Outcomes and Associated Factors Of Integrated Community Case Management of Childhood Illnesses in Rural Districts of Dawro Zone, South West Ethiopia

Waju Beyene Salgedo*[1] , Sisay Dejene Babulo[2] and Tesfaye Dagne Weldemarium[3]

[1]*Arba Minch University, Ethiopia*

[2]*Department Health Policy and management, Faculty of Public Health, Institute of Health, Jimma University*

[3]*St.Paul Millennium medical college, Addis Abeba, Ethiopia*

Corresponding Author*

Waju Beyene Salgedo
Department of Health policy and Management,
Faculty of public Health, Health institute,
Jimma University-Ethiopia
E-mail: wabeyene@yahoo.com
Tel: 947211385

Received date: May 06, 2020; **Accepted date:** June 17, 2020; **Published date:** June 24, 2020

Abstract

Background: Integrated community case management (ICCM), after its scale-up in March 2011in Ethiopia, has reached about 86% national geographic coverage, more than 38,000 health extension workers (HEWs) were trained and care seeking behavior at health posts was increased. However, there was no study on health outcomes of under-five children and associated factors following treatment of common childhood illnesses by HEWs in Ethiopia.

Objective: To assess outcomes and associated factors of integrated community case management of childhood illnesses' services in Dawro zone in order to provide evidence for informed decision-making.

Methods: A community based retrospective cross-sectional study was conducted on randomly selected mothers and/or care givers of sick under-five years aged children from March 15 to April 12, 2017 in districts of Dawro zone, southwest Ethiopia. The Sample size was determined by single population proportion formula with assumption of p = 50%, 95% confidence interval, 5% marginal error, design effect of 2 due to multistage sampling that gave 768 and 5% non-response rate making the total calculated size of 806. The sample size was proportionally allocated to each woreda/ district and town administration based on number of their children treaded in the study period. Multivariate logistic regression analysis was used identify variables associated with outcomes. Findings were presented descriptively by frequency tables and graphs. Ethical clearance was obtained from Health Institute of Jimma University.

Result: Seven hundred ninety one child-caregiver pairs of under-five children were participated in this study. Among these 705, 58, and 28 were cured, 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 associated with outcomes of the treated children.

Conclusion: This study revealed that most of the under-five children improved following the management by health extension workers. Distance of residence from health post, knowledge of Caregiver and harmful traditional practices had negatively influenced the outcome. Thus, it was recommended that capacity should be built to teach caregivers about danger signs of childhood illnesses and eliminating harmful traditional practices.

Keywords: Community Health Workers. Health Extension Workers. Integrated Community Case Management (ICCM). Health Post, Dawro zone.

Introduction

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]. 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 [2].

Ethiopia began the health extension program (HEP) in 2002/03 and 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 [3]. One health post is meant to run by two HEWs and expected to serve about 5,000 populations and it gets supervision from nearby health center [4]. The Ethiopian 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 treat common childhood illnesses [5].

Since its scale-up 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 to 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 implementation of the aforementioned activities, the care seeking for under-five sick children at health posts showed an increment: acute respiratory infection treatment from 5 to 14 percent, fever treatment from 4 to 15 percent, and diarrhea treatment from 7 to 20 percent from 2010 to 2012 [6].

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. But the neonatal mortality remained stagnant and contributed a large proportion (nearly half) of the under-five mortality rate. For example, from 184,000 under-five deaths occurred in 2015, the neonatal death shares 87,000 (47%). The nation met the Millennium Development Goal 4 by reducing under-five mortality to 68 deaths per 1,000 live births in 2012 three years ahead of the set time [7].

The major causes of childhood morbidity in Ethiopia were pneumonia, diarrhea, malaria, neonatal conditions and malnutrition that consist of over two-thirds of childhood deaths. Especially under-nutrition is the major underlying cause contributing to nearly half of all childhood deaths [8]. The common problems identified in the management of these conditions 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 in the earlier reports [4]. But there was no contemporary study evidence on outcomes integrated community case management of childhood illness and associated factors nationally including the study area. Therefore, the

purpose of this study was to provide evidences to managers for informed decision- making regarding improvement of integrated community case management of under-five children.

Methods

A community based retrospective cross-sectional study design was employed to conduct the study in Dawro Zone, Southern Nation Nationalities and People's regional (SNNPR) state, Ethiopia, from March 15 to April 12, 2017. Dawro was 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 from. The zone had five districts and one town administration with one general hospital, one primary hospital, 22 health centers, 174 health posts to serve a projected total population of 642,409 from which about 100,280 were under-five children.

Under-five children who have lived for at least six months in the sampled kebele were included in the study while under-five children whose caregivers were severely ill and unable to respond were excluded from the study.

The dependent variable of the study was outcome of ICCM service while the independents variables of measurement were: 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), Child related characteristics(Sex, Age, Harmful traditional practice), 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) and Obstetric history of the mother (PNC attendance, Number of under-five children.

The sample size was determined by single population proportion formula with assumptions of proportion of 50%(no similar prior study, 95% confidence interval with 5% margin of error and considered design effect of 2(due to multistage sampling) and by adding 5% non-response rate that resulted in the calculated sample size of 806. Two districts and one town administration were selected randomly. The total sample size was divided to each district and town administration based on proportion of the estimated children. Next 30% kebeles/villages from the districts and two kebeles/villages from town administration were selected by simple random sampling. And then the allocated sample was allocated to selected kebeles/villages proportionally and the participants were selected by simple random sampling.

A structured interviewer administered questionnaire was adapted from UNICEF IMCI household survey tool (9) because majority of the study population were not educated while the relative household wealth estimation tool was adapted from EDHS 2011 (10). The questionnaires were translated into local language (Dawrotsuwa) and then back to English by different translators. Dawrotsuwa version was used for data collection from caregivers. ICCM registration books were used as a sampling frame.

Six diploma nurses and three public health officers who were fluent in local language collected the data. 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 kebeles/villages (out of study area) two days prior to the data collection on 5% of total sample size to check for consistency, clarity and sequence of questions and necessary corrections were made. Data was checked for completeness, accuracy, and consistency by supervisors and principal investigator after the data collection on daily basis.

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, 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. 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. After all, reliability of variables within each component was assessed and variables with Cronbach alpha of 0.6 and more were included.

Multivariate logistic regression analysis was used to identify factors associated to outcomes of ICCM of childhood illnesses. 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.

Ethical clearance was obtained from Jimma University Institute of Health, Research Ethics clearance board. Letter of cooperation was obtained from Dawro zone health department, district health offices, and Tercha town health office. Study participants were informed about the objectives of the study and verbal consent was obtained on the spot during data collection.

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: 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 escorted by other family member.

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

Health Development Army meeting (HAD) meeting: a basic informal neighboring mother's where they discuss about 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 about 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.

Results

Socio Demographic and Economic Characteristics

Seven hundred ninety one caregivers participated in the study yielding a 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 within less than 30

minutes travel distance from the 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.

S. No	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
		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

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 on the 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).

Table 2: Caregiver related characteristics of under-five years children those attended ICCM of childhood illnesses services in Dawro zone, south west Ethiopia, 2017.

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	1-2	754	95.3
		No	22	2.8
		>2	15	1.9
4	Knowledge of childhood danger signs	Yes	511	64.6
		No	280	35.4
5	Family support during health post visit	Yes	554	70
		No	237	30
6	Regular HDA meeting participation	Yes	384	48.5
		No	407	51.5
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
		No	145	18.4
		NA	170	21.5
10	The child was taken full dose medication	Yes	348	44.1
		No	30	3.8
		NA	412	52.2

11	The child was taken to higher facility if referred	Yes	158	20
		No	12	1.5
		NA	620	78.5

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. Harmful traditional practices such as uvula cutting, milk teeth extraction, and female circumcision were not applied on 534(67.5%). With regard to services provided from health extension workers, 377 (47.7%), 244 (30.8%), and 170 (21.5%) had taken medication, counseling for home care, and referred to health centers respectively. From 791 children who were ill and managed by health extension workers, 28 (3.5%) were died (Figure 1).

Figure1: outcomes and associated factors of childhood illnesses managed by health extension workers through ICCM in Dawro zone, southwest Ethiopia, 2017.

Factors associated with outcomes of ICCM of childhood illnesses

Bivariate logistic regression analysis was carried out to check for the presence of association between dependent variable and each of the independent variables. Among the variables in bivariate logistic regression analysis those which had a p-value of less than 0.25 were taken as candidates for multivariable logistic regression analysis.

Children of 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).

Table 3: Multivariate logistic regression analysis of factors associated with outcomes of ICCM of childhood illnesses in Dawro zone, south west Ethiopia, 2017.

Variables	Outcomes of ICCM			P-value	AOR (95% C.I)
	Cured	Worsen	Dead		
Cured Vs Worsen					
Residence	501 (87.6%)	48 (8.4%)	23 (4.0%)	0.234	1.62 (0.73, 3.6)
Rural	204 (93.2%)	10 (4.6%)	5 (2.3%)		
Urban*					
HDA meeting	356 (87.5%)	33 (8.1%)	18 (4.4%)	0.21	1.49 (0.8, 2.79)
No	349 (90.9%)	25 (6.5%)	10 (2.6%)		
Yes*					
Age of the child	174 (77.7%)	34 (15.2%)	16 (7.1%)	<0.001	3.9 (2.1, 7.27)
<=1 year	531 (93.7%)	24 (4.2%)	12 (2.1%)		
>1 year<5 years*					
Age of the caregiver	111 (86%)	14 (10.9%)	4 (3.1%)	0.036	3.03 (1.07, 8.55)
>=35 years	454 (89%)	36 (7.1%)	20 (3.9%)	0.18	1.83 (0.75, 4.45)
25-34 years	140 (92.1%)	8 (5.3%)	4 (2.6%)		
15-24 years*					
Educational status of caregiver	334 (83.9%)	43 (10.8%)	21 (5.3%)	0.001	2.97 (1.53, 5.77)
No formal education	371 (94.4%)	15 (3.8%)	7 (1.8%)		
Primary and above*					

Travel time to HPs	75 (72.8%)	20 (19.4%)	8 (7.8%)	0.001	3.2 (1.57, 6.53)
>=30 minutes	630 (91.6%)	38 (5.5%)	20 (2.9%)		
< 30 minutes*					
Harmful traditional practices	212 (82.5%)	31 (12.1%)	14 (5.4%)	0.007	2.35 (1.27, 4.35)
Victim	493 (92.3%)	27 (5.1%)	14 (2.6%)		
Not victim*					
Family support during HP visit	197 (84.5%)	22 (9.4%)	14 (6%)	0.43	1.3 (0.68, 2.47)
No	508 (91%)	36 (6.5%)	14 (2.5%)		
Yes*					
Knowledge of danger signs	223 (79.6%)	39 (13.9%)	18 (6.4%)	<0.001	3.34 (1.78, 6.28)
Not knowledgeable	482 (94.3%)	19 (3.7%)	10 (2%)		
Knowledgeable*					
Wealth quintile	126 (79.7%)	18 (11.4%)	14 (8.9%)	0.004	5.77 (1.74, 19.14)
Lowest	135 (84.9%)	18 (11.3%)	6 (3.8%)	0.007	5.2 (1.56, 17.23)
Second	142 (89.3%)	13 (8.2%)	4 (2.5%)	0.052	3.37 (0.99, 11.42)
Middle	151 (96.2%)	5 (3.2%)	1 (0.6%)	0.8	1.2 (0.29, 4.86)
Fourth	151 (95.6%)	4 (2.5%)	3 (1.9%)		
Highest*					
Cured Vs Dead					
Residence	501 (87.6%)	48 (8.4%)	23 (4.0%)	0.21	2.02 (0.67, 6.03)
Rural	204 (93.2%)	10 (4.6%)	5 (2.3%)		
Urban*					
HDA meeting	356 (87.5%)	33 (8.1%)	18 (4.4%)	0.14	1.94 (0.81, 4.62)
No	349 (90.9%)	25 (6.5%)	10 (2.6%)		
Yes*					
Age of the child	174 (77.7%)	34 (15.2%)	16 (7.1%)	0.002	3.72 (1.61, 8.61)
<=1 year	531 (93.7%)	24 (4.2%)	12 (2.1%)		
>1 year<5 years*					
Age of the caregiver	111 (86%)	14 (10.9%)	4 (3.1%)	0.38	2 (0.43, 9.24)
>=35 years	454 (89%)	36 (7.1%)	20 (3.9%)	0.2	2.2 (0.65, 7.2)
25-34 years	140 (92.1%)	8 (5.3%)	4 (2.6%)		
15-24 years*					
Educational status of caregiver	334 (83.9%)	43 (10.8%)	21 (5.3%)	0.01	3.33 (1.33, 8.37)
No formal education	371 (94.4%)	15 (3.8%)	7 (1.8%)		
Primary and above*					
Travel time to HPs	75 (72.8%)	20 (19.4%)	8 (7.8%)	0.084	2.39 (0.89, 6.4)
>=30 minutes	630 (91.6%)	38 (5.5%)	20 (2.9%)		
< 30 minutes*					
Harmful traditional practices	212 (82.5%)	31 (12.1%)	14 (5.4%)	0.12	1.93 (0.84, 4.44)
Victim	493 (92.3%)	27 (5.1%)	14 (2.6%)		
Not victim*					
Family support during HP visit	197 (84.5%)	22 (9.4%)	14 (6%)	0.067	2.18 (0.95, 5.01)
No	508 (91%)	36 (6.5%)	14 (2.5%)		

Yes*					
Knowledge of danger signs	223 (79.6%)	39 (13.9%)	18 (6.4%)	0.012	3 (1.27, 7.07)
Not knowledgeable	482 (94.3%)	19 (3.7%)	10 (2%)		
Knowledgeable*					
Wealth quintile	126 (79.7%)	18 (11.4%)	14 (8.9%)	0.01	6.1 (1.56, 23.9)
Lowest	135 (84.9%)	18 (11.3%)	6 (3.8%)	0.27	2.3 (0.52, 10.17)
Second	142 (89.3%)	13 (8.2%)	4 (2.5%)	0.7	1.37 (0.28, 6.66)
Middle	151 (96.2%)	5 (3.2%)	1 (0.6%)	0.29	0.29 (0.028, 2.9)
Fourth	151 (95.6%)	4 (2.5%)	3 (1.9%)		
Highest*					

Reference category is: Cured

Model assumption (Goodness of fit – Pearson statistic): Chi-square = 1059.2, df = 1066, p-value =0.553

Overall model fitting (Likelihood Ratio test): Chi-square = 164.48, df = 28, p-value = <0.001

*Reference category of independent variables

Similarly, 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). 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).

Discussion

Our research found that about high percent ill children were cured while few were died. The proportion of the cured under-five children was similar to the survey conducted in Amhara, Oromia, and SNNPR regions which 87% [11]. Similarly, the proportion of under-five children died was similar with the study conducted in Bangladesh where 4.4 percent children died after management of childhood illnesses by community health workers [12]. However, it was higher compared to the survey conducted in Amhara, Oromia, and SNNPR regions which found 2 percent cases died [11].

In this study, age of the child was important predictor of the health outcomes among children managed by HEWs. 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 similar to 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 [13].

The proportion of under-five children their illnesses worsen among under-five children with caregivers other than mothers was higher compared to under-five children with biological mother caregivers. And also the proportion of under-five children with exactly and above 35 years aged caregivers other than mothers was higher than proportion of under-five children with mother caregivers. 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. This might be because of less attention towards under-five children by caregivers other than mothers.

Maternal educational status became key determinant of child health according to this study finding. Children born to mothers with no education were more likely to encounter complication and death outcomes compared to children born to educated mothers. Ethiopian demographic health survey of 2011 also found educational status of mothers significantly influencing under-five children health outcomes [14]. 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 [15]. The difference might be due to methodological distinction of only under-five children mothers' participation in the latter survey while this study incorporated care givers other than mothers.

Travel time to health post was found to be another significant factor which contributed to child health outcomes. 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 result is similar with multi-country study that showed distance was a significant contribution for children' health outcomes [16]. But it is in contrary 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 [13]. This might be because in the latter one most households were located within one hour on foot walk from health facilities.

This study found that children with caregivers who know childhood danger signs had better health outcomes 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 [17]. 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.

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 [14, 15].

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 to be worse than those not affected and it was significantly associated.

Conclusion

This study revealed that a high proportion of the under-five managed by health extension workers through integrated community case management

of childhood illnesses were cured and few 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 negatively affected the treatment outcome of childhood illnesses.

Thus it was recommend that:

The health extension workers should strengthen provision of health education to caregivers about danger signs in under-five children starting during ANC.

District health office and zonal health department managers should collaboratively work on capacity building of HEW, awareness creation and mobilization of the community against harmful traditional practices and provide supportive supervision to HEW for improving their performance.

Other researchers are warranted to conduct study on outcomes of methods ICCM of childhood illnesses using prospective cohort study design by integrating qualitative can be helpful.

Limitations of the study

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

Authors' contributions (optional as needed)

Mr Sisay was initiator of the research idea. We, the three, have significant contribution in the proposal development, defending, fund obtaining, data collection and analysis and manuscript preparation process of this work.

Acknowledgments

We are grateful to Jimma University for the financial support of the data collection. Our thanks go to Dawro zone Health office and the respective districts and health posts for their permission to conduct the study in their catchment area. We also acknowledge our study participants for providing the necessary information and the data collectors for collecting the data carefully.

Competing Interests (optional as appropriate)

There was no any form of financial and nonfinancial competing interest b/n the funder and the research area community and we, the researchers.

References

1. Marsh DR, Hamer DH, Pagnoni F, Peterson S. Introduction to a special supplement: evidence for the implementation, effects, and impact of the integrated community case management strategy to treat childhood infection. *American Journal of Tropical Medicine and Hygiene*. 87(2012): 2-5.
2. WHO/UNICEF. Joint Statement: Integrated Community Case Management (ICCM). Geneva and New York: 2012.
3. FMOH. Health Sector Transformation Plan. Addis Ababa, Ethiopia: FDRE Ministry of Health; 2015.
4. Miller NP, Amouzou A, Bryce J, Victora C, Hazel E, Black RE. Integrated Community Case Management of Childhood Illness in Ethiopia: Implementation Strength and Quality of Care. The American journal of tropical medicine and hygiene, 2014.
5. Federal Ministry of Health and ICCM implementation partners. National scale up of ICCM, Ethiopia, December 2013.
6. Federal Ministry of Health and ICCM implementation partners. National scale up of ICCM, Ethiopia, December 2013
7. UNICEF,WHO, WB, UN. Levels and Trends in Child Mortality: Estimates Developed by the UN Interagency Group for Child Mortality Estimation. New York (NY), Geneva and Washington (DC); 2015.
8. FMOH. National Strategy for Newborn and Child Survival in Ethiopia; 2015/16-2019/20, 2015.
9. UNICEF. IMCI Household Level Survey Questionnaire. Geneva, 1999.
10. Central Statistical Agency [Ethiopia] and ICF International. Ethiopia Demographic and Health Survey 2011. Addis Ababa, Ethiopia and Calverton, Maryland, USA: Central Statistical Agency and ICF International, 2012.
11. Yenealem T., et al., Utilization of Integrated Community Case Management Services in Three Regions in Ethiopia after Two Years of Implementation; *Ethiop Med J*, (2014), Vol. 52, Sup. 3
12. Baqui H., et al., Effectiveness of Home-based Management of Newborn Infections by Community Health Workers in Rural Bangladesh. *Pediatric Infectious Disease Journal*. (2009) 28(4): 304–310
13. Okwaraji YB, Cousens S, Berhane Y, Mulholland K, Edmond K. Effect of Geographical Access to Health Facilities on Child Mortality in Rural Ethiopia: A Community Based Cross Sectional Study. *PLoS ONE* 7(3): e33564. doi: 10.1371/journal.pone.0033564.(2012)
14. Central Statistical Agency [Ethiopia] and ICF International. Ethiopia Demographic and Health Survey 2011. Addis Ababa, Ethiopia and Calverton, Maryland, USA: Central Statistical Agency and ICF International, 2012.
15. Sumonkanti D, Rajwanur MR. Application of ordinal logistic regression analysis in determining risk factors of child malnutrition in Bangladesh. Nutrition Journal 2011, 10:124 http://www.nutritionj.com/content/10/1/124.
16. Mahesh K. Gunther F., David C., Facility distance and child mortality: a multi country study of health facility access, service utilization, and child health outcomes. *International Journal of Epidemiology*, 2016
17. Degefie T., et al., Community case management improves use of treatment for childhood diarrhea, malaria and pneumonia in a remote district of Ethiopia. *Ethiop J Health Dev*. 2009; 23(1): 120-6
18. Kwon H.J. Climate change and health: More research is still needed. *J Prev Med Public Health*, 53(2020): 1-2.

Cite this article: Waju Beyene salgedo, et al.. "Outcomes and Associated Factors Of Integrated Community Case Management of Childhood Illnesses in Rural Districts of Dawro Zone, South West Ethiopia". Prim Health Care, 2020,10(2), 001-008.