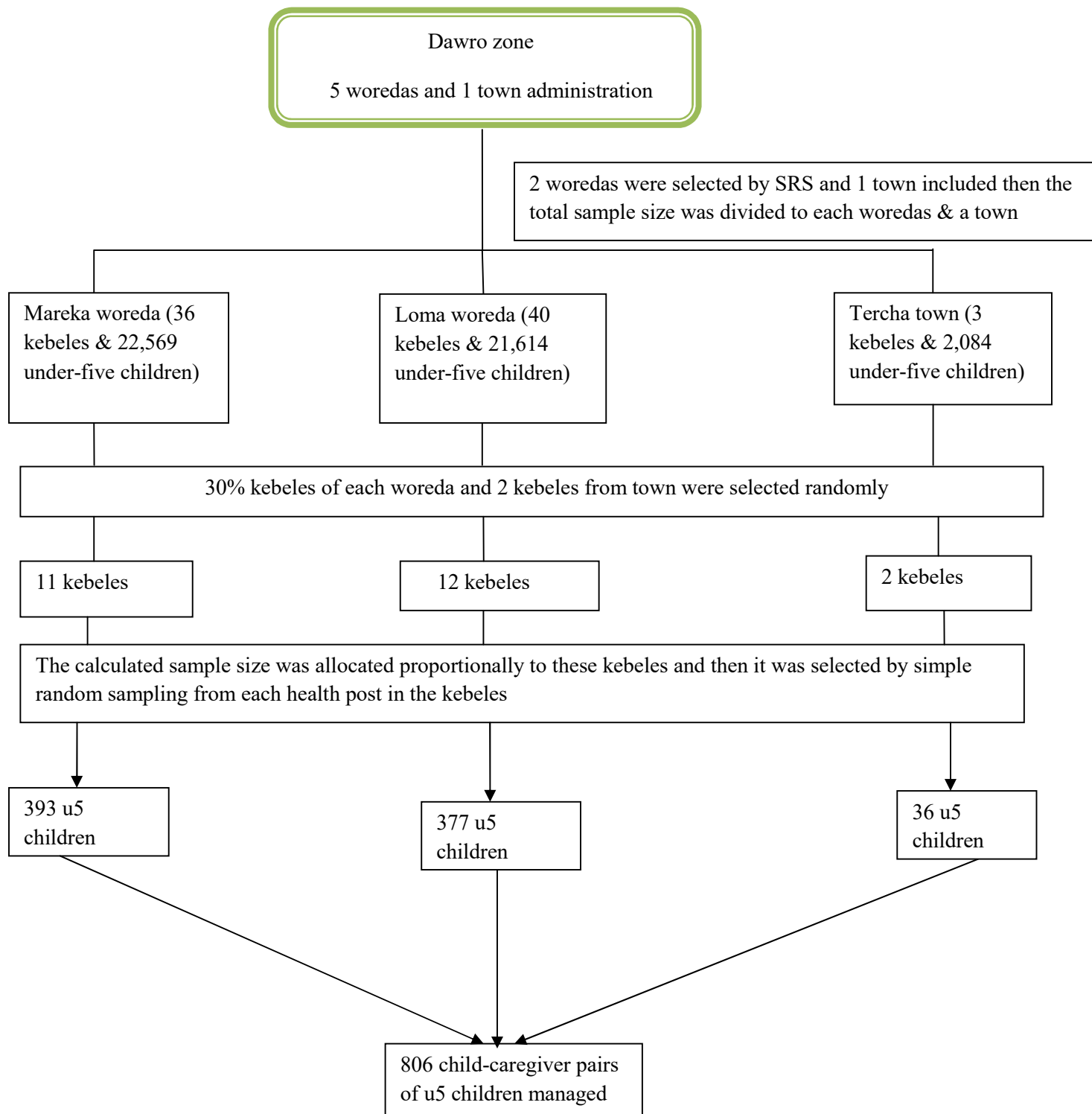


Figure 2: Schematic representation of sampling procedure for outcomes and associated factors of ICCM of childhood illnesses in Dawro zone, southwest Ethiopia, 2017

4.11. Data collection tools

The structured interview questionnaire was adapted from UNICEF IMCI household survey tool [31] and Ethiopian ICCM chart booklet [32]. Questionnaire for relative household wealth estimation was adapted from EDHS 2011 [26]. This structured interview questionnaire was translated into Dawrotsuwa and then back to English by different translators. Dawrotsuwa version questionnaire was used for data collection from caregivers. Health extension workers in the sampled kebeles were asked to show ICCM registration books to get children managed in the health posts.

4.12. Data collectors

Six diploma nurses were selected from Mareka and Loma woredas i.e. three from each. They have collected the data interchangeably. Three public health officers were selected for supervision purpose i.e. one from each woreda and one from town. Both data collectors and supervisors were selected based on their fluency in Dawrotsuwa language. Three data collectors were assigned to each woreda while each supervisor follows up two data collectors. Data collectors were guided to the randomly selected households by a guider who knows the area well to facilitate data collection.

4.13. Operational Definitions

Care giver: a person primarily responsible to feed, wash, and look after a child. They are mostly mothers but other immediate person was interviewed when there was no mother.

Community Health Workers: they are health workers selected from and deployed to the local community to provide basic and primary health services.

Family support: it identifies whether a caregiver took a child to health post alone or supported by other family member.

First place the child taken: it is a place where mothers seek care first to their sick child. It may be traditional healer, religious leader, or health facilities.

HDA meeting: it is a health developmental army meeting with neighboring mothers where they discuss child and maternal health issues.

Health Post: is the lowest level of health unit in Ethiopian health care hierarchy where HEWs provide health services in the community.

HEWs: women who have completed high school and hired by the government after one year training to provide preventive and curative health services in the community in Ethiopia.

ICCM of childhood illnesses: it is a health service provided to under-five children in the community which includes counseling caregivers for home care, providing medication, and referring to health centers.

ICCM chart booklet: a book prepared by FMOH to be used by HEWs to assess, classify, treat, and refer a sick under-five child in the community.

Knowledge of danger signs: there are five under-five children danger signs (unable to breastfed or feed, vomiting everything, fever, unconsciousness, and convulsion). A caregiver will be considered knowledgeable if she can call three or more danger signs.

Number of days the child stayed at home: it is a number of days the child stayed at home after recognition of illness by the caregiver before a visit to health post.

Outcome: status of an ill child after management by health extension worker in the community or a health post using ICCM chart booklet. It can be cure, worsening of the illness, or death.

PNC attendance: it is a mother's postnatal care status during six weeks following delivery of a sick child.

Relation to child: this is to identify the relation of the caregiver to the child. A caregiver can be mother or another woman who primarily feed, washes, and look after a child.

4.14. Data Processing and Analysis

Data were entered into Epi data version 3.1 and exported to SPSS 21.0 statistical software for analysis. Principal component analysis (PCA) was used to estimate wealth indices of households. When using PCA assumptions such as dichotomizing items, minimum sample size of 50, ratio of cases to items of 5 to 1 or more, two or more correlation of 0.3 or more on correlation matrix, removing items with sampling adequacy less than 0.5, and significance of Bartlett test of sphericity were checked. Quartimax rotation was used to get better loading variables to the components. Additionally variables with communality less than 0.5 were removed and then after variables with loadings 0.4 or more on more than one component were removed. Components with only one variable loading on them were checked on rotated component matrix. After all, reliability of variables within each component was assessed and variables with Cronbach alpha of 0.6 and more were included.

Multinomial logistic regression analysis was used to identify factors associated to outcomes of ICCM of childhood illnesses. Assumptions of multinomial logistic regression such as nominal dependent variable, mutually exclusive dependent variable category, linearity of log transformation of dependent variable with continuous independent variables, and

multicollinearity were checked. During multicollinearity check up independent variables with variance inflation factor (VIF) less than 10, tolerance of greater than 0.1, and standard error of less than 2 were included in the further analysis. Summary of the result was presented descriptively by frequency tables and charts. Significant independent predictors were declared at 95% confidence interval and p-value of less than 0.05 using adjusted odds ratio for interpretation.

4.15. Data Quality Management

Data collectors and supervisors were trained for two days on the objective of the study, method of data collection, interview technique and content of questionnaire. The tool was pretested in Wara kebele from Tocha district two days prior to the data collection on 5% of total sample size child-caregiver pairs to check for consistency, clarity and sequence of questions, and also to familiarize the data collectors with instruments and all necessary corrections were made. Data collectors were trained to give sufficient time to interviewees to recall during interview since they were asked what happened in past. They were also informed to interview caregivers whose children died empathetically. Data were checked for completeness, accuracy, and consistency by supervisors and principal investigator after the data collection on daily basis.

4.16. Ethical Consideration

Ethical clearance was obtained from Jimma University Institute of Health, Research Ethics Board. Letter of cooperation was obtained from Dawro zone health department, Woreda health offices, and Tercha town health unit. Participant caregivers were informed about the objectives of the study and verbal consent for participation was obtained individually. To maintain privacy, individual interview was made in separate place near to their home. Then finally participants were informed that they have full right to withdraw at any time during the interview.

4.17. Plan for Dissemination of Results

The findings of this study will be submitted and presented to Jimma University, Institute of Health, Department of Health Economics, Management, and Policy. And also it will be distributed to Zonal Health department, District Health offices, and local NGOs. Necessary efforts will be made to publish in reputable scientific journal.

Chapter Five: Results

5.1. Socio Demographic and Economic Characteristics

From the total sample size of 806 under-five children 791 were participated in the study which yields response rate of about 98%. Most of the caregivers were married (95.8%), about half (50.3%) were never attended formal education, about 65 percent were at age between 25 and 34 years, and 66% of them were Protestants by religion. There were 72.8% rural residents and 87% were at less than 30 minutes travel time from health posts. Wealth of households was divided into five quintiles and all of the quintiles were around 20% (Table 1).

Table 1: Socio demographic and economic characteristics of participants of outcomes and associated factors of ICCM of childhood illnesses in Dawro zone, south west Ethiopia, 2017 (n=791).

Characteristics	Category	Frequency	Percentage
1. Age of the caregiver	15-24	152	19.2
	25-34	510	64.5
	>=35	129	16.3
2. Ethnicity	Dawro	663	83.8
	Amhara	60	7.6
	Wolayta	33	4.2
	Other	35	4.4
3. Religion	Protestant	520	65.7
	Orthodox	219	27.7
	Catholic	46	5.8

	Other	6	0.8
4. Marital status	Never married	14	1.8
	Married	758	95.8
	Divorced	14	1.8
	Widowed	5	0.6
5. Educational status of caregiver	No education	398	50.3
	Primary	226	28.6
	Secondary	119	15
	Above secondary	48	6.1
6. Educational status of husband	No education	289	36.6
	Primary	240	30.4
	Secondary	132	16.7
	Above secondary	97	12.3
	Not applicable	33	4.2
7. Travel time to health post	<30 minutes	688	87
	30 min-1hr	81	10.2
	>1hour	22	2.8
8. Residence	Rural	576	72.8
	Semi-urban	215	27.2
9. Wealth quintile	Lowest	158	20
	Second	159	20.1
	Middle	159	20.1

Fourth	157	19.8
Highest	158	20

5.2. Care giver related characteristics

Regarding care giver characteristics 764(96.6%) caregivers were mothers and 547(69.2%) reported that they had postnatal care visit after delivery. About eighty nine percent of caregivers visited health post after recognition of illness within two days. More than half (53.4%) caregivers hadn't participated during health development army meeting regularly. Health facilities were first choice for caregivers when seeking care for their children (90.9%). Among children provided medication by health extension workers and those counseled for home care, 475(60.1%) visited the health posts on the appointed while 145(18.4%) not. From 378 children treated by health extension workers with medication 348 (90.2%) had taken full dose as prescribed.

Table 2: Caregiver related characteristics of participants of outcomes and associated factors of ICCM of childhood illnesses in Dawro zone, south west Ethiopia, 2017 (n=791).

S.N.	Characteristics	Category	Frequency	Percentage
1.	Relation of caregiver to child	Mother	764	96.6
		Others	27	3.4
2.	Postnatal care	Yes	547	69.2
		No	217	27.4
		NA	27	3.4

3. Number of under-five children in the home	No	22	2.8
	1-2	754	95.3
	>2	15	1.9
4. Knowledge of childhood danger signs	Knowledgeable	511	64.6
	Not knowledgeable	280	35.4
5. Family support during health post visit	Yes	554	70
	No	237	30
6. Regular HDA meeting participation	No	407	51.5
	Yes	384	48.5
7. Number of days from recognition of illness to health post visit	<= 2 days	700	88.5
	3-5 days	68	8.6
	>5 days	22	2.8
8. First place the child was taken when ill	Health facility	719	90.9
	Traditional healer	43	5.4
	Religious place	29	3.7
9. Health facility visit on appointment date	Yes	475	60.1
	NA	170	21.5
	No	145	18.4
10. The child was taken full dose medication	NA	412	52.2
	No	30	3.8
	Yes	348	44.1
11. The child was taken to	Yes	158	20

higher facility if referred	No	12	1.5
	NA	620	78.5

5.3. Children related characteristics

Among 791 children included in the study 406(51.3%) were males and 385(48.7%) were females. Concerning age most of them 567 (71.7%) were above one and below five years, 207 (26.2%) were infants, and only 17(2.1%) were neonates (Figure 3).

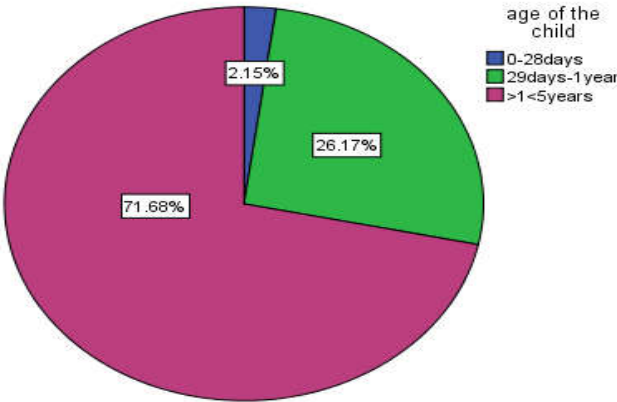


Figure 3: Age of the under-five children for outcomes and associated factors of ICCM of childhood illnesses in Dawro zone, south west Ethiopia, 2017

About 33% under-five were victims of harmful traditional practices such as uvula cutting, milk teeth extraction, and female circumcision while others were not. Among seven hundred ninety

one children who visited health posts 377 (47.7%), 244 (30.8%), and 170 (21.5%) had taken medication, counseled for home care, and referred to health centers respectively. From 791 children who were ill and managed by health extension workers, 705 (89.1%) were cured, 58 (7.3%) had their illness worsen, and 28 (3.5%) were died (Figure 4).

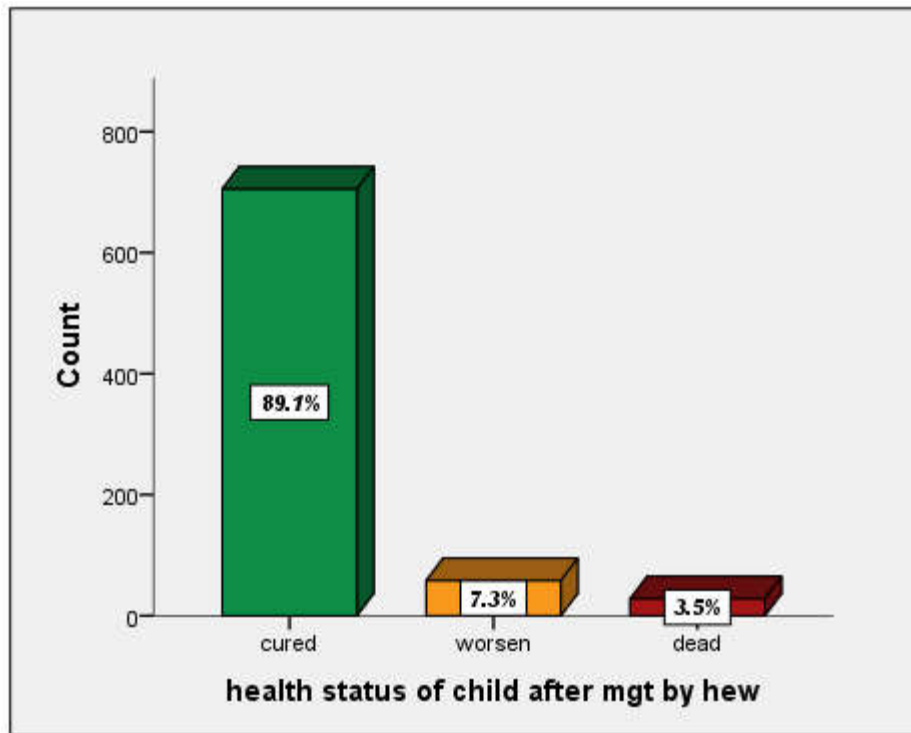


Figure 4: Outcomes of under-five children managed by health extension workers for outcomes and associated factors of ICCM of childhood illnesses in Dawro zone, south west Ethiopia, 2017

The 95% confidence interval for the outcomes of ICCM was (87.0, 91.5), (5.6, 9.0), and (2.4, 4.8) for cured, worsen illness, and died under-five children respectively.

5.4. Factors associated with outcomes of ICCM of childhood illnesses

Before bivariate analysis all variables were checked by cross tabulation for fulfilling chi-squared test assumptions of 80% expected frequency greater than five and all cells expected frequency greater than one. The variables residence, health development army meeting attendance, family support during health post visit, harmful traditional practices, household wealth index, educational status of the mother, age of the child, knowledge of childhood danger signs, distance from home to health post, and sex of the child were passed chi-square test hence they were included in bivariate analysis to select candidate variables.

Among eleven variables in bivariate logistic regression analysis ten of them had a p-value less than 0.25 hence they were candidates for multivariable logistic regression. Multinomial logistic regression was employed to identify factors associated with outcomes of integrated community case management of childhood illnesses. Caregiver's educational status, wealth quintile, harmful traditional practice, distance from home to health post, age of the child, caregiver's age, and knowledge of danger signs were variables which had significant association with outcomes of ICCM of childhood illnesses.

There were two models for the three outcomes of ICCM of childhood illnesses. The first one compares cured children with those children whose illnesses worsen. Children with uneducated caregivers were about 3 times more likely for their illness to be worsen compared to children with educated caregivers ($p= 0.001$, AOR= 2.97, 95%CI= 1.53, 5.77). The odds among infant children whose illnesses worsen was about 4 times greater than children aged more than one year and below five years ($p= <0.001$, AOR= 3.9, 95%CI= 2.1, 7.27). Under-five children with caregivers aged exactly and more than 35 years were about 3 times more likely for their illness to be worsen compared to children with caregivers aged 15 to 24 years. The odds among children

living more than or exactly 30 minutes on foot walk from health posts whose illness worsen was about 3.2 times greater than children living less than 30 minutes travel time from health posts ($p= 0.001$, AOR= 3.2, 95%CI= 1.57, 6.53) (Table 3).

Children from households of lowest quintile were about 5.7 times more likely to be their illnesses worsen compared to children from households of highest wealth quintile ($p= 0.004$, AOR= 5.77, 95%CI= 1.74, 19.14). Under-five children from second household wealth quintile were about 5.2 times at greater risk of disease complication compared to children from highest wealth quintile households ($p= 0.007$, AOR= 5.2, 95%CI= 1.56, 17.23). Children that were victims of harmful traditional practices were about 2.3 times more likely for their illness to be worse than children that were not victims of harmful traditional practices ($p= 0.007$, AOR= 2.35, 95%CI= 1.27, 4.35). Children with caregivers who don't know childhood danger signs were about 3.3 times more likely for their illness to be worsen when compared to children with caregivers who know childhood danger signs ($p= <0.001$, AOR= 3.34, 95%CI= 1.78, 6.28) (Table 3).

The second model compares children that were cured with dead after ICCM of childhood illnesses in health posts. The odds among children with uneducated caregivers to die from childhood illnesses after management by HEWs was about 3.3 times greater than children with educated caregivers ($p= 0.01$, AOR= 3.33, 95%CI= 1.33, 8.37). The odds among infant children to die from childhood illnesses after management by HEWs was about 3.7 times greater than children aged more than one year and below five years ($p= 0.002$, AOR= 3.72, 95%CI= 1.61, 8.61) (Table 3).

Children in lowest household wealth quintile were about 6 times more likely to die from childhood illnesses after management by health extension workers compared to children in highest household wealth quintile ($p= 0.01$, AOR= 6.1, 95%CI= 1.56, 23.9). The odds among children with caregivers who don't know childhood danger signs to die was 3 times greater than children with caregivers who know childhood danger signs ($p= 0.012$, AOR= 3, 95%CI= 1.27, 7.07) (Table 3).

Table 3: Multivariable logistic regression analysis of factors associated with outcomes of ICCM of childhood illnesses in Dawro zone, south west Ethiopia, 2017 (n=791).

Variables	Outcomes of ICCM			COR	AOR (95% C.I)
	Cured	Worsen	Dead		
Worsen Vs Cured					
Residence					
Rural	501 (87.6%)	48 (8.4%)	23 (4.0%)	1.95	1.62 (0.73, 3.6)
Semi-urban*	204 (93.2%)	10 (4.6%)	5 (2.3%)		
HDA meeting					
No	356 (87.5%)	33 (8.1%)	18 (4.4%)	1.29	1.49 (0.8, 2.79)
Yes*	349 (90.9%)	25 (6.5%)	10 (2.6%)		
Age of the child					
<=1 year	174 (77.7%)	34 (15.2%)	16 (7.1%)	4.3	3.9 (2.1, 7.27)
>1 year<5 years*	531 (93.7%)	24 (4.2%)	12 (2.1%)		
Age of the caregiver					
>=35 years	111 (86%)	14 (10.9%)	4 (3.1%)	2.2	3.03 (1.07, 8.55)
25-34 years	454 (89%)	36 (7.1%)	20 (3.9%)	1.39	1.83 (0.75, 4.45)
15-24 years*	140 (92.1%)	8 (5.3%)	4 (2.6%)		
Educational status of caregiver					
No formal education	334 (83.9%)	43 (10.8%)	21 (5.3%)	3.2	2.97 (1.53, 5.77)

Primary and above*	371 (94.4%)	15 (3.8%)	7 (1.8%)		
Travel time to HPs					
>=30 minutes	75 (72.8%)	20 (19.4%)	8 (7.8%)	4.42	3.2 (1.57, 6.53)
<30 minutes*	630 (91.6%)	38 (5.5%)	20 (2.9%)		
Harmful traditional practices					
Victim	212 (82.5%)	31 (12.1%)	14 (5.4%)	2.67	2.35 (1.27, 4.35)
Not victim*	493 (92.3%)	27 (5.1%)	14 (2.6%)		
Family support during HP visit					
No	197 (84.5%)	22 (9.4%)	14 (6%)	1.58	1.3 (0.68, 2.47)
Yes*	508 (91%)	36 (6.5%)	14 (2.5%)		
Knowledge of danger signs					
Not knowledgeable	223 (79.6%)	39 (13.9%)	18 (6.4%)	4.44	3.34 (1.78, 6.28)
Knowledgeable*	482 (94.3%)	19 (3.7%)	10 (2%)		
Wealth quintile					
Lowest	126 (79.7%)	18 (11.4%)	14 (8.9%)	5.39	5.77 (1.74, 19.14)
Second	135 (84.9%)	18 (11.3%)	6 (3.8%)	5.03	5.2 (1.56, 17.23)
Middle	142 (89.3%)	13 (8.2%)	4 (2.5%)	3.46	3.37 (0.99, 11.42)
Fourth	151 (96.2%)	5 (3.2%)	1 (0.6%)	1.25	1.2 (0.29, 4.86)
Highest*	151 (95.6%)	4 (2.5%)	3 (1.9%)		
Dead Vs Cured					

Residence					
Rural	501 (87.6%)	48 (8.4%)	23 (4.0%)	1.87	2.02 (0.67, 6.03)
Semi-urban*	204 (93.2%)	10 (4.6%)	5 (2.3%)		
HDA meeting					
No	356 (87.5%)	33 (8.1%)	18 (4.4%)	1.77	1.94 (0.81, 4.62)
Yes*	349 (90.9%)	25 (6.5%)	10 (2.6%)		
Age of the child					
<=1 year	174 (77.7%)	34 (15.2%)	16 (7.1%)	4.0	3.72 (1.61, 8.61)
>1 year<5 years*	531 (93.7%)	24 (4.2%)	12 (2.1%)		
Age of the caregiver					
>=35 years	111 (86%)	14 (10.9%)	4 (3.1%)	1.26	2 (0.43, 9.24)
25-34 years	454 (89%)	36 (7.1%)	20 (3.9%)	1.54	2.2 (0.65, 7.2)
15-24 years*	140 (92.1%)	8 (5.3%)	4 (2.6%)		
Educational status of caregiver					
No formal education	334 (83.9%)	43 (10.8%)	21 (5.3%)	3.33	3.33 (1.33, 8.37)
Primary and above*	371 (94.4%)	15 (3.8%)	7 (1.8%)		
Travel time to HPs					
>=30 minutes	75 (72.8%)	20 (19.4%)	8 (7.8%)	3.36	2.39 (0.89, 6.4)
<30 minutes*	630 (91.6%)	38 (5.5%)	20 (2.9%)		
Harmful traditional practices					

Victim	212 (82.5%)	31 (12.1%)	14 (5.4%)	2.33	1.93 (0.84, 4.44)
Not victim*	493 (92.3%)	27 (5.1%)	14 (2.6%)		
Family support during HP visit					
No	197 (84.5%)	22 (9.4%)	14 (6%)	2.58	2.18 (0.95, 5.01)
Yes*	508 (91%)	36 (6.5%)	14 (2.5%)		
Knowledge of danger signs					
Not knowledgeable	223 (79.6%)	39 (13.9%)	18 (6.4%)	3.89	3 (1.27, 7.07)
Knowledgeable*	482 (94.3%)	19 (3.7%)	10 (2%)		
Wealth quintile					
Lowest	126 (79.7%)	18 (11.4%)	14 (8.9%)	5.59	6.1 (1.56, 23.9)
Second	135 (84.9%)	18 (11.3%)	6 (3.8%)	2.24	2.3 (0.52, 10.17)
Middle	142 (89.3%)	13 (8.2%)	4 (2.5%)	1.42	1.37 (0.28, 6.66)
Fourth	151 (96.2%)	5 (3.2%)	1 (0.6%)	0.33	0.29 (0.028, 2.9)
Highest*	151 (95.6%)	4 (2.5%)	3 (1.9%)		

Reference category is: Cured

Model assumption (Goodness of fit – Pearson statistic): Chi-square = 1059.2, p-value = 0.553

Overall model fitting (Likelihood Ratio test): Chi-square = 164.48, p-value = <0.001

** Reference category of independent variables*

Chapter Six: Discussion

This was a community based retrospective cross sectional study which identified outcomes of integrated community case management of childhood illnesses and associated factors in Dawro zone of SNNPR, Ethiopia. It was found that among children managed by HEWs for common childhood illnesses about 89.1% ill children were cured, for 7.3% their illnesses were worsen, and 3.5% percent were died. The proportion of under-five children died was consistent with the study conducted in Bangladesh where 4.4 percent children died after management of childhood illnesses by community health workers [16]. However, it was higher compared to the survey conducted in Amhara, Oromia, and SNNPR regions which found 2 percent cases died [29]. The difference might be due to high attention to ICCM strategy at its beginning stage since the three regions survey was conducted in 2012.

This study found that children with caregivers who know childhood danger signs were more likely to be cured than children with caregivers who do not know childhood danger signs. Under-five children with caregivers that know childhood danger signs were 61 percent. The proportion of caregivers who know childhood danger signs were lower compared to the study conducted in Liben district of Oromia region where 94 percent of caregivers know at least two childhood danger signs [25]. This might be due to methodological difference of the two studies that is the latter one assessed knowledge for mothers whose children were below the age of two years.

Travel time to health post was found to be another significant factor which contributed to child health outcomes. Under-five children born to households near to health posts had higher probability to be cured than those far from health posts in this study. This is in line with multi-country study which found distance to health facilities as important factor for children health outcomes [19]. But it is opposing to the study conducted in Dabat district of Ethiopia which

found no association between travel time to health posts and with outcomes of child health [21]. The finding also differs from the study conducted in Kenya where there was no association of travel time to health facilities with child health outcomes [20]. This might be due to variation in accessibility of health facilities in two countries.

Maternal educational status became key determinant of child health according to this study finding. Under-five children born to mothers with no education were more likely for their illnesses worsen and die compared to children born to educated mothers. Ethiopian demographic health survey of 2011 also found as educational status of mothers increase under-five children mortality rate decrease [30]. This finding was also similar to study done in Bangladesh which also found statistically significant relation of educational status of mothers to child health outcomes [17]. While the study performed in Cambodia opposes this finding which investigated no significant association of maternal education with child health outcomes [18]. The difference might be due to methodological distinction of two studies which is only under-five children mothers' participation in the latter survey while this study incorporated care givers other than mothers.

Household wealth became an important factor for health outcomes of common childhood illnesses according to this study finding. When household wealth increases the likelihood of a child to be cured from illnesses also increases. Households with highest wealth had higher proportion of cured children than lowest quintile wealth and it was significantly associated. Most of the complicated and dead cases were from households below fourth wealth quintile. This finding is in line with study conducted in Bangladesh and EDHS 2011. In both surveys the more wealthy the household the more the proportion of cured children from common childhood illnesses [17, 30].

Age of the child was another important predictor of health outcomes among children managed by HEWs based on this study finding and it was significantly associated. Higher proportion of children more than one year were cured compared to infants. Children aged below one year had higher odds of dying and worsening due to common childhood illnesses than children aged above a year and below five years. This is in line with the finding from Dabat district in Amhara region of Ethiopia which reported higher risk of death among infants than children of age above one year and below five years [21]. This might be due to immature immunity of infants and delayed care seeking by parents for these children.

It was found that under-five children with caregivers aged exactly and above 35 years were more likely for their illnesses be worse compared to under-five children with caregivers aged 15 to 24 years. Harmful traditional practices (HTPs) such as uvula cutting, milk teeth extraction, and female circumcision were other important predictors of under-five health outcomes managed by health extension workers. Those children who were affected by harmful traditional practices were more likely for their illnesses to be worse than those not affected. This might be due HTPs are performed by untrained practitioners and use of unhygienic materials which exposes children for infections.

Strength of the study

As per my knowledge this is the first study in the study area which assessed the outcomes and associated factors of integrated community case management of childhood illnesses. It was conducted using probability sampling technique so allows generalization for the under-five children receiving integrated community case management of childhood illnesses.

Limitation of the study

Because caregivers were asked about their children illness in the past six months, there might be recall bias.

Chapter Seven: Conclusion and Recommendation

7.1. Conclusion

This study found that most of the under-five managed by health extension workers through integrated community case management of childhood illnesses were cured. Some of them encountered worsening of the illness and few were died.

Household wealth, travel time from home to health post, age of the child, age of the caregiver, caregiver's educational status, caregiver's knowledge of childhood danger signs, and harmful traditional practices on child were significantly associated with under-five children those their illnesses worsen following management by health extension workers through ICCM for childhood illnesses. For under-five children died following management by health extension workers through ICCM for childhood illnesses the variables household wealth, age of the child, caregiver's educational status, caregiver's knowledge of childhood danger signs were significantly associated.

7.2. Recommendation

For community

- They should avoid harmful traditional practices that deter the health of under-five children
- They should bring under-five children especially infants to health facilities as soon as possible when they get sick.

For health extension workers

- HEWs should build up providing health education for caregivers about danger signs in under-five children beginning from pregnancy in order to alert them to seek care early.
- They should also strengthen teaching and mobilizing the community to combat harmful traditional practices commonly performed on under-five children.
- They should give special emphasis when managing children aged below one year.

For district health office and zonal health department managers

- They should consider construction of additional health posts and training new health extension workers for wide and topographically difficult kebeles.
- They should reinforce awareness creation and mobilization of the community to fight harmful traditional practices in collaboration with other sectors.
- They should also sensitize HEWs so that they can teach childhood danger signs and manage ill under-five children properly.

For other researchers

- Conducting study on outcomes of ICCM of childhood illnesses using follow up study design by integrating qualitative methods can be helpful.

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Annex

Informed verbal consent form for the survey questionnaire

Greeting!! My name is _____. I am working as a data collector temporarily for post graduate student of Jimma University, Institute of Health. The objective of the study is to assess outcomes and associated factors of integrated community case management of childhood illnesses in Dawro zone. The findings of the study will be disseminated to HEWs, supervising HCs, district health office, zonal health department and partners working in child health to contribute to the improvement of ICCM service. During the interview you will be asked some short questions about your background, husband's background, under-five child's illness, and obstetric history. Your answers will be recorded on a survey questionnaire. No personal identifiers will be attached or recorded to the interview. All the data obtained will be kept strictly confidential by using code numbers. Your participation in the study is upon purely voluntary basis. The interview will be conducted individually and will take 15-20 minutes. During the interview period, if you feel ambiguity, you can interrupt and ask for clarification. If you feel discomfort at the time of interview you can appoint to other time or even withdraw at any time after you get involved in the study. Your active and honest participation in responding to the questions is very important for the study and highly appreciated. If you agree to participate in this study I will interview you.

Would you be willing to participate? Yes No

If yes, proceed.

If no, thank and stop here.

Date and signature of the interviewer _____

A questionnaire in English

Health post code _____

Woreda code _____

General instruction: Circle the correct number which contains the answer from answer box or write the answer on the space provided.

I. Socio demographic information

Instruction: Circle or write the correct response

S.N	Question	Response	Remark
201	How old are you?	_____	
202	What is your ethnicity?	1. Dawro 2. Amhara 3. Wolayta 4. Other _____	
203	What is your religion?	1. Protestant 2. Orthodox 3. Catholic 4. Other (specify) _____	
204	What is your marital status?	1. Never married 2. Married 3. Divorced 4. Widowed	

		5. Other (specify) _____	
205	What is your educational status?	1. No education 2. Primary education 3. Secondary education 4. More than secondary	
206	What is your husband's educational status?	1. No education 2. Primary education 3. Secondary education 4. More than secondary	
207	How much time it take from your house to reach the health post on foot walk?	1. <30 min 2. 30 min -1 hour 3. >1 hour	
208	Residence	1. Rural 2. Semi-urban	

II. Household characteristics for wealth estimation

Instruction: Circle or write the correct response

S.N	Questions	Response	
		Yes	No
1.	Does your household have the following properties?		
	Functioning radio/tape	1	0

	Functioning television	1	0
	Stove (kerosene/electric)	1	0
	Motorcycle	1	0
	Watch (hand /wall)	1	0
	Mobile phone	1	0
	Mattress	1	0
2.	What is the main source of drinking water for members of your household?	1. Pipe 2. Well 3. Surface 4. Other specify_____ _____	
3.	What is the main source of water used in your household for other purposes such as cooking and hand washing?	1. Pipe 2. Well 3. Surface 4. Other specify_____	
4.	What kind of toilet facility do members of your household usually use?	1. Pit latrine 2. Bush/field 3. Other specify_____	
5.	What type of fuel does your household mainly use for cooking?	1. Wood 2. Charcoal	

		3. Electricity		
		4. Other specify_____		
6.	Do you have separate kitchen for cooking?	1. Yes		
		2. No		
7.	What is the main material of the floor in your household?	1. Earth		
		2. Cement		
		3. Other specify		
8.	What is the main material of the roof in your household?	1. Corrugated iron		
		2. Thatch		
		3. Other specify_____		
9.	How many rooms in this household are used for sleeping?	_____		
10.	Does any member of this household own any agricultural land?	1. Yes		
		2. No		
11.	If yes for question 11, how many hectares of agricultural land do members of this household own?	1. _____		
		2. Don't know		
12.	Does your household have the following domestic animals?	Yes	No	How many?
	Cattle	1	0	
	Horses, donkeys, and mules	1	0	

	Goats and sheep	1	0	
	Chickens	1	0	
	Beehives	1	0	
13.	Does any member of this household have a bank or microfinance saving account?	1. Yes 2. No		

III. Child related characteristics

Instruction: Circle or write the correct response

S. N	Items	Child's information	Remark
101	Sex	1. Male 2. Female	
102	Age	1. ____ days (if < 7 days) 2. ____ weeks (if $\geq 7 < 28$ days) 3. ____ months (if ≥ 28 days < 12 months) 4. ____ years (if ≥ 12 months < 5 years)	
103	Were any of the following practices performed on your child? (such as uvula cutting, female child circumcision, milk teeth extraction)	1. Yes 2. No	

IV. Obstetric history of the mother

Instruction: Circle or write the correct response

S.N	Question	Response	Remark
301	Had you PNC visit after delivery of the child?	1. Yes 2. No	
302	How many under-five children do you have?	_____	

V. Mother/caregiver related characteristics

Instruction: Circle or write the correct response

S.N	Questions	Response	Remark
401	What is your relation to the child?	1. Mother 2. Other (specify)_____	
402	Do you know danger signs of children?	1. Yes 2. No	
403	If yes for question 403, probe a caregiver to tell you under-five children danger signs		
		Yes	No

	Unable to breast feed			
	Vomit everything			
	Convulsion			
	Fever			
	Unconsciousness			
404	Do you attend HDA meeting regularly?	1. Yes 2. No		
405	Where did you take first the child when he/she became sick?	1. Health post 2. Health center 3. Hospital 4. Religious leader 5. Traditional healer 6. Other (specify) _____		
406	Did the HEW visited the child at home or you took him/her to health post?	1. I took the child to HP 2. HEW visited at home		
407	After how many days from beginning of illness did you take the child to the health post or HEW visited at home?	_____		
408	Was there family support when you take the child to health post?	1. Yes 2. No		
409	What the HEW did to your child?	1. Counseled for home care 2. Treated with medication 3. Referred		

		4. Other (specify) _____	
410	If option 2 for question number 409, did the HEW appointed you to bring the child again?	1. Yes 2. No	
411	If yes for question number 410, had you visited health post on the appointed date?	1. Yes 2. No	
412	Had you given the full dose of the medication to the child as told by HEW?	1. Yes 2. No	
413	If option 3 for question number 409, had you took the child to higher facility?	1. Yes 2. No	
415	What was happened to your child after management by HEW?	1. Cured 2. Worsen 3. Died	

A questionnaire in Dawrotsuwa

Pilgetsaa oosha zaranaw eeno giyawa doonan erisiya qonchetsa

Saro lo'e aymale!! Ta suntsay _____ geetetay. Taani Jimma Universtiya Payyatetsa Institutiyan 2^{tsa} digiriya tamariyaw pilgetsaa oosuwaw koshshiya itti itti oosha hintena oochanaw yaadi. Ha pilgetsay oosetiya gaasu Dawro zoniyan de'iya payyatetsa keellatuwan aakimitteda ichcheshu laysappe garssa naana akimiya murutanne ha murutanna gaketiya gaasotuwa shaakkanassa. K'assika akimiya murutayenne gaasotu erettowappe guyiyan sintsaw k'eri naanay lo'o naaguwa hintepenne keellan otsiya payyatetsa eranchatuwappe demmide hayk'uwappe attanadan maaddiya era ha pilgetsay demissee. Ha pilgetsaa wursetsa demuukka kellappe dommin zoni gakkanaw de'iya payyatetsa birotuwaw erissettiya gishshaw sintsaw ichcheshu laysappe garssan de'iya naanaw imettiya akimiya maaduwa loytsanaw maaddee.

Ha'i taani oochiya ooshatukka mata wode payyatetsa kellan aakimitteda hinte na'a/tti ba, hintenanne hinte goolliyawunna gaketiya ooshatuwa. Ubba ooshatukka k'antsa gidode wurssana gakkanaw 15 ppe 20 gidiya dak'ik'a xalala koshshee. Ta hintena oochiyawe hinte polo eeno giyawa gooppe gidishin oosha gidдон hinto gelibennawa taana oochchanaw dandayita. Itti itti ooshay hintew zaaranaw ufayssennawa gidintokka ha pilgetsaa polanaw loytsi koshshiya gishshaw ubba ooshatuwa zaranaada hintena mentsetsay. Hinte ooshaaw eeno gennan attoppekka hinte bolla aynne metuwa ahenna.

Ha ooshaw mayetite? 1. Eee 2. Mayetikke

Ooshaw mayettiya gidoppe oochcha iss'oppe kalliya keetsa baana koshshee.

Dawrotsuwa ooshatuwa

Payatetsa kella payduwa _____

Worada payduwa _____

Kaaletsuwa: Likke zaruwa oykeda payduwa bolla yushsha/ s'aafetiya zaruwaw xaafa.

I. ICCM mas'afappe kumiya na'anna/tinna gaketiya ooshatuwa

S.P	Ooshaa	Dooratuwa	K'ofissuwa
1.	Matuma	1. Attumawa 2. Maccanno	
2.	Laytsa	1. _____ k'amma (<7 qamma) 2. _____ saminta (>=7<28 qamma) 3. _____ agina (>=28 k'amma<12agina) 4. _____ laytsa (>=1 laytsa)	

II. Deretetsanne asanna gaketiya ooshatuwa

S.P	Ooshatuwa	Zaaruwa dooruwa	K'ofissuwa
1.	Hintew aappun laytse?	_____	
2.	Hinte kochchay aye?	1. Dawro 2. Amaara 3. Wolaytsa 4. Hara (s'aafa) _____	
3.	Hinte ammanu aye?	1. Protestantiya	

		<ul style="list-style-type: none"> 2. Ortodoksiya 3. Katolikiya 4. Muslimiya 5. Haraa (s'aafa)_____ 	
4.	Hinte soyzuwa hanotay aye?	<ul style="list-style-type: none"> 1. Gellabeyke 2. Geladi 3. Biletadi 4. Asinay hayk'eda 5. Haraa (s'aafa)_____ 	
6.	Hinte timirtiya detsay woysel?	<ul style="list-style-type: none"> 1. Tamarabeyke 2. Koyro detsa 3. La'etso detsa 4. La'etso detsappe bolla 	
7.	Hinte golliyawu timirtiya detsay woysel?	<ul style="list-style-type: none"> 1. Tamaribenna 2. Koyro detsa 3. La'etso detsa 4. La'etso detsappe bolla 	
8.	Hinte golliyappe Payyatetsa kellay woysa saatiya haakki?	<ul style="list-style-type: none"> 1. <30 dak'ik'a 2. 30 dak'ik'appe 1 saatiya 3. 1 saatiyappe bolla 	
9.	Golli de'iyasa	<ul style="list-style-type: none"> 1. Gas'ariya 2. Bagga-katama 	

III. Golliya dureta malanaw koshshiya ooshatuwa

S.N	Ooshatuwa	Zaaruwa dooruwa		Qofissuwa
1.	Hinte ketsan hawappe kaaliya miishshay de'i?	De'e	Baawa	
	Ootsiya iraadoniya/teepiya	1	0	
	Ootsiya telezbhiniya	1	0	
	Xompiya	1	0	
	Motorsaykiliya	1	0	
	Saatiya (kushiyawa/godawa)	1	0	
	Mobayliya	1	0	
	Firashiya	1	0	
2.	Hinte ushiya haatsa haqappe go'etite?	1. Bombappe 2. Ollappe 3. Shaafappe 4. Haraa (xaafa) _____		
3.	Quma kasawunne kushiya meechawu aya hatsa go'etite?	1. Bombappe 2. Ollappe 3. Shaafappe 4. Haraa (xaafa)_____		
4.	Sheeshshaw haqan go'etite?	1. Sheeshsha ketsa 2. Wora 3. Hara (xaafa)_____		
5.	Quma kasaw daro wode aya go'etite?	1. Mitsa 2. Kasaliya 3. Xompiya 4. Haraa (xaafa)_____		

6.	Quma katsiya dumma golli de'i?	1. Eee 2. Baawa		
7.	Golliya wuygi ayappe me'detede?	1. Biitta 2. Sarxaa 3. Simintuwa 4. Haraa (xaafa)_____		
8.	Golliya kaaray ayappe me'detede?	1. Qorqoruwa 2. Gattaa/woshuwa 3. Haraa (xaafa)_____		
9.	Golliyan asay gisiya kifiliya paydu woyse?	_____		
10.	Golle asaw goshsha biittay de'i?	1. Eee 2. Baawa		
11.	Oosha payduwa 14 wu eee goppee, appun hectare gidii?	_____		
12.	Kalli de'iya mehatu hinte ketsan de'i?	De'e	Baawa	Aappunu de'i?
	Macca mizza,booraa,kormaa,maraa	1	0	
	Haari,baquluwa,para	1	0	
	Deeshsha, dorsaa	1	0	
	Kuttuwa	1	0	
	Matsa kootsa	1	0	
13.	Ha gollen bankiya/maykiruwa buukii de'iya asay de'i?	1. De'e 2. Baawa		

IV. Aatti yeluwanna gaketiya ooshatuwa

S.N	Ooshatuwa	Zaaruwa dooruwa	K'ofissuwa
1.	Na'a yelowappe guyyiyan akimiyappe kaaluwa demmedite?	1. Eee 2. Demmabeyke	
2.	Hintew aappun ichcheshu laysappe garssa naanay de'i?	_____	

V. Aattinna/dichiya asanna gaketiya ooshatuwa

S.N	Ooshatuwa	Zaaruwa dooruwa	Qofissuwa
1.	Na'aw/ttiw hinte aatiye woy hara dichchiya ase?	1. Aatto 2. Attippe haraa	
2.	Ichcheshu laysappe garssa naanan beettiya darissi hirgissiya sakuwa malatatuwa erite?	1. Eee 2. Erike	
3.	K'ommon 2tsiya ooshaaw eee gooppe, ane hinte eriya malatatuwa s'eesite.	S'esaddu	S'esabeykku
	D'antsa d'ammenawa		
	Ubaba c'ooshiyawa		
	Bollay kokoriyawa		
	Loytsi qoos'etiyawa		
	Barena doguwa/qas'enawa		
4.	Mac'c'a asa dichchaa cuuguwa shiik'uwa ubba wode shiik'ite?	1. Eee 2. Ubba wode shiiqike	

1.	Hinte na'ay/tta saketto wode koyro hak'a afedite?	<ol style="list-style-type: none"> 1. Paytetsa kella 2. Payatetsa s'aabiya 3. Hospitaliya 4. Heera erancha 5. Ammanuwa keetsa 6. Haraa (xaafa)_____ 	
6.	Na'a/tto hinte kella afedite woy payatetsa aassiya osanchata (PAO) gollen ya s'eellade?	<ol style="list-style-type: none"> 1. Tani kella afadi 2. PAO gollen s'eelladu 	
7.	Na'ay/tta sakettodeppe appun k'ammappe guyyan kella afedite/PAO gollen s'eellade?	_____	
8.	Hinte na'a kella afode hintenana madeti afeda asay de'i?	<ol style="list-style-type: none"> 1. De'e 2. Baawa 	
9.	PAO hinte na'aw/ttu ay maaduwa immade?	<ol style="list-style-type: none"> 1. Gollen maddiyaba maqqadu 2. D'aliya immadu 3. D'ok'asa aakimiyaw afanada odaddu 4. Haraa (xaafa)_____ 	
10.	D'aliya immadu gidoppe zaari yanada qas'aruwa immadde?	<ol style="list-style-type: none"> 1. Eee 2. Immabeyku 	
11.	K'ommo 10tsa ooshaw eee goppe, na'a/tto k'as'aro gallasan afedite?	<ol style="list-style-type: none"> 1. Eee 2. Afabeyke 	
12.	D'aliya immadu gidoppe imettedda	<ol style="list-style-type: none"> 1. Eee 	

	d'aliya na'aw/ttiw wurana gakkanaw immedite?	2. Wursa immabeyke	
13.	K'ommo 9tsa ooshaw zaaru 3tsuwa gidoppe na'a/tto d'ok'k'a aakime golle afedite?	1. Eee 2. Afabeyke	
14.	Kaalli de'iya doyatuwappe hinte na'a/tti bolla oosetedawe de'ii? (k'ood'iya qans'uwa, badiniya wooc'etsa, mac'c'a nana qas'ara)	1. Eee 2. Bawaa	
15.	Payyatetsa aassiya oosanchatta (PAO) hinte na'a/tto maadda simmin na'ay/tta waanede/nade?	1. Pas'eeda 2. Minni hargeedda 3. Hayqeda	

DECLARATION

I, the undersigned, declare that this thesis is my original work, and has not been presented for a degree in this or any other university and that all sources of materials used for the thesis have been fully acknowledged.

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