Magnitude and Predictors of Compliance with Community Directed Treatment with Ivermectin for Onchocerciasis Elimination in Yeki Woreda Sheka Zone, SNNP Regional State, South-West Ethiopia

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Abstract

Back ground: Onchocerciasis is one of the Neglected Tropical Disease (NTD), which is commonly known as river blindness. Compliance with annual Ivermectin treatment is major challenge in community-directed treatment with ivermectin (CDTI) implementation. Those individuals, who did not comply with the annual mass treatment, will contribute to the continuity of the disease transmission. The objective of this study was assessing magnitude and predictors of compliance with annual community directed treatment with Ivermectin for Onchocerciasis Elimination in Yeki Woreda Sheka Zone, SNNP Regional state, South-West Ethiopia.

Methods: A community based cross-sectional study was conducted in March 1-28, 2018 on systematically sampled 546 representative households. Data was collected using interviewer administered pre-tested questionnaire and key informant interview guide. The data was entered into Epi data version 3.1 and exported to SPSS version 20 for analysis. Descriptive statistics was computed to summarize data in tables. Variable with P-values < 0.25 in bivariate analysis were selected for multivariable analysis. Multivariable logistic regression was used to determine the independent predictors of the CDTI compliance at P value <0.05.

Results: A total of 546 respondents aged from 19 to 73 (mean 42.2± 13) years participated in the study. More than two-third (77.3%) of them reported compliance with the annual treatment. Significantly higher rate of treatment compliances were reported by those who were in the age group above 35 years [AOR: 3; 95% CI: 1.4, 6.0], perceived risk of infection [AOR: 4.6; 95% CI: 2.3, 9.6], knowledgeable about CDTI [AOR: 3.8; 95% CI: 1.2, 12.2], Perceive community drug distributors (CDDs) are doing their work well [AOR:2.7;95%CI:1.2,5.0], being civil servant [AOR:0.1;95% CI:0.04,0.25],being merchant [AOR:0.09;95% CI:0.03,0.19], and who had favorable attitude towards CDTI [AOR: 2.5; 95% CI: 1, 6.3].

Conclusion: The annual treatment compliance with CDTI in the study area was low so to overcome these problem intervention packages should consider factors such as age, perceiving risk, performance of CDD, occupation, knowledge and attitude towards CDTI improve compliance.

Key words: Onchocerciasis, Ivermectin, Treatment, Compliance, Ethiopia

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List of abbreviations and acronyms

APOC African Program for Onchocerciasis Control

CDD Community Drug Distributor

CDI Community Directed Intervention

CDTI Community Directed Treatment with Ivermectin

FMOH Federal Ministry of Health

HEW Health Extension Worker

HH House Hold

LF Lymphatic Filariasis

MDA Mass Drug Administration

Mf Microfilariae

NTD Neglected Tropical Disease

OCP Onchocerciasis Control Program

REMO Rapid Epidemiological Mapping of Onchocerciasis

SNNP South Nation Nationality People

WHO World Health Organization

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1. Introduction

1.1 Back ground

Onchocerciasis is one of Neglected Tropical Disease (NTD), which is commonly known as river blindness and vector born parasitic disease caused by filarial worm *Onchocerca volvulus*. It is transmitted by bite of black flies *Simulium* damnosum species which breeds in fast flowing river (1).Onchocerciasis is public health and socio-economic problem of poorest population of developing country special Africans (2).

Worldwide about 123 million people are at risk of infection; above 96% of the disease burden is in Africa with at least 37 million of those infected and 1 million blinded or have severe visual impairment (3,4). In five regional states of Ethiopia rapid epidemiological mapping of onchocerciasis (REMO) indicates that about 20 million people in different part of country are living in endemic area (5).

Mass Drug Administration (MDA) is being undertaken through Community directed treatment with ivermectin (CDTI), which is the major strategy for the control and elimination of onchocerciasis in the endemic area. Community directed treatment with ivermectin is cost effective and sustainable strategies to reach target group developed by African Program for Onchocerciasis Control. Community directed treatment with ivermectin is principle of empowering community to educate, mobilize and arrange the community members who are selected by community to distribute Ivermectin for control and elimination without any cost. The annual treatment can continue for more than 15 years in order to cover life span of adult worm (1, 6).

The drug ivermectin (trade name, Mectizan®) is a microfilaricide and a temporary microfilarial suppressant, which was approved in 1978 for mass treatment of communities exposed to onchocerciasis. Treatment has to be continued annually for at least 10 years in order to cover the life span of the adult worms, which are not killed by this drug (7).

Compliance to CDTI is defined as the extent to which individual members of the communities take ivermectin pill at annual distribution in the village. The desired treatment compliance with annual ivermectin treatment should be at least 90% of the eligible population (80% total

population therapeutic coverage) and 100% geographical coverage in all active transmission zones (‘foci’) in the country (8,9).

The annual mass treatment should be continue for 15 -20 years while the community should take the drug in order to ensure an adequate reduction in the transmission of the parasite and protection from further infection (10).

Many studies show that all eligible population (all adult population age above 5 years and height above 90cm) the community is not receiving the annual treatment (11,12).

1.2 Statement of the problem

Compliance with annual Ivermectin treatment is a major challenge in community-directed treatment with ivermectin (CDTI) implementation, not all eligible individuals within communities receives the annual treatment. There are individuals who do not comply with the annual mass treatment, which contributes to the continuity for disease transmission Studies conducted in Kabo and Kaffa Zone; South-west Ethiopia shows non-compliance rate for Community Directed Treatment with Ivermectin (CDTI) among study participants was 19.8% and 21% respectively (13, 14, 15).

Survey done in Sheka Zone; Yeki Woreda South-West Ethiopia after 10 years of annual CDTI shows that micro filarial rates average an unacceptable 6.9% (range 0%-15.2%). Special children less than 10 years old of age were found harboring Microfilariae (mf) in skin biopsies that show the existence of new infections and therefore conclusive evidence of recent ongoing transmission (8).

Studies done in Ethiopia and Nigeria shows that compliance with CDTI can be influenced by factors such as age, gender, perceived risk of contracting the disease, residence duration, one’s family support. In addition, only few similar studies had been done elsewhere that can help answer the questions compliance rate with CDTI and predictors of treatment compliance (14,16,17).Therefore this study was try to identify factors associated with CDTI compliance and provides a basis for understanding how to sustain community control efforts over a long period to achieve the Elimination plan.

2. Literature review

2.1 Over view of Onchocerca volvulus Infection

Onchocerciasis is caused by infection with a filarial worm, *Onchocerca volvulus*, which only infects humans. The adult worms are found in nodules under the skin of infected persons and they can live up to 14 years. They produce thousands of small microfilaria that migrate through the skin and that are responsible for the main clinical complications as a result of inflammatory reactions to microfilaria in the skin and in the eyes. It is known to cause human onchocerciasis otherwise known as River Blindness. Female black flies *Simulium damnosum*, are day biters, and are mostly found near fast running rivers and streams (11**,** 18, 19, 20).

Beyond the debilitating health burden, Onchocerciasis also inflicts tremendous social and economic damage on individuals and entire communities. Studies shown in Ethiopia and Nigeria onchocerciasis is responsible for poor school performance, higher dropout rate among children due to itching, lack of sleep and other associated consequences. Also, low productivity, low income and higher health related costs are found among adults with onchocerciasis (16, 21,22).

The onchocerciasis program mainly applies community directed treatment strategies due to many reasons. Africa's insufficient health workforce is a major constraint to attaining the Millennium Development Goals (MDGs) for reducing poverty and disease. While Africa's burden of the World's disease is 25%, its share of the world's health workforce is only 1.3%. As a result many out-of-reach populations are deprived of any kind of health services and the few established health programmes are not sustained, bringing disillusion to the population and loss of confidence in the health systems. Communities are often not consulted or involved in determining the health needs or priorities of health systems (23).

2.2 Magnitude of Compliance to community directed Ivermectin treatment

Studies conducted in Kabo and Kaffa Zone; South-west Ethiopia shows compliance rate for Community Directed Treatment with Ivermectin (CDTI) among study participants are 80.8% and 79.8% respectively (14,15). Similar studies conducted in Uganda and Nigeria shows study participants annual treatment compliance level to community directed treatment with Ivermectin

is 82.2% and 55.4% respectively. The compliance rate was low when compared with the desired treatment compliance standard of Onchocerciasis Elimination plan (24, 25).

2.3 Predictors of compliance with community-directed treatment with Ivermectin

Studies conducted in Kaffa Zone and Kabo in South-west Ethiopia shows that Age, duration of residence, risk of contracting the disease, perceive community drug distributors (CDDs) are doing their work well and participants who know at least one CDD in their village was positive predictors of compliance for Community Directed Treatment with Ivermectin (14,15).

Similar study done in Bebeka coffee plantation farm and Uganda shows as believing that measuring height is the best way to determine one's dose of ivermectin, having social support from one's family, perceiving CDDs as doing their work well and high risk perception and in Cameroon perceptions of Ivermectin campaign's organization and of community drug distributor's commitment were factor associated with compliance for Community Directed Treatment with Ivermectin (17, 24, 26).

2.3.1 Socio- demographic factors

Study conducted in South-West Ethiopia Kabo area; show that educational status, age and ethnicity were significantly associated with treatment compliance. Study participants, whose age is above 35 year old were five times more compliant to CDTI than respondents whose age is ≤ 35 years old [AOR: 5.48, 95% CI; 1.97, 15.23]. Duration of residence has significant association with Compliance to treatment were higher for those duration of residence in the area for ten years and more (87.2%) compared to those who duration residence for less than ten years (60.8%) ($P < 0.05$) and educational status also shows a significant association with treatment compliance higher treatment compliance rate were reported by literate (86.0%) compared to illiterate (75.0%) (14,27).

Study conducted in Bebeka coffee plantation farm south-west Ethiopia shows Occupational status has strong association with CDTI compliance; employed individuals were more likely to comply with Ivermectin treatment when compared to unemployed individuals [AOR: 1.68, 95% CI 1.11-2.61] (17).

Study done in Cameroon and Nigeria shows Males, adults and those who had ever been married had higher rates of compliance than females, youth and singles. Education level and Christianity were negatively associated with compliance, while belonging to the majority ethnic group in the area was a positive factor concerning compliance rate. Although educational level and ethnic status appear to be the strongest factors associated with compliance (17).

2.3.2 Individual related Factors

Individual related factors affect the Onchocerciasis control and Elimination plan in different part of African country. Perception of being at risk of infection, participation in recruitment of CDD, Favorable attitude to CDTI, Knowledgeable to CDTI and knowing at least one CDD in the village were strongly associated with CDTI compliance. Study done in South-West Ethiopia Kabo area; shows respondents who perceived themselves to be at risk of onchocerciasis infection were 7.05 times more likely to comply with the treatment compared to those who did not [AOR: 7.05; 95% CI: 2.70, 18.43], respondents who know at least one CDD in their village were 2.83 times more likely to comply with CDTI compared to those who did not know any CDD in their village [AOR: 2.83; 95% CI: 1.26, 6.40] (14).

Similar study done in Bebeka Coffee Plantation Farm South-west Ethiopia; on factor associated with treatment compliance show as fear of side effects that could avert them from going to school and the drug's side effect may last up to one week. Moreover, a shorter period of ivermectin distribution that lasts for about two weeks in most communities possibly increases the likelihood of missing these highly mobile segments of the population, thus contributing to non-compliance. The other factor positively associated with compliance in this study was high risk perception to the infection of onchocerciasis, Favorable attitude and Knowledgeable to CDTI (17).

Study form Uganda shows perceiving personal risk of onchocerciasis and believing that Ivermectin prevents onchocerciasis is the most important factor that contributes positively for CDTI compliance (24).

Study done in Cameroon and Nigeria shows Onchocerciasis perceived as curable and serious disease were individual factor positively associated while lack of information on the arrival of

the drug and absenteeism the major factor negatively associated with community directed treatment with ivermectin (26,27).

2.3.3 Program related Factors

Scientific studies have proven the effectiveness of the CDI strategy in other health interventions programmes, such as: Vitamin A distribution, Lymphatic Filariasis (LF) treatment, schistosomiasis treatment and de-worming. The Community Directed Intervention strategy recruits Community Directed Distributors (CDD) from within the community to administer the drugs. CDD's who participated efficiently made they readily available to other community directed interventions (28, 29, 30).

Study in Kabo area shows perceived CDDs are performing their work well had significantly higher compliance rate (89.1%) compared to those who believe CDDs are poor in performance (12.1%) ($p < 0.05$), perceived that CDTI as very important (87.9%) and the program can control onchocerciasis (89.1%) had significantly higher compliance rate compared to those who look at CDTI as an obligation (7.4%) and those who believe the program can't control onchocerciasis (33.3%) ($P < 0.05$) (14).

Other study done in Bebeka coffee plantation farm shows individuals who perceived that measuring height is the best way of one's dose determination were 6.4 times more likely to comply with the treatment than individuals who perceived that measuring height is not the best way of one's dose determination [AOR: 6.37, 95% CI 2.10, 19.29], showed that perceived good performance of CDDs by the population is associated with increased compliance (17).

Study from Cameroon shows that people who were best perception on campaigns' organization useful and well organized was 10% higher compliant than of those who have negative perception and The proportion of respondents who found their area's CDDs devoted and polite higher compliant than that of people who found their area CDDs were not devoted and polite (26).

Conceptual framework

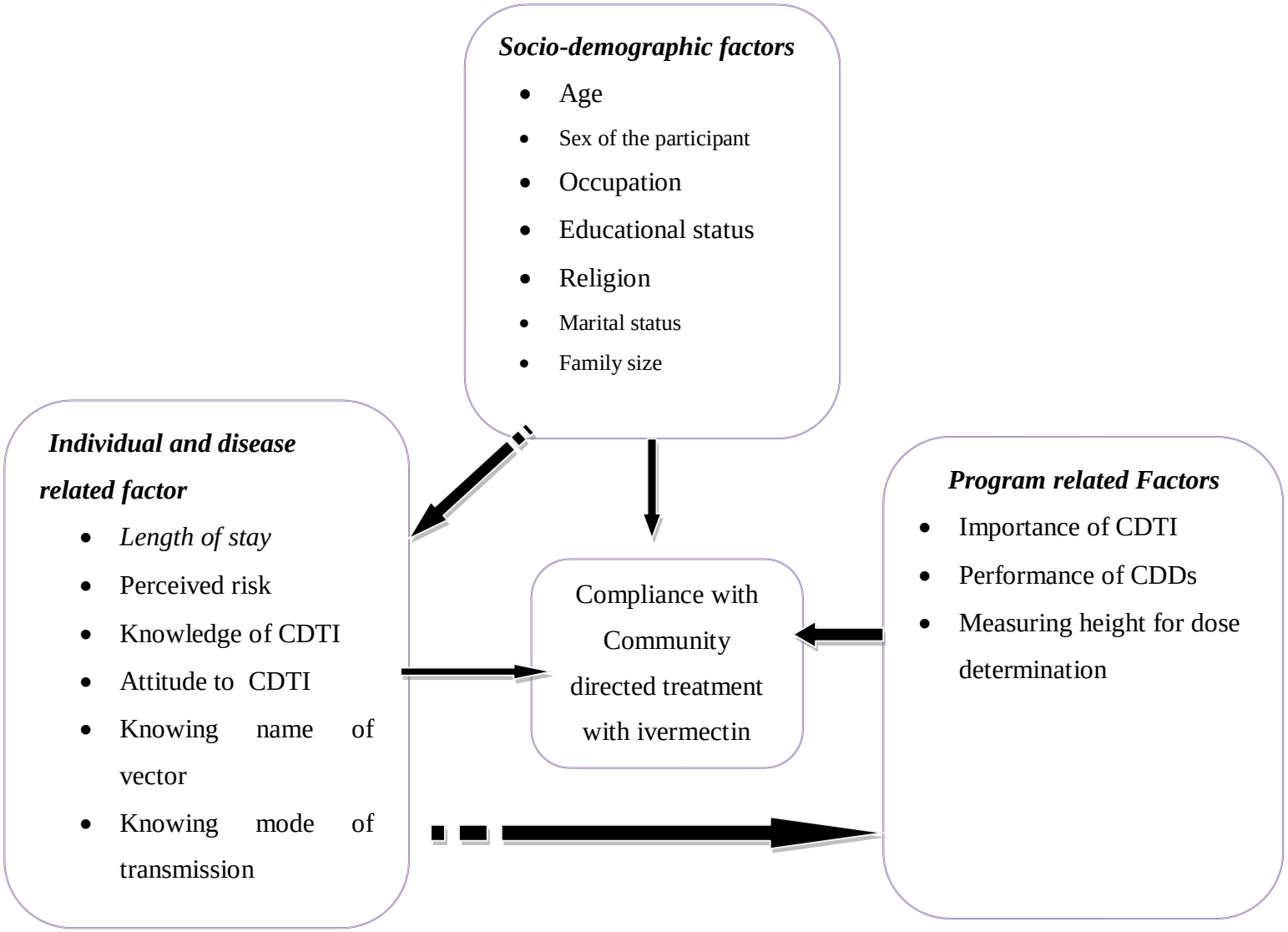

Figure 1**;** Conceptual frame work of predictor of compliance with CDTI

This was adapted by reviewing different literatures regarding predictor of compliance with CDTI (14, 17, 15, 24, 26)

Significance of study

Ivermectin is distributed free of charge through the African Program for Onchocerciasis Control and Elimination (APOC), evidence show that not all eligible individuals within communities receives the annual treatment

So that, finding of this study has assessed why eligible people fail to comply with the CDTI to the expected level and recommend possible solutions for program managers, heath care providers and stockholders to sustain community control and Elimination efforts over a long period to achieve the Elimination plan.

3 Objectives

General Objective

To assess magnitude and Predictors of compliance with 2017 annual community directed treatment with Ivermectin for Onchocerciasis Elimination in Yeki Woreda Sheka Zone, SNNP Regional state, South-West Ethiopia.

Specific objectives

- ✓ To determine the magnitude of compliance to CDTI for onchocerciasis elimination during the 2017 annual treatment.
- ✓ To identify predictors of compliance with CDTI for Onchocerciasis Elimination during the 2017 annual treatment.

4 Method and materials

4.1 Study area and period

The study was conducted in Yeki woreda which is one of the three woreda in Sheka zone, administratively the woreda is structured into 22 rural kebeles. Sheka Zone is one of the 14 zones in SNNPR and one of the few areas with high forest cover in Ethiopia, which favors the presence of black fly, the vector of Onchocerciasis. The woreda is located 864 Kms to south West of Hawassa, the capital of SNNPR and 624 Kms to South west of Addis Ababa. The geographical coordinates are approximately 7.12 -7.43 latitude and 35.32 - 35.75 longitude. The woreda has an altitude range of 1001-1500 meter above sea level, mean annual temperature ranges from 15.1 to 22.5 in (^{o}c) and it receives average rainfall of 1801 to 2200 mm annually.

The woreda has a total population of 141,539 with 71052 female and 70487 male according to 2010 Ethiopian Fiscal Year estimate. Community-based treatment with Ivermectin for control of onchocerciasis was initiated in the area in 2001 by APOC in partnership with Ethiopian Federal Ministry of Health (FMOH), the Carter Center, local administration and the community. Study was conducted from March 1-28, 2018.

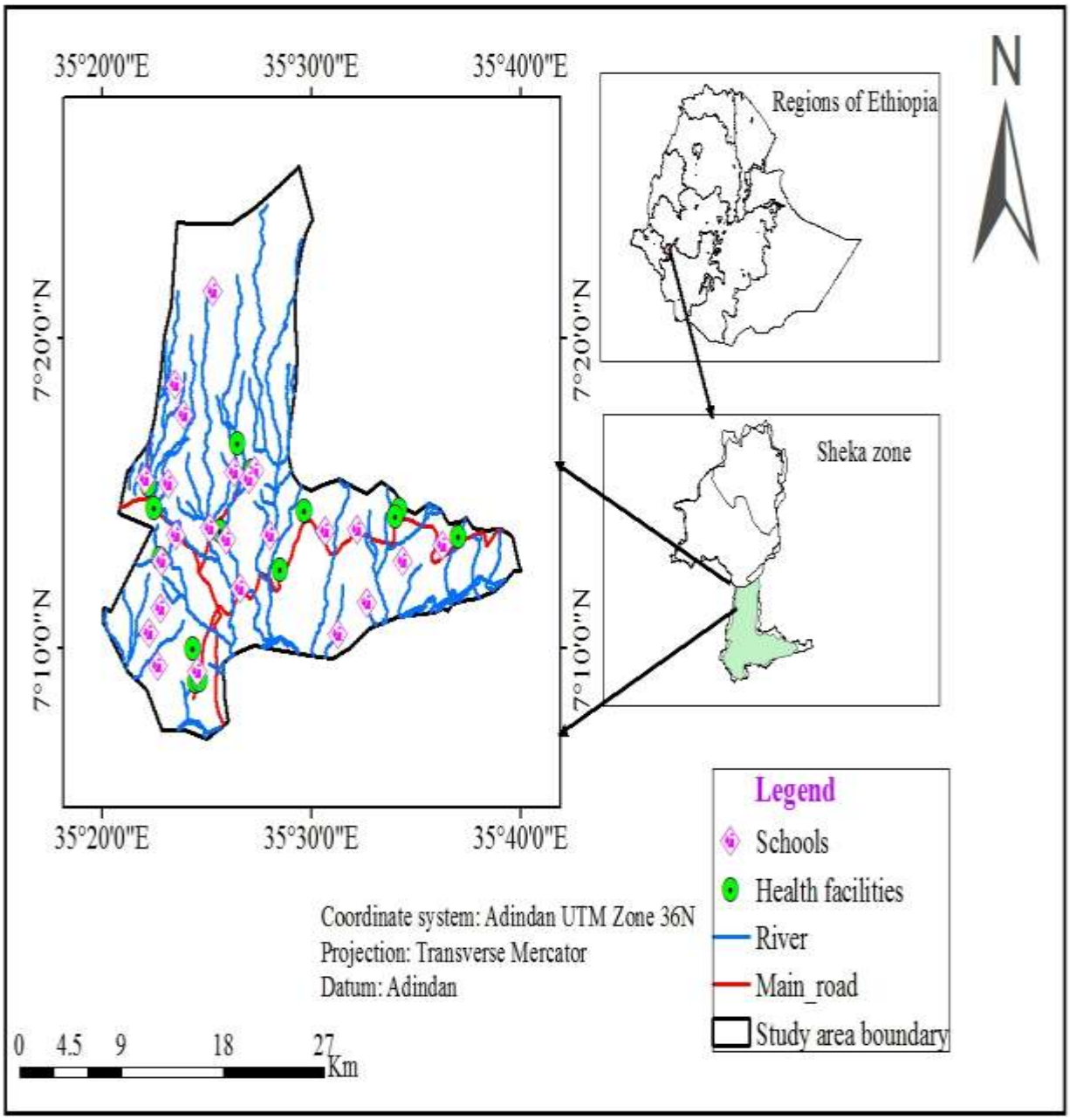

Figure 2; Map of Yeki Woreda

4.2 Study design

Community-based cross sectional study was employed.

4.3.1 Source population

Individual whose age was 18 years and above old population in Yeki Woreda.

4.3.2 Study population

Those individual whose residencies is in selected kebele.

4.3.3 Sampling unit

Individual with household

4.4 Inclusion and Exclusion Criteria

4.4.1 Inclusion criteria

Age 18 years or above whose; duration of residence in the study area was at least six months.

4.4 .2 Exclusion criteria

Pregnant and lactating woman's who had infant less than one week of ages; during Mass Drug Administration.

4.5 Sample size determination and sampling procedure

The sample size was determined using single population proportion formula as follows.

$$n = \frac{(Z\alpha/2)^2\, p(1-p)}{d^2}$$

Where p=proportion of CDTI compliance rate 79.8% were taken from similar study conducted Kaffa zone south western Ethiopia (Asfaw D: 2017). Z α/2 at 95% CI (1.96) and d=5% margin of error (0.05)

$$n = \frac{(1.96)^2 * 0.798(1-0.798)}{(0.05)(0.05)} = 248$$

Since the sampling was multistage, the total sample size was multiplied by 2 to minimize the design effect and 10% was added to compensate for non-response rates, thus the final sample size was estimated to be 546. For the key informant in-depth interview, six participants from Woreda Neglected Tropical Disease officer, supervisor from health center, HEW, Kebele leader, CDD and community representatives who were affiliation with CDTI program were included.

4.5.2 Sampling technique

The Yeki woreda has 22 kebeles; from those 30% of the kebele was selected by Simple random sampling technique. Seven Kebeles was included in the study because the population were homogeneous, then simple random sampling method was used to select seven kebeles. Then, total 546 Sample size was allocated to all randomly selected kebeles proportional based on number of house hold in each sampled kebeles. List of HH was obtained for each kebele health post health extension worker and systematic sampling method was applied to select households (HHs) with interval of 20 HHs where the first HH was selected randomly. Purposive sampling was employed for qualitative study.

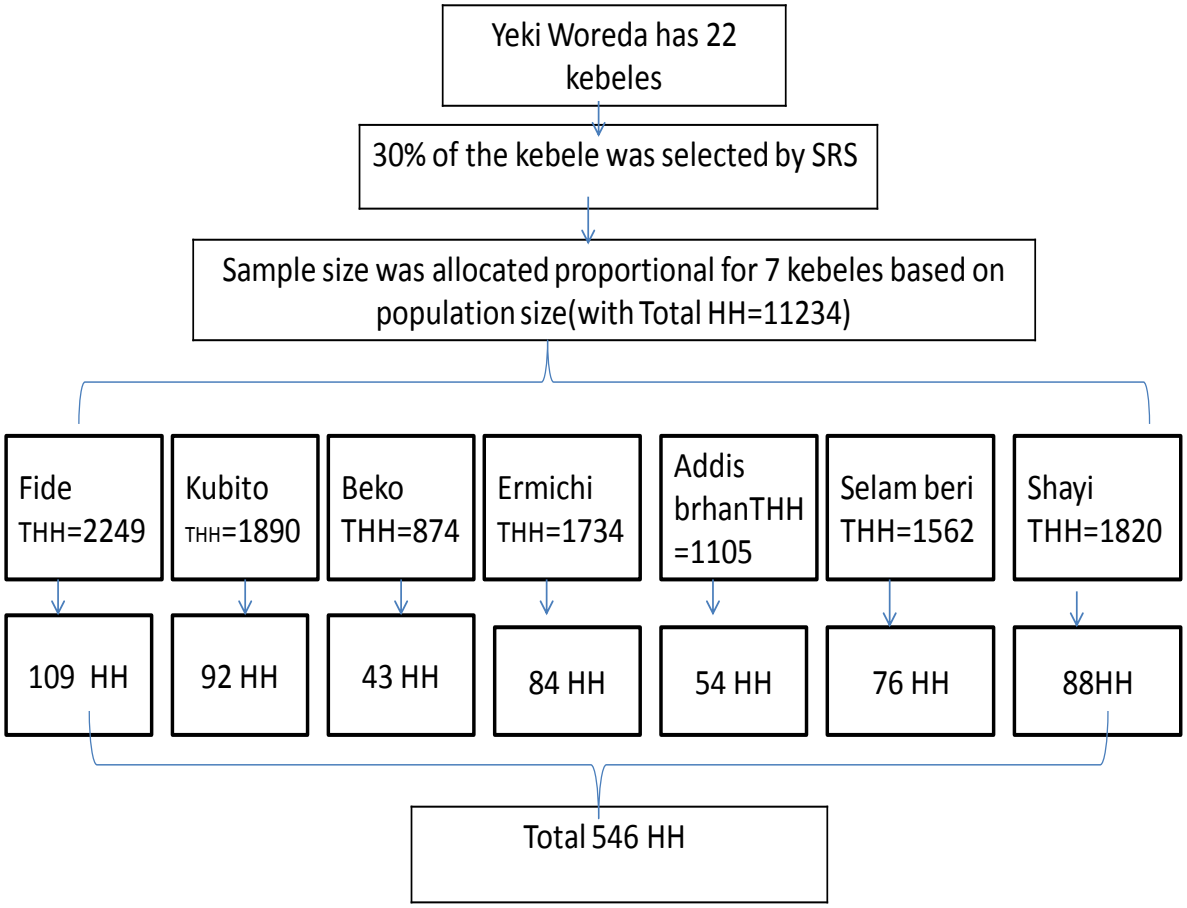

Figure 3; Schematic presentation of sampling technique for recruitment of study participant

4.6 Data collection tool and procedure

4.6.1 Data collection tool

Data was collected by interviewer administered pre-tested questionnaire for quantitative study and in depth interview guide for qualitative study, which had been adapted from previous related studies (14, 17, 24, 26, 25, 27).

4.6.2 Data collectors

Data collectors were seven grades ten complete for interviewer administered questionnaire and one Bsc nurse for in-depth interview who were fluent speaker of the local language, and two Bsc nurse supervisors was recruited. Training was given for one day on the objective of the study, questionnaire, method of data collection, interview techniques and procedures for data collection and half day on identified gaps during pre-test.

4.6.3 Data collection procedure

Data was obtained by direct face to face interviewing of the study participants at their home. Only one respondent was interviewed per household.

4.6.4 Data quality assurance

Data quality was ensured during instrument development, data collection, coding and analysis. The questionnaire was initially prepared in English, then translated into Amharic and finally back translated to English by another language expert to ensure consistency. Pre-test was conducted on 5% of the total sample outside of the survey area (Adracha woreda Gamadro kebele) before commencing the study. Findings was discussed among data collectors and supervisors, so that, the tool was modified before actual data collection. The final interview was conducted using the modified questionnaire. The completeness of questioners was checked every day by the supervisors and principal investigator.

4.7 Variables

4.7.1 Dependent variable

Compliance with community directed treatment with Ivermectin (CDTI).

4.7.2 Independent variables

A. Socio-demographic factors: Age, sex, marital status, family size, religion, duration of residence, ethnicity, occupation and educational status.

B. Individual related factors: knowledge on CDTI, attitude to CDTI, risk infection with onchocerciasis and knowing about vector.

C .Disease related factors: mode transmits onchocerciasis, method of prevention and seriousness disease.

D. *program related Factors*: place of ivermectin distribution, way of CDD recruitment, side effects, performance of CDDs and important of CDTI.

4.8 Data processing and analysis

Data was checked for completeness and consistency, and coded. Then, data was entered in to Epi Data version 3.1 and exported to SPSS version 20 for statistical analysis. Descriptive statistics was computed to summarize data in tables. Those variables with P-values less than 0.25 in bivariate analysis were selected by back ward elimination method as candidate variables for multivariate analysis. A multivariate logistic regression was used to assess the association of independent variables with outcome variables. The adjusted odds ratio together with their corresponding 95% confidence interval was considered to determine strength of associations and level of significance among the variables. For qualitative study tape-recorded interviews were transcribed verbatim. The transcribed text from each informant was translated to English then data was transcribed and analyzed manually.

4.9 Operational definition and definition of terms

Onchocerciasis; is a parasitic disease caused by *Onchocerca volvulus*, which is transmitted to humans by black flies genus *Simulium*.

Perceived risk; is defined as personal feeling in danger of getting Onchocerciasis infection.

Compliance with CDTI; is defined as the individual members of the communities take Ivermectin pill at annual distribution of CDTI in their village.

Non compliance with CDTI; is defined as the individual members of the communities miss Ivermectin pill at annual distribution of CDTI in their village

Transmission zone; is defined as a geographical area, where transmission of O. volvulus occurs by locally breeding vectors.

Ivermectin; drug used to treat Onchocerciasis which kills microfilaria, affect the viability and reproductivity of the adult worms.

Knowledge to CDTI: an individual understanding and awareness on CDTI and Ivermectin obtain magnitude of score given for 11 questions. Score $\geq$ mean defined as adequate knowledge and < mean score define as having in adequate knowledge on CDTI and Ivermectin. Knowledge was scored by giving 0 for incorrect answers and 1 for correct answers.

Attitude to CDTI: an individual feeling as well as any preconceived idea on CDTI obtains magnitude of score given for 11 Likert-scale questions. Those Score $\geq$ mean score and < mean score define as having favorable and unfavorable attitude CDTI.

4.10 Ethical consideration

Ethical clearance letter was obtained from Institutional Review Board of Jimma University Institute of Health. Permission letter to conduct the research was obtained from Sheka Zonal Health Department and Yeki Woreda Health Office. Then, letter of support was communicated to the local kebele administrator to get permission before the start of the data collection. Moreover, all the study participants had provided informed written consent with understanding of the purpose and benefit of the study along with their right to refuse. Confidentiality of study

participants was assured by using questionnaire identification number and privacy by removing names and other identifiers during the intervie*w.*

4.11 Plan for dissemination of findings

The findings of the study will be submitted to the Institute of Health of Jimma University in fulfillment of the requirements for the degree of masters of public health in General public health. A copy of the finding will be disseminated to Yeki Woreda Health Office and Sheka Zone Health Department. The findings of the study will be published in peer reviewed reputable journals to reach the wider scientific community.

5 Results

All the estimated 546 sample individuals were interviewed yielding a response rate of 100%. Six key informants were interviewed, two female and four male, except health center head, all lived in the area for more than twenty years and supervisor health center lived for four years. Interviews were conducted at kebele and Woreda health office after securing respondent consents. The interview took from 30 to 50 minutes per participant.

Socio-demographic characteristics

The age of the respondents ranges from 19 to 73 years with mean age of 42.2± 13 years and 338 (61.9%) of them were age above 35 years old. Three hundred fifty one (64.3%) were males; regarding length of stay, nearly three-forth (73.4%) of them stayed for more than 10 years in the study area. The dominant religion was Orthodox Christian 251 (46.0%) followed by Muslim 161(29.5%). Regarding their marital status, 461 (84.4%) was married. One hundred seventy four (31.9%) of the study participants belonged to Amhara, 132 (24.2%) were Kafecho and 107 (19.6%) were Shekacho ethnic groups. Regarding educational status, 276 (50.5%) were literate. Concerning occupation and family size, about two-third (72.9%) were farmers and the mean family size was 4.5 (±2.3). The details of socio demographic characteristics were summarized in Table 1.

Table 1: Socio- demographic characteristics of the respondents, Yeki woreda, Ethiopia 2018 (n=546)

Variable	Categories	Freq (%)
Age in years	≤35	208 (38.1)
	>35	338 (61.9)
Sex	male	351 (64.3)
	female	195 (35.7)
Length of stay	<10 years	145 (26.6)
	≥10 years	401 (73.4)
Religion	Orthodox	251 (46)
	Muslim	161 (29.5)
	Protestant	134 (24.5)
Marital status	Currently married	461 (84.4)
	Not in marriage	85 (15.6)
Ethnicity	Shekacho	107 (19.6)
	Kafecho	132 (24.2)
	Amhara	174 (31.9)
	Oromo	54 (9.9)
	Shekoo	19 (3.5)
	Mezhenger	22 (4.7)
	Benchi	12(2.2)
	Tigre	8(1.4)
	Other	18(3.3)
Educational status	illiterate	270 (49.5)
	literate	276 (50.5)
Occupation	farmer	398(72.9)
	civil servant	67(12.3)
	merchant	81(14.8)
Family size	1-4	265 (48.5)
	5-8	170 (31.1)
	9+	111 (20.3)

Knowledge and attitude towards CDTI

Four hundred sixty two (91.0%) of respondent were knowledgeable about Community Directed Treatment with Ivermectin. Regarding their attitudes, 462 (84.6%) of respondent had favorable attitude towards Community Directed Treatment with Ivermectin.

Individual and disease related factors

Five hundred twenty five (96.2%) of the study participants had ever heard about onchocerciasis. Closely two-third of the respondents 64% had correctly identified the name of the vector that transmits onchocerciasis. Concerning transmission, 327 (59.9%) of the study subjects correctly responded that onchocerciasis can be transmitted by black fly biting. Three hundred fifty six (65.2 %) of the respondents knew preventive methods. Regarding symptoms of the disease, 506 (92.7%) of respondent knew at least one symptoms. Nearly three-fourth of respondents, 403 (73.8 %) believe that onchocerciasis is a serious disease; two-third (67.8%) of participants believed onchocerciasis was common in their village and 352 (64.5%) perceive that they are high risk of infection with onchocerciasis (Table 2).

Table 2: Individual related factors among the study participants, Yeki woreda, Sheka Zone, SNNPR Ethiopia 2018 (n=546)

Variables	Responses	Freq (%)
Ever heard about onchocerciasis	Yes	525 (96.2)
	No	21 (3.8)
Named of the vector of onchocerciasis	Correct	355 (64)
	Incorrect	191 (36)
Identified mode of transmission	Correct	327 (59.9)
	Incorrect	219 (40.1)
Identified methods of prevention	Correct	356 (65.2)
	Incorrect	190 (34.8)
Identified symptoms (at least one)	Yes	506 (92.7)
	No	40 (7.3)
Perceived seriousness of onchocerciasis	Yes	403 (73.8)
	No	143 (26.2)
Know onchocerciasis presence of onchocerciasis	Yes	370 (67.8)
	No	184 (32.2)
Risk perception of infection with onchocerciasis	High risk	352 (64.5)
	Low risk	194 (35.5)

CDTI compliance rate and Program related factors

Four hundred twenty two (77.30%) of respondents were found to be compliant to annually distributed Ivermectin. The most frequently mentioned reasons for missing the treatment were: absence during the campaign day 99 (79.2 %), fear of side effects 14 (11%), CDDs did not come to their house to provide them the treatment 2 (1.6%), Ivermectin not effective 4 (3.2%) and other reasons 4(3.2 %).

The reasons commonly cited by the key informants for non-compliance, being absent during the treatment time, fear of side effects and lack of awareness both to the disease and the treatment, which are in line with results of the quantitative findings. Additional reason for non-compliance mentioned by 37 years old woman CDD *"...majority of community member was accepted drug distribution by community drug distributor but some individuals didn't accept distribution by us. I remember one person asked me, you are not nurse, not HEW or doctor how you can distribute drug without having clinical skill and knowledge and he told me I don't want to take drug including my family finally he become non compliant for treatment"*

Supervisor from health center explained that *"the abilities of the some of the drug distributors are not different from that of community members; I don't think the drug distributors had taken enough training about CDTI, disease transmission and prevention of disease. Majority of distributor have similar knowledge with community when we asked them at supervision time they told us "we are distributing "oncho" even they did not differentiate the name of drug. These might have contributed to the lack trust by some of the community members on the treatment and contributed to non compliant"*

The distribution of drug took place at community centre 256 (69.8 %), at home of the study participants 89 (16.3%) and at CDD home 77 (14.1%). Most (99.05%) of them have reported swallowed in front of CDD and 445 (81.5 %) participant had awareness about distribution of Ivermectin in their village.

Regarding CDDs and treatment, majority (97.8%) of the respondents knew at least one CDD person in their village and only 117(21.4%) participated in recruitment of CDD.

A kebele leader said that "*previous years the drug was distributed by CDDs (male and female) but in recent years, it has been distributed by health development army and one to five network leaders; and selection of distributor was done by health extension worker. The gaps seen in this community ivermectin distribution might be lack enough training on disease prevention and benefit of the treatment."*

Four hundred fifty six (83.5%) of the respondents believed performance of CDD was good, 458 (83.9%) perceived Ivermectin treatment can eliminate onchocerciasis, 44 (8.1%) participant knew people who stopped taking ivermectin in their area and 513 (94.0%) believed that CDTI program is important (Table 3).

Table 3: CDTI compliance rate and Program related factors Yeki woreda, Sheka Zone, SNNPR Ethiopia 2018 (n=546)

Variables	Response	Freq (%)
Compliance to recent campaign	Yes	422 (77.3)
	No	124 (22.7)
Aware of ivermectin distribution	Yes	445 (81.5)
	No	101 (18.5)
Swallowed in front of CDD	Yes	418 (99.05)
	No	4 (0.05)
Place of Ivermectin distribution	Community centre	256 (69.8)
	CDD come to my house	89 (16.3)
	CDD home	77 (14.1)
Reason for non compliance to recent campaign	Absent in house	99 (79.2)
	Fear of side effect	14 (11.2)
	Not informed	5 (4.0)
	Ivermectin not effective	4 (3.2)
	CDD did not come to my house	2 (1.6)
	Do not believe free treatment	1 (0.8)
know at least one local CDD person	Yes	534 (97.8)
	No	12 (2.2)
Participation in recruitment of CDD	Yes	117 (21.4)
	No	429 (78.6)
Performance of CDD	Good	456 (83.5)
	Poor	90 (16.5)
Ivermectin treatment can eliminate onchocerciasis	Yes	458 (83.9)
	No	88 (16.1)
Know a person who stopped treatment	Yes	44 (8.1)
	No	502 (91.1)
Reason for stopped taking ivermectin	Absent in house	30 (68.2)
	Fear of side effect	14 (31.8)
Perceived importance of CDTI	Important	513 (94.0)
	Not important	33 (6.0)

Bivariate analysis

Binary logistic regression was employed for each individual variable to select candidate variables for multivariable logistic regression. From variables under socio-demographic age, sex, length of stay, marital status, educational status, occupation and family size were significant in bivariate logistic regression and selected as candidate for multivariable logistic regression (Table 4).Additionally, knowledge and attitude about CDTI were selected as candidates for multivariable logistic regression analysis.

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Table 4: Bivariate logistic regression of CDTI compliance versus socio demographic of the respondents Yeki woreda, Sheka Zone, south Ethiopia 2018 (n=546)

Variable	Categories	Compliance		COR (95% CI)	p-value
		Yes=422(%)	No=124 (%)		
Age in years	≤35	105(24.8)	103(83)	1	
	>35	317(74.2)	21(17)	14.8(8.8-24.8)	0.001*
Sex	male	265(62.8)	86(69.4)	1	
	female	157(37.2)	38(31.6)	1.3(0.8-2)	0.178*
Length of stay	<10 years	71(16.8)	74(60.6)	1	
	≥10 years	351(83.2)	50(39.4)	7.3 (4.7-11.4)	0.01*
Religion	Orthodox	188(44.5)	63(50.8)	1	
	Muslim	135(32)	26(21)	1.7(1-2.8)	0.32
	Protestant	99(23.5)	35(28.2)	0.95(0.6-1.5)	0.86
Marital status	Currently married	382(90.5)	79(63.7)	5.4(3.3-8.8)	0.01*
	Not in marriage	40(9.5)	45(36.3)	1	
Ethnicity	Shekacho	89(21)	18(14.5)	1	
	Kafecho	102(24.2)	30(24.2)	0.68 (0.36-1.3)	0.26
	Amhara	133(31.5)	41(33.0)	0.65(0.35-1.2)	0.37
	Oromo	43(10.2)	11(8.8)	0.8(0.34-1.8)	0.58
	shekoo	16(3.8)	3(2.4)	1.0(0.34-1.8)	0.58
	Mezhenger	14(3.3)	8(6.4)	0.35(0.13-0.96)	0.91
	Benchi	10(2.4)	2(1.6)	1.0(0.02-1.58)	0.71
	Tigre	6(1.4)	2(1.6)	0.6(0.12-3.3)	0.63
	other	15(2.8)	3(4.8)	1.0(0.13-2.96)	0.31
Educational status	illiterate	250(59.2)	20(16.2)	7.5(4.5-12.6)	0.001*
	literate	172(41.8)	104(83.8)	1	
Occupation	farmer	374(88.6)	24(19.6)	1	
	civil servant	23(5.5)	44(36.2)	0.034 (0.017-0.064)	0.001*
	merchant	25(5.9)	56(45.2)	0.03 (0.015-0.05)	0.001*
Family size	1-4	164(38.8)	101(81.4)	0.16(0.04-0.24)	0.01*
	5-8	154(36.5)	16(13.0)	0.6(0.26-1.6)	0.34
	9+	104(24.7)	7(5.6)	1	

Individual, disease and Program related factors

There are 12 variables which include knowing the name of vector, mode of transmission, correct method of prevention, symptom of diseases, perceiving disease serious, perceiving risk of infection, believed onchocerciasis common in their village, knowing at least one CDD person in village, participation in recruitment of CDD, believe that treatment eliminate the disease and importance of CDTI were selected as candidates for multivariable logistic regression analysis (Table 5)

Table 5: Disease, individual and program related factors affecting compliance with CDTI among study participants, Yeki woreda, Sheka Zone, south Ethiopia (n=546)

Variable	Response	compliance		COR 95% CI	p-value
		Yes=422(%)	No=124(%)		
Heard about onchocerciasis	Yes	408(96.7)	117(94.4)	1.7(0.68-4.4)	0 .24
	No	14(3.3)	7(5.6)	1	
Named of the vector of onchocerciasis	Correct	299(70.8)	56(45.2)	2.9(1.9-4.4)	0.00 1*
	Incorrect	123(29.2)	68(54.8)	1	
Identified mode of transmission	Correct	281(66.6)	46(37.1)	3.4(2.2-5.2)	0.001*
	Incorrect	141(33.4)	78(62.9)	1	
Identified symptoms (at least one)	Yes	400(94.7)	106(85.5)	3(1.6-5.9)	0.002*
	No	22(5.3)	18(14.5)	1	
Perceiving seriousness of onchocerciasis	Yes	365(86)	38(30)	14.5(9-23)	0.001*
	No	57(14)	86(70)	1	
Risk perception of infection	High risk	327(77)	25(19.7)	13.6(8.4-22)	0.001
	Low risk	95(23)	99(80.3)	1	
Onchocerciasis common in you village	Yes	340(80)	30(24.2)	12.9(8-20)	0.001*
	No	82(20)	94(75.8)	1	
know at least one CDD in you village	Yes	418(99)	116(93.7)	7.2(2-24.3)	0.002*
	No	4(1)	8(6.3)	1	
Participation in recruitment of CDD	Yes	108(25.6)	9(7.0)	4.4(2.1-8.7)	0.001*
	No	314(74.4)	115(93)	1	
performance of CDD	Good	379(90)	77(62.0)	5.4(3.3-8.7)	0.001*
	Poor	43(10)	47(38.0)	1	
Perceive onchocerciasis elimination	Yes	377(89.3)	81(65.3)	4.4(2.7-7.2)	0.01*
	No	45(9.7)	43(34.7)	1	
Perceived Importance of CDTI	Important	412(97.6)	101(81.3)	9.4(4.3-20)	0.001*
	Not important	10(2.4)	23(19.7)	1	

Multivariable logistic regression

Six variables were found to have statistically significant association with compliance to CDTI after adjusting for other variables. Age, occupation (civil servant and merchant), risk perception to onchocerciasis, attitude towards CDTI, performance of CDD and knowledge for CDTI were significantly associated with the compliance of CDTI. Respondents with age greater than 35 years old were 3 times more likely to comply with CDTI compared to those whose age was less than or equal to 35 years [AOR:3; 95% CI: 1.4, 6.0]. The respondents who perceived themselves to be at high risk of onchocerciasis infection were 4.6 times more likely to comply with the treatment compared to those who did not [AOR :4.6; 95% CI: 2.3, 9.6].

Sixty one years old community representative explained that: "*we had suffered by onchocerciasis for long period of time in our village after CDTI program started our health problem was solved even though still today we fear of disease due to its health risk; thus, we follow annual treatment and in addition to that Ivermectin too important to treat internal parasites."*

In addition, respondents who perceived that CDDs are doing their work good were 2.7 times more likely to comply with CDTI compared to their counter parts [AOR: 2.7; 95% CI: 1.2, 6.7].

Similarly, individuals who had favorable attitude towards CDTI were 2.5 times more likely to comply with the treatment compared to those who had unfavorable attitude towards CDTI [AOR: 2.5; 95% CI: 1, 6.0]. Respondent who had knowledgeable of CDTI were 3.8 times more likely to comply with the treatment compared to those who had not knowledgeable to CDTI [AOR: 3.8; 95% CI: 1.2, 12.2]. Similarly, the Qualitative findings substantiate the need for the knowledge of the importance of CDTI to increase compliance of the program. For instance, thirty fours years old male from woreda office (neglected tropical disease officer) said that "r*eason for compliance was community has good knowledge about CDTI and positive attitude towards the programs also we have had a lot of advocacy, health education and distributed leaflet.*"

Additionally Civil servant were 90% less likely compliant than farmer [AOR: 0.1; 95 CI: 0.04-0.25] and merchant were 91% less likely compliant than farmer [AOR: 0.09; 95 CI: 0.03-0.19] (Table 6).

Table 6: Independent predictors of compliance with Community Directed Treatment with Ivermectin, Yeki, South-West Ethiopia, 2018

Variables	Categories	Compliance		COR 95%CI	AOR 95%CI
		Yes=422(%)	No=124 (%)		
Age in years	≤35	108(25.06)	106(83.6)	1	
	>35	323(74.94)	21(16.4)	15(9-25.3)	**3 (1.4- 6.0)**
Occupation	farmer	374(88.6)	24(19.6)	1	
	civil servant	23(5.5)	44(36.2)	0.034 (0.017-0.064)	**0.1(0.04-0.25)**
	merchant	25(5.9)	56(45.2)	0.03 (0.015-0.05)	**0.09(0.03-0.19)**
Risk of infection	High risk	327(77)	25(19.7)	13.6(8.4-22)	**4.6(2.3-9.6)**
	Low risk	95(23)	99(80.3)	1	
knowledge for CDTI	knowledgeable	413(97.8)	84(67.7)	21.8(10.2-46.7)	**3.8(1.2-12.2)**
	not knowledgeable	9 (2.2)	40(32.3)	1	
Attitude towards CDTI	favorable	398(94.3)	64(51.6)	15.5(9.0-26.7)	**2.5(1-6.0)**
	un favorable	24(5.7)	60(49.4)	1	
Recruitment of CDD	Yes	108(25.6)	9(7.0)	4.4(2.1-8.7)	2.4(0.9-6.4)
	No	314(74.4)	115(93)	1	
performance of CDD	Good	379(90)	77(62.0)	5.4(3.3-8.7)	**2.7(1.2-6.7)**
	Poor	43(10)	47(38.0)	1	
Perceiving seriousness	Yes	365(86)	38(30)	14.5(9-23)	2.5(1.2-5.0)
	No	57(14)	86(70)	1	

6 Discussion

This study has to shown magnitude and predictors of compliance with compliance to annual CDTI Treatment with Ivermectin for Onchocerciasis Elimination in the study setting. The annual ivermectin treatment compliance rate in the present study is 77.30 % among the study participants. This finding is somewhat less than the findings of the studies conducted in Kabo (14), Kaffa zone (15), Uganda (24), which show that treatment compliance rate was 80.8%, 79.8%, 82.2% respectively. But it is higher than a finding study conducted in Nigeria (25), which was 55.4% were compliant to CDTI. The treatment compliance is low when it compared with elimination point of compliance, there is a need to attain and maintain a high coverage of CDTI; at least 90%, for elimination of onchocerciasis as a public health problem (8, (9). The possible reason for difference in magnitude of compliance might be sample size difference, prevalence of disease and length of CDTI year difference.

Among the socio-demographic variables, age groups >35 years had a positive association with CDTI compliance and were higher treatment compliance compared ≤35years old. The finding is consistent with a study conducted in Kabo (14), Bebeka coffee plantation farm south-west Ethiopia (17) and Kaffa Zone (15).The reason may be attributed to the fact that younger individuals were relatively highly mobile and likely to travel outside the village for work and other opportunities or they could be reluctant and miss the annual treatment (17).

The strongest factor associated with compliance to CDTI in this study was personal risk of onchocerciasis infection. Individuals who perceive that they are at risk of getting the infection more likely to comply with CDTI compared to those who consider themselves as free from risk of the infection. The finding is consistent with a study conducted in Kabo (14), Bebeka coffee plantation farm (17), Cameroon and Nigeria (25).

The reason may be attributed to the fact that the likelihood of an action treatment intake would increase if the perceived threat of the disease is high. On the other hand, qualitative study ;sixty one years old community representative said that *"we had suffered by onchocerciasis for long years in our village after CDTI program started our health problem was solved even though still today we fear of disease due to these we follow annual treatment"*

Other strongest factor associated with compliance to CDTI in this study Knowledge. Individuals who were knowledgeable about CDTI were more likely to comply with CDTI compared to those who were not knowledgeable. The finding is similar with a study conducted in Bebeka coffee farm south-west Ethiopia (17). This may be due to the fact that knowledgeable person have high level of understanding about the advantage and disadvantage of compliance to CDTI. Therefore they choice were being compliant rather than missing.

Our findings also showed that perceived good performance of CDDs by the population is associated with increased compliance. This result is similar to what other investigators have found out elsewhere Kabo coffee farm(14),Bebeka coffee farm (17), Uganda (31). Good performance of CDD might have resulted for acceptability by the community and resulted for high compliance.

The strongest factor associated with compliance to CDTI in this study attitude towards CDTI. Individuals who favorable attitude had more likely to comply with CDTI compared to those who had unfavorable attitude. The finding is similar with a study conducted in Bebeka coffee farm (17) and Cameroon (26). In qualitative result similar with quantitative result most of the informants indicated that community have favorable attitude to CDTI factor that contribute for treatment compliance.

The reason may be attributed to the fact that the likelihood of an action treatment intake would increase if individual had favorable attitude towards CDTI which lead to compliance rather than no-compliant.

Being Civil servant and merchant were negatively associated with compliance to CDTI. Individual whose occupation was civil servant and merchant were less likely compliant when compared with farmer. Being Civil servant and merchant were not statically significant in study conducted elsewhere these differences might be sample size and study design difference. This may be due to the fact that individuals were relatively highly mobile and likely to travel outside the village for work and other hand opportunities and the life style of farmers, civil servant and merchant is different degree of risk of farmer is high when compared with those other might result high compliant.

7 Conclusion

The annual treatment compliance to community directed treatment with Ivermectin (CDTI) in the study area was low. Members of the community who had adequate knowledge, favorable attitude to CDTI, perceived performance of CDD good, old adult (age >35 years) and perceived risk of being infection were highly compliant to CDTI. Those segment population particularly merchant and civil servant were less compliant with the annual treatment. So those individuals who was non compliant with the annual mass treatment, contributes to the continuity for disease transmission.

8 Recommendations

The woreda health officers, health center health professionals and health extension workers should give health education focused on epidemiological information in order to increase risk perception about Onchocerciasis infection, to overcome the gaps of knowledge and attitude of CDTI, and importance of complying with Ivermectin, the consequences of non-compliance with treatment.

The distribution should last long enough, at each treatment round, in order to reach less complier more mobile community (age≤35, merchant and civil servant) village members.

Zonal Health Department, Carter center and Woreda health office should motivation and continual support to improve CDD's performance.

Assurance of principal investigator

The under signed agrees to accept responsibility for the scientific ethical and technical conduct of the research project and for provision of required progress reports as per terms and conditions of the Institute of Health Science.

Name of the student: _____

Date._____ Signature _____

APPROVAL OF THE FIRST ADVISOR

Name of the first advisor: _____

Date._____ Signature _____

APPROVAL OF THE SECOND ADVISOR

Name of the second advisor: _____

Date._____ Signature _____

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Annex 1: Questionnaire English version

Jimma University Institute of Health Department of Epidemiology

Questionnaire for Community Based Survey On magnitude And Predictors Of Compliance With Community Directed Treatment With Ivermectin for Onchocerciasis Elimination in Yeki Woreda Sheka Zone,SNNPR State, South West Ethiopia.

Consent Form: Hello! My name is _____ I am working as a data collector temporarily for post graduate student of Jimma University Institute of Health. The main purpose of this study is to assess magnitude and Predictors of compliance with annual community-directed treatment with Ivermectin for onchocerciasis elimination. Onchocerciasis is one of tropical neglected disease. It is public health and socio-economic problem of poorest population of developing country including study population the aim of this study will be to determine the rate of compliance with CDTI and to asses factors influencing compliance with CDTI in Yeki Woreda, which will be contribute to the success of the on-going program.

So you are kindly requested to be included in the study, which will have importance in improving onchocerciasis elimination plan. The interview will take about 20-30 minutes. No information concerning you, as individual will be passed to another individual without your agreement. Your participation is voluntary and you have the right to not participate fully or partially. Only honest answers would contribute to improvement of health planning. The study has approval from Jimma University. "Can we start now?" _____

- ✓ If yes, continue interviewing
- ✓ If No, thank and stop interviewing.

- Name of the interviewer _____Sign. _____ date _____
- Date of interview _____
- Name of the supervisor _____. Sign _____ Date_____

PART ONE: SOCIO- DEMOGRAPHIC CARACTERSTICS OF RESPONDANTS

S.NO	Questions	Alternative /choice of response	Code	Skip
101	What is your age completed these in years?	_____		
102	Sex	1.Male 2.Female		
103	For how long have you lived in this kebele?	_____		
104	What is your religion?	1. Orthodox Christian 2. Muslim 3. Protestant 4. Catholic. 5. Other, specify-----		
105	What is your marital status currently?	1. Currently married 2. Not in marriage		
106	What is your ethnicity?	1. Shekacho 2. Kafecho 3. Amhara 4. Oromo 5. Mezhenger 6. shekoo 7. Other _____		
107	What is you grade completed?	_____		
108	What is your Occupation?	1 Farmer 2 Civil servant 3 Merchant 4 student 5 Other (specify		
109	Total family size	_____		

Part two; Knowledge for Community Directed Treatment with Ivermectin and Ivermectin

S.no	Questions	Alternative /choice of response	Code	skip
201	Do you now CDTI program in your village?	1. Yes 2. No		If "No" skip to Q303
202	If answer is yes for question number 301 what are actives done?	1. Ivermectin distribution 2. Vitamin A supplementation 3. I do not have information		
203	Who were not eligible for Ivermectin distribution?	1. Pregnant and lactating younger than one week. 2. Adult 3. Adolescent 4. I do not have information		
204	What is name of drug used for onchocerciasis treatment?	1. Ivermectin 2. Vitamin A 3. I do not have information		
205	Who is responsible body for drug distribution in community?	1. HEW 2. CDD 3. Woreda Health office 4. I do not have information		
206	How do CDDs determine dose of drug in you village?	1. By measuring height 2. By measuring weight 3. I do not have information		
207	Who is responsible body for CDD recruitment?	1. HEW 2. Kebele leader 3. Community 4. I do not have information		
208	By how many month intervals does ivermectin distribution take place current in you village?	1. Every three month interval 2. Every six month interval 3. I do not have information		
209	What is benefit of taking Ivermectin?	1. To treat onchocerciasis 2. To treat malaria 3. I do not have information		
210	What is color of Ivermectin tablet?	1. White 1. Red 2. I do not have information		
211	How you explain ivermectin in terms of payment?	1. It is free 2. It is Paid 3. I do not have information		

PART three: Attitude to Community Directed Treatment with Ivermectin

S no	Questions	Strongly disagree (1)	Disagree(2)	Neutral (3)	Agree (4)	Strongly agree (5)
301	CDTI is important for elimination onchocerciasis					
302	Measuring height is the best way of dose determination					
303	Onchocerciasis drug given by the CDD is safe and useful					
304	The drug in the campaign given based on interest of community					
305	The drug given in the campaign reaches to all people					
306	The drug given through CDDs is the correct strategy					
307	The Drug given in the campaign distributed on appropriate time for all the villagers					
308	The drug given in mass					

	drug treatment past years prevented me from disease					
309	The drug is much useful and I care if not given in the future					
310	I want the drug because of its effective					
311	I know now about the disease cause, transmission and prevention because of the CDTI programme					

PART four: Disease related factors

S.no	Questions	Alternative /choice of response	Code	skip
401	Have you ever heard about Onchocerciasis?	1. Yes 2. No		If "No" skip to Q 204
402	What is name of the vector that transmits onchocerciasis?	1. Filarial worm 2. Black (river) fly 3. Mosquito 4. I do not known		
403	What is the mode of transmission of onchocerciasis?	1. Mosquito bite 2. Black fly bite 3. Sexual contact 4. Sharing clothes 5. contact with infected person 6. I do not have information		
404	Which one correct method used for prevent Onchocerciasis?	1. Taking ivermectin 2. Using bed net 3. Killing black fly 4. Wearing protective clothes 5. Environmental sanitation 6. Keeping Personal hygiene 7. No idea of what to do		
405	Which one is symptom of Onchocerciasis?	1. Itching 2. Diarrhea 3. I do not known		
406	Onchocerciasis is serious disease?	1. yes 2. No		
407	Is Onchocerciasis common in this village?	1. yes 2. No		
408	What is your risk of infection with onchocerciasis?	1. High risk 2. Low risk		

Part five Program related Factors

S.no	Questions	Alternative /choice of response	code	skip
501	Did you have information about Ivermectin distribution in village?	1. Yes 2. No		
502	Did you receive Ivermectin in the Recent campaign (this year)?	1. Yes 2. No		If "No" skip to Q 505
503	If Yes, did you swallowed in front of the CDD?	1. Yes 2. No		
504	From where did you collect Ivermectin?	1. CDD came to my house 2. I went to CDD's House 3. From the community centre		
505	If no, for question 502 What was the reason?	1. Absent in the house 2. Sides effects ivermectin 3. Not being informed 4. CDD didn't come to house 5. Don't believe in free things 6. We do not have a CDD 7. Drug not effective 8. Other, Specify--------		
506	Do you know at least one CDD person in you village?	1. Yes 2. No		
507	Do you aware of how CDD's were recruited?	1. Yes 2. No		
508	How did you evaluate the performance of CDDs?	1. Good 2. Poor		
509	Do you think Ivermectin treatments can Elimination onchocerciasis?	1. Yes 2. No		
510	Did you know someone who had been stopped taking ivermectin?	1. Yes 2. No		If "No" skip to Q 512
511	If Yes, What was the reason?	1. Absent in the house 2. Sides effects ivermectin 3. Not being informed 4. CDD didn't come to house 5. Don't believe in free things 6. We do not have a CDD 7. Drug not effective 8. Other, Specify--------		
512	Do you think CDTI is important?	1. Important 2. Not important		

Annex 3: Questionnaire Amharic Version

ጂማ ዩንቨርሲቲ ጤና ኢንስትቲዩት ኢፒዲሞሎጂ ትምህርት ክፍል

የሚስጥር አጠባበቅ ስምምነት፡፡

*ጤና ይስጥልኝ እኔ----------አባላለሁ፡ኖ ምነ ራዉ ለጅማ ዩኒቨርስቲ ጤና ሳይንስ እንስትትዩት_*

ድህረ-ምረቃ ተማሪ ለሆነው እንዴ ጊዜያዊ መረጃ(ዳታ) ሰብሳቢ በመሆን ነው፡፡

የጥናቱ ዓላማ፡- *የ ህዝብ መራሽ የአንኮ መድሐኒት ዕደላቁርኝት ስፋትና መንሰኤዎች ለማጥናት ነው ;; ለዚሁ ዓላማ የእርስዎን ማህበራዊና ስነ ህዝባዊ መረጃ ፣ የአንኮ በሽታ ዕውቀት፣ ዝንባለ እና ለህዝብ መራሹ መድሀኒት ዕደላ እውቀትና ግዝዘቤ ዙሪያ መረጃዎችን እንሰበስባለን፡፡ በመሆኑም የሚሰጡን መረጃ መንግስትና ሌሎች ጉዳዩ የሚመለከታቸዉ አካላት ለአንኮ በሽታ ለማጥፋት ለሚደረገው ጥረት የመፍትሄ መንገዶችን እንዲቀይሱ ይረዳቸዋል፡፡ በጥናቱ ላይ የሚሳተፉት በፍላጎትዎ ሲሆን በሙሉም ሆኔ በከፊል ያለመሳተፍ መብትዎ የተጠበቀ ነዉ፡፡ በሚንሰበስባቸዉ መረጃዎች ላይ ስምዎት ስለማይመዘገብና ሌሎችም መለያ መረጃዎች በሚስጥር ተጠብቀዉ ከጥናቱ በሀኋላ ስለሚቃጠሉ ምስጥርዎት እንደማይባክን እርግጠኛ ይሁኑ፡፡ ቃለ-መጠይቁ ለ20-30 ደቂቃ ያህል የሚወስድ ሲሆን በማንኛዉም ጊዜ ማቆም ይችላሉ፡፡ እስካሁን በተነጋገርንባቸዉ ጉዳዮች ላይ ያልገባዎትና ግልፅ ያልሆነ ነገር ካለ መጠየቅ ይችላሉ፡፡ አሁን በጥናቱ ላይ ለመሳተፍ ተስማምተዋል?*

አዎ---------- አይደለም---------- ፈቃደኛ ካለሆኑ ዉሳኔያቸዉን አክብረህ(ሽ) ፊርማ ----------ቀን ------

ቃለ መጠይቁን ያደረገዉ ስም---------- ፊርማ-------- ቀን----------

ክፍል አንድ ፡.ማህበራዊና ስነ-ህዝባዊ መረጃዎች

ተ.ቁ	ጥያቄዎች	አማራጭ መልሶች	መለያ	ወደ
101	*ዕድሜዎ ስንት ነዉ?*	_____		
102	*ፆታ*	*ነ. ወንድ* *2. ሴት*		
103	ምን ያህል ጊዜ እዝህ ቀበሌ ኖረዎል?	_____ _		
104	*ሃይማኖትዎ ምንድነዉ?*	*1. ኦርቶዶስ ተዋህዶ* *2. ሙስልም* *3. ፕሮተስታንት* *4. ካቶሊክ* *5. ሌላ ጥቀስ ---------*		
105	*የትዳር ሁኔታ*	*1. በትዳር አንድ ላይ ያሉ* *2. አሁን ትዳር ላይ ያልሆነ*		
106	*ብሄርዎ ምንድነ ው*	*1. ሸካቾ* *2. ካፋቾ* *3. አማራ* *4. ኦሮሞ* *5. መዠንግር* *6. ሸኮ* *7. ሌላ ---------*		
107	*እስከ ስንተኛ ክፍል ተምሯል?*	----------		
108	*ሰራዎት ምንድነው?*	*1. አርሶ አደር* *2. የመንግስት ሰራተኛ* *3. ነጋዴ* *4. ተማሪ* *5. ሌላ ---------*		
109	*አጠቃላይ የቤተሰብ ብዛት ?*	----------		

ክፍል **ሁለት** ፡. ለማህበረሰብ መራሽ አንኮ መድሀኒት ዕደላና ለኢይቨሪን መክትን ያለው ዕውቀት

ተ.ቁ	ጥያቀዎች	አማራጭ መልሶች	መለያ	ወደ
201	የማሕበረሰብ መራሽ የአንኮ መድሀኒት እደላ መንደረሮት መኖሩንያውቃሉ?	1. አዎ 2. አይደለም		አይደለም ከሆነ ወደ ጥያቄ 303 ይለፉ::
202	ምላሾት ፤ልጥቄ 301 አዎ ከሆነ ምን ዓይነት ተግባራት ይፈጸማሉ?	1. ኢይቨሪ መክትን ዕደላ 2. ቫይታሚን ኤ ዕደላ 3. መረጃ የለኝም		
203	ለኢይቨሪመክትን ብቁ ያልሆኑት እነማናቸው?	1. ነፍሰ ጡርና ዕድሜያቸው ከ1 ዛምንት በታች የሆኑ ሕጻናት የሚያተቡ እናቶች 2. አዋቂ 3. ጎረምሳ 4. መረጃ የለኝም		
204	የአንኮ በሽታ የሚያክም መድሀኒት ስሙ ምን ይባላል?	1. ኢይቨሪመክትን 2. ቫይታሚን ኤ 3. መረጃው ለኝም		
205	በማሕበረሰብ መራሽ መድሐኒት ዕደላ ኃላፊነቱ የማንው?	1. ጤና ኤክስተሽን 2. የመንደር መድሐኒት አዳዮች(CDD) 3. ወረዳ ጤናጽ/ቤት ባለሙያዎች 4. መረጃ የለኝም		
206	መድሀኒት መጠን ምወሰነው በምን ዓይነት ዜዴ ነው?	1. ቁሜት በመለካት 2. ክብደትበመለካት 3. መረጃ የለኝም		
207	የመንደር መድሀኒት አዳዮች መምረጥ የማን ኃላፊነት ነው?	1. የጤና ኤክስተሽን ባለሙያ 2. የቀበሌ አስተዳዳሪ 3. የሕብረተሰቡ 4. መረጃ የለኝም		
208	የአንኮ መድኃኒት ስርጭት በምን ያህል ጊዜ ልዩነት ነው የምሰራጨው?	1. በየ3 ወር ልዩነት 2. በ6 ወር ልዩነት 3. በ12 ወር ልዩነት 4. መረጃ የለኝም		
209	የአንኮ መድሐኒት መውሰድ ጥቅሙ ምንድነው?	1. አንኮ በሽታን ያክማል 2. ወባ በሽታን ያክማል 3. መረጃ የለኝም		
210	አይቨሪሜክትን መልኩ እንደት ያለ ነው?	1. ነጭ 2. ቀይ 3. አላውቅም		
211	የመድሐኒቱ ኪፍያ ስንት ነው?	1. ነፃ 2. ኪፍያ አለው 3. መረጃ የለኝም		

ክፍል ሦስት ፡. ለማሕበረሰብ መራሽ የአንኮ ሕክምና ዝንባለ

ተ.ቁ	ጥያቀዎች	በጣም አልስማም(1)	አልስማም(2)	መሃል ቤት(3)	እስማማለሁ(4)	በጣም እስማማለሁ(5)
301	ማሕበረሰብ መራሽ የአንኮ ሕክም በሽታንየአንኮ ማጥፋት ይቻላል፡፡					
302	ቁሜት መለካት በትክክል መድሐኒቱን መተን ለመመጠን ይጠቅማል፡፡					
303	የአንኮ መድሐኒት በCDD መሰራጨቱ አስተማማኝና ጠቃሚ ነው፡፡					
304	በዘመቻ ጊዜ የተሰራጨው መድሐኒት ለሁሉምሕብረተሰብ ተዳሪሷል፡፡					
305	መድሐኒት በCDD መሰራጨቱ ትክክለኛ ዜዴ ነው፡፡					
306	በዘመጫ ጊዜ የተሰራጨው መድሀኒት በጊዜና በትክክል ተዳርሷል፡፡					
307	ከዚህ በፊት የተሰራጨው መድሐኒት እኔን ከበሽታ ጠብቆኛል፡፡					
308	መድሀኒቱ ብዙም ጠቃሚ ስላልሆነ ባይሰጥም ግድ ይለኛል፡፡					
309	መድሀኒቱን መውሰድ አላስፈላጊ ጎንዮሻዊ ጉዳት አለው፡፡					
310	አሁን ባለው ስለበሽታ መተላለፊያ መንገድና መከላከያ አውቃለሁኝ፡፡ምክንያቱም ህዝብ መራሽ ተግባር በመኖሩ፡፡					
311	ዘመቻው ጊዜ መድሐኒቱ የምሰጠው በማስማማት ነው፡፡					

ክፍል አራት፡. በሽታ ጋር የተገናኙ ሁነታዎች

ተ.ቁ	ጥያቀዎች	አማራጭ መልሶች	መለያ	ወደ
401	ስለአንኮ በሽታ እስከ አሁን ሰምተው ያውቃሉ?	1. አዎ 2. አይደለም		አይደልም ከሆነ ወደ ጥያቄ 204 ይለፉ
402	የአንኮ በሽታ አስተላላፊ ትንኝ ምን ትባላለች?	1. ጥቁር ዝንብ 2. ወባ ትንኝ 3. አላውቅም		
403	አንኮ በሽታ መተላለፊያ መንገድ ምንድነው?	1. በወባ ትንኝ ንክሻ 2. በጥቁር ዝንብ ንክሻ 3. በፆታዊ ግንኙነት 4. ልብስ በመጋራት 5. መረጃ የለኝም::		
404	የአንኮ በሽታ ለመከላከል ምን ያደርጋሉ?	1. አይቨሪመክትን መውሰድ 2. አጎበር መተቀም 3. ጥቁር ዝንብ መግደል 4. መከላከያ ልብስ መልበስ 5. አካባቢ ንጽህና መጠበቅ 6. ምንም ሳብ ለኝም		
405	የአንኮ በሽታ ምልክት ምንድነው?	1. ማሳከክ 2. ተቅማጥ 3. አላውቅም::		
406	አንኮ አደገኛ በሽታ ነው?	1. አዎ 2. አይደለም		
407	የአንኮሰርኪያሲስ በሽታ በአካባቢያችሁ በስፋት ይታውካል?	1. አዎ 2. አይደለም		
408	ለበሽታ የመጋለጥ እድልዎ ምንያህል ነው?	1. ከፍተኛ 2. ዝቅተኛ		

ክፍል አምስት ፡.ፕሮግራሙ ጋር የተገናኙ ሁነታዎች

ተ.ቁ	ጥያቄዎች	አማራጭ መልሶች	መለያ	ወደ
501	የአይቨሪ ሜክትን ዕደላ በማሕበረሰቡ ውስጥ ግንዛቤ አለ?	1. አዎ 2. አይደለም		
502	በቅርብ ጊዜ በተደረገው መድሐኒት ዕደላ አይቨሪሜክትን ወስደሃል?	1. አዎ 2. አይደለም		
503	ከወሰድክ በመድሐኒት አዳች ፊት ውጠሃል?	1. አዎ 2. አይደለም		
504	መድሐኒቱን ከየት ነው የወሰድከው?	1. CDD ቤቴ መጥቶ 2. CDD ቤት ሂጀ 3. አቅራቢያ ባለው አማካይ ቦታ		
505	ለጥያቄ 502 አይደለም ከሆነ ምክንያቱ ምንድ ነው?	1. ቤት አልነበርኩም 2. የመድሐኒቱ ጎንዮሽ ጉዳት 3. መረጃ ስለለኝ 4. CDD ቤት ስላልመጣ 5. በነፃ ነገር ስለማላምን 6. CDD በመንደረ ስለለ 7. መድሐኒቱ ስለማይጠቅም 8. ለላ ካ ጥቀስ ----------		
506	በመንደርህ CDD ታውቃለህ?	1. አዎ 2. አይደለም		
507	የ CDD መረጣ መረጃ አሎት?	1. አዎ 2. አይደለም		
508	የ CDD አፈፃፀም እንደት ይመዝናሉ?	1. ጥሩ 2. መጥፎ		
509	የአይቨሪሜክትን ሕክምና የአንኮ በሽታን ያጠፋል ብሎ ያስባሉ?	1. አዎ 2. አይደለም		
510	መድሐኒት መውሰድ ያቆመ ሰው ያውቃሉ?	1. አዎ 2. አይደልም		አይደለም ከሆነ ወደ 512 እለፍ
511	ምላሾት አዎ ከሆነ ምክንያቱ ምንድ ነው?	1. ቤት አልነበረም 2. የመድሐኒቱ ጎንዮሽ ጉዳት 3. መረጃ ስለለኝ 4. CDD ቤት ስላልመጣ 5. በነፃ ነገር ስለማላምን 6. CDD በመንደረ ስለለ 7. መድሐኒቱ ስለማይጠቅም 8. ለላ ካ ጥቀስ ----------		
512	ሕብረተሰብ መራሽ መድሐኒት ምንያህል ጠቃሚ ነው?	1. ጠቃሚ ነው 2. ምንም አይጠቅምም		

Annex 2: In depth Interview guide

Guide questions for in-depth interview

1. How can you explain current status of onchocerciasis in Yeki Woreda?
2. How can you explain Perception of community towards Community Directed Treatment with Ivermectin (CDTI)?
3. How can you explain Community Drug Distributor (CDD's) recruitment and performance?
4. How can you explain Communities' perception on the Ivermectin use?
5. What are factors that help individuals to comply with the treatment and reasons for non compliance?

Thank you very much for participating in the Interview!