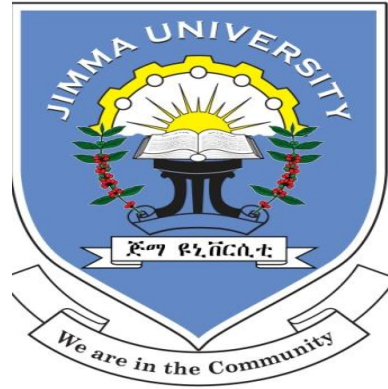


**Dracunculiasis disease Prevention Behaviors and Associated Factors
among Households in Gog District, Gambella Region, Southwestern
Ethiopia: Using Health Belief Model, 2014**



By

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A Research Thesis Submitted to the Department of Health Education and Behavioral Sciences, College of Public Health and Medical Sciences, Jimma University; in Partial Fulfillment for the Requirements of Degree of Master of Public Health (MPH) in Health Education and Health Promotion

June, 2014

Jimma, Ethiopia

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June, 2014

Jimma, Ethiopia

Abstract

Back ground: Dracunculiasis is a water-borne parasitic infection caused by *Dracunculus medinensis* and limited to remote, rural villages in Chad, Ethiopia, Mali and South Sudan of that do not have access to safe drinking water. Ethiopia accounts 7 cases from the total Dracunculiasis disease occurrences worldwide in 2013.

Objectives: The objective of this study is to assess Dracunculiasis disease prevention behaviors and associated factors among households in Gog District, Gambella Region, Southwestern Ethiopia, 2014.

Methods: A community based cross-sectional study is conducted among households who had been living in Gog district, Gambella region. The data was collected by using an interviewer's administered questionnaire from a total of 442 household head. The data were collected using health belief model items, knowledge and socio demographic questionnaire and entered by using EPI data version 3.1 and analyzed by using statistical package for social science version 16. The reliability of instruments was checked by Cronbach alpha. Data analysis statistical tools, included descriptive statistics, bivariate and multiple logistic regression analysis was conducted to identify factors significantly associated with dracunculiasis preventive behaviors.

Result: A total of 429 respondents with a response rate of 97% were participated in the study. 145(33.8%) of households were engaged in dracunculiasis preventive behavior. 267(62.2%) of the respondent were not filtered their drinking water in past two weeks. Socio demographic variables, marital status, religion, educational level, occupational status, income level and from health belief model constructs perceived threat and perceived net benefits were significant predictor of households dracunculiasis preventive behaviors, whereas self-efficacy, cues to action and knowledge was no significant relation with the preventive behaviors. For one score increase in perceived threat of disease and perceived net benefits of preventive behavior, the log odds that the households will have to engage in preventive behavior will increased by 0.056 and 0.036 with (AOR=1.06, 95% CI: 1.03, 1.09) and (AOR=1.04, 95% CI:1.003,1.07) respectively.

Conclusion and recommendation: Dracunculiasis disease preventive behavior of the households was very low. Marital status, religion, educational status, work condition, household's income status, Perceived threat and perceived net benefits have positive effects on Dracunculiasis disease preventive behaviors. Different partners, zonal woreda administrative should avail safe water supply for the community and the eradication program should be design to focus households.

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Table of content

Abstract	iii
Acknowledgement	iv
Table of content	v
List of figure	viii
List of table	ix
Acronyms and Abbreviations	x
Chapter one: Introduction	1
Back ground	1
Statement of the problem	2
Chapter two: Literature reviews.....	5
Dracunculiasis disease preventive behaviors	5
Perception of dracunculiasis and preventive behavior	5
Filtration of drinking water	7
Rational to use Health Belief Model	8
Conceptual frame work	9
Significance of the study.....	10
Chapter three: Objectives.....	11
General objectives	11
Specific objectives.....	11
Chapter four: Methods and materials.....	12
Study area and period	12
Study design	12
Population.....	12
Sources population	12
Study population.....	12
Study unit.....	12

Inclusion criteria	12
Exclusion Criteria	12
Sample size and Sampling technique /procedure	13
Sample size determination.....	13
Sampling technique/ procedure	14
Variables.....	16
Dependent variable	16
Independent variable.....	16
Operational and definition of terms	16
Instrument and Data collection procedure	17
Data collection tool.....	17
Data collection method.....	19
Pretest	19
Data processing, analysis and presentation	20
Data quality management.....	20
Ethical consideration	21
Dissemination plan.....	21
Chapter five: Result	22
Socio demographic characteristics of the study subject.....	22
Knowledge about Dracunculiasis disease	24
Dracunculiasis disease preventive behaviour.....	26
Perception towards dracunculiasis disease and preventive behavior	28
Association between socio demographic characteristics and Dracunculiasis disease preventive behavior	33
The association of health belief model components and Dracunculiasis disease preventive behaviors.	36
Factors associated with Dracunculiasis disease preventive behaviors.....	36

Chapter six: Discussion.....	40
Chapter seven: Strength and Limitation of the study.....	43
Strength of the study	43
Limitation of the study	43
Chapter eight: Conclusion and Recommendation.....	44
Conclusion.....	44
Recommendation.....	45
Reference	46
Annex 1: Verbal Consent.....	49
Annex: 2 English Questionnaires.....	50
Annex: 3 Anguwa Questionnaires	58

List of figure

FIGURE 1: - CONCEPTUAL FRAMEWORK ADOPTED FROM HEALTH BELIEF MODEL TO PREDICT DRACUNCULIASIS DISEASE PREVENTIVE BEHAVIOR. 9

FIGURE 2: THE SCHEMATIC PRESENTATION OF SAMPLE SELECTION PROCEDURE IN GOG DISTRICT. 15

List of table

TABLE 1 SOCIO DEMOGRAPHIC CHARACTERISTICS OF HOUSEHOLDS IN GOG DISTRICT, GAMBELLA REGION, 2014.....	22
TABLE 2 HOUSEHOLD’S KNOWLEDGE ABOUT DRACUNCULIASIS DISEASE IN GOG DISTRICT, GAMBELLA REGION, 2014.....	24
TABLE 3 DRACUNCULIASIS DISEASE PREVENTIVE BEHAVIORS AMONG HOUSEHOLDS IN GOG DISTRICT, GAMBELLA REGION, 2014.....	27
TABLE 4 DRACUNCULIASIS DISEASE PERCEPTION SCORE OF HOUSEHOLDS AT GOG DISTRICT, GAMBELLA REGION, 2014.....	29
TABLE 5 PERCEIVED SUSCEPTIBILITY OF HOUSEHOLDS TOWARDS DRACUNCULIASIS DISEASE IN GOG DISTRICT, GAMBELLA REGION, 2014	30
TABLE 6 PERCEIVED SEVERITY OF HOUSEHOLDS TOWARDS DRACUNCULIASIS DISEASE IN GOG DISTRICT, GAMBELLA REGION, 2014.....	30
TABLE 7 PERCEIVED BENEFITS OF DRACUNCULIASIS DISEASE PREVENTIVE BEHAVIOR OF HOUSEHOLDS IN GOG DISTRICT, GAMBELLA REGION, 2014.	31
TABLE 8 PERCEIVED BARRIERS OF DRACUNCULIASIS DISEASE PREVENTIVE BEHAVIOR OF HOUSEHOLDS IN GOG DISTRICT, GAMBELLA REGION, 2014.	31
TABLE 9 PERCEIVED SELF-EFFICACY OF DRACUNCULIASIS DISEASE PREVENTIVE BEHAVIOR OF HOUSEHOLDS IN GOG DISTRICT, GAMBELLA REGION, 2014	32
TABLE 10 CUES TO ACTION TO DRACUNCULIASIS DISEASE PREVENTIVE BEHAVIORS OF HOUSEHOLDS IN GOG DISTRICT, GAMBELLA REGION, 2014	33
TABLE 11 ASSOCIATION OF SOCIO DEMOGRAPHIC CHARACTERISTICS AND DRACUNCULIASIS DISEASE PREVENTIVE BEHAVIORS OF HOUSEHOLD, AT GOG DISTRICT, GAMBELLA REGION, 2014.....	34
TABLE 12 ASSOCIATION BETWEEN HBM COMPONENTS AND DRACUNCULIASIS DISEASE PREVENTIVE BEHAVIOR OF HOUSEHOLDS AT GOG DISTRICT, GAMBELLA REGION, 2014	36
TABLE 13 FACTORS ASSOCIATED WITH HOUSEHOLD’S DRACUNCULIASIS DISEASE PREVENTIVE BEHAVIORS, GOG DISTRICT, GAMBELLA REGION, 2014.....	38

Acronyms and Abbreviations

CDC	Centers for Disease Control and Prevention
EPHI	Ethiopian Public Health Institution
GRHB	Gambella Regional Health Bureau
GRWAB	Gambella Regional Water Bureau
EGWEP	Ethiopian Guinea Worm eradication program
HBM	Health Belief Model
HHH	Households Head
ICCDE	International Commission for the Certification of Dracunculiasis Eradication
KAP	Knowledge, Attitude and Practice
MOH	Ministry Of Health
NGO	Non-governmental Organization
NTD	Neglected Tropical Disease
SPSS	Statistical Package for Social Science
SNNPR	Southern Nations, Nationalities and Peoples' Region
UNICEF	United Nations Children's Fund
VBVs	Village-based Volunteers
WHO	World Health Organization

Chapter one: Introduction

Back ground

The neglected tropical diseases (NTDs) are a group of 17 or more chronic parasitic diseases and related infections that represent the most common illnesses of the world's poorest people and particularly prevalent in tropical countries(1). Among NTD Dracunculiasis is one of a water-borne parasitic infection caused by *Dracunculus medinensis*. People become infected when they drink water containing tiny crustaceans, called copepods or "water fleas," that act as intermediate hosts of the organism and harbor infective larvae(2). Approximately 1 year after infection from contaminated drinking water, the worm emerges through the skin of the infected person, usually on the lower limb. Pain and secondary bacterial infection can cause temporary or permanent disability that disrupts work and schooling(3).

In drier areas such as the Sahel just below the Sahara desert, the "dracunculiasis season" coincides with the brief rainy season, because that is the time of year when sources of surface water are abundant, and available to receive and transmit new parasites. In better watered climates nearer the Atlantic coast in West Africa, the dry season is the optimal period for the disease because that is when stagnant water sources are shrinking and most contaminated. Areas where the period of peak prevalence of Dracunculiasis disease coincides with the rainy season are doubly handicapped; since that is also the time of year when travel into remote areas, and hence, provision and supervision of control measures, is most difficult(4).

Since 1980, the beginning of global campaign to eradicate the dracunculiasis, the number of cases has decreased from 3.5 million to 148 in 2013 and disease transmission is currently limited to 4 countries in Africa — South Sudan, Mali, Chad, and Ethiopia. so that failures in surveillance and containment, lack of clean drinking water, insecurity in Mali and parts of South Sudan, and an unusual epidemiologic pattern in Chad are the main remaining challenges to global dracunculiasis eradication program(3,5,6). Since 1995 the International Commission for the Certification of Dracunculiasis Eradication (ICCDE) has met eight times and on its recommendation WHO has certified 192 countries and territories as free of dracunculiasis(7).

Statement of the problem

Dracunculiasis is a disease with low rate of mortality and a cause of functional disability on sufferers of the disease. Impaired mobility as a result of dracunculiasis prevents people from working in their fields, tending their animals, going to school, and caring for their families during the worm removal and recovery periods. This disability lasts on average of 43.7 days(8) but sometimes can be permanent. Negative impacts on agricultural and animal husbandry activities due to disability result in economic losses in the millions of dollars each year(9). School absenteeism can exceed 60% in some highly endemic villages, not only because children are disabled themselves but also because they are needed to work the fields or tend the animals in place of disabled family members(10,11). Therefore, dracunculiasis is both a disease of poverty and also a cause of poverty(12); 100% of cases occur in the poorest 10% of world's population without access to safe drinking water and health care(13,14).

The risk for dracunculiasis varies by sex, age, occupation, and ethnicity. These differences reflect how and where people get their drinking water in different areas, countries, and cultures. For the most part, dracunculiasis is distributed roughly equally between males and females and occurs in all age groups although, in general, it is more common among young adults (ages 15-45 years)(15). This may be a reflection of the types of work persons in this age range perform. Farmers and those fetching drinking water for the household generally become infected more frequently, perhaps because they are more likely to drink from stagnant potentially-contaminated water sources while away from the household.

Worldwide in 2013, one hundred forty eight cases of dracunculiasis were reported from 95 villages of four African endemic countries (South Sudan, Chad, Mali and Ethiopia), only 67% of the cases were contained; Majority of cases were reported from South Sudan republic with 113 cases from 76 villages. Ethiopia was also reported 7 cases from 4 villages and the source of all cases was from Gambella region of endemic villages(6).

Dracunculiasis eradication programme in Ethiopia was introduced in 1991 and a case search was conducted throughout the country in 1992. The survey confirmed that the disease is endemic in six districts (Abobo, Akobo, Gambella, Gog, Itang and Jikawo) of Gambella Regional State and Nyangatom district from Southern Nations Nationalities Peoples' Region (SNNPR). A number of interventions were initiated in endemic areas. These were case control; vector control; provision of safe water; health education; provision of filters; training of village-based volunteers

(VBVs), and monthly reporting. These efforts achieved considerable success on the reduction of the number of incidence in area(16,17).

Ethiopia has reported fewer than 50 cases each year since 2001, although low-level transmission remains uncontrolled. Cases now come from the remotest villages, which are inaccessible during seasons of heavy rain. In addition, periodic political instability results in migrants, especially from South Sudan, coming into Ethiopia, which "presents a challenge for eradication" of dracunculiasis(18). Accessibility of drinking water, individual risk factor (work in the field and collection of water), and house hold water filtration practice, contamination of water sources through infected person , community awareness and perception of preventive behaviour and availability unprotected seasonal ponds may influence the continuous transmission of the disease in the study area.

In 1993, 1120 cases of dracunculiasis were reported from 7 endemic districts in Ethiopia(19). Indigenous transmission has been interrupted from South Omo since 2001. However Gambella region the only region reports an exasperating continuation of dracunculiasis cases over the past two decades in Ethiopia[18(20)]. The last 5 year (2009 to 2013) case report shows that Ethiopia reports 58 cases from Gambella region and majority of the cases were from the study area, Gog districts(6).

The annual incidence of dracunculiasis cases in Gambella region has decreased significantly since 1994, but the main goal of the programme, interruption of indigenous transmission was not achieved, However an average of 12 cases per year was reported for the past five years and two districts Abobo and Itang also reported five and one cases respectively by the year 2013 after five consecutive years of no cases.(6,3). And also the sources of these 7 infections was remain unknown and a worm emergence was associated with an uncontained case in 2012(21). However, different intervention measures were taken to interrupt the transmission of the disease by Carter Center, WHO and Ethiopian dracunculiasis eradication program it was difficult to interrupt the disease from the study area, even though the 2013 cases report shows that majority of cases involved a resident of a village that had not reported a case since 2010(3). Dracunculiasis is feasible disease to interrupt its transmission because; no human carrier state beyond the one-year incubation period, no known animal reservoir, transmission is seasonal, skin lesions is a sensitive means of detection of the presence of the disease in villages, the methods for controlling transmission are simple and can be targeted effectively. From the effective

controlling methods at individual level filtering of any drinking water before drinking and not enter in to water sources having blister is the effective mechanisms to interrupt the transmissions, while those prevention mechanism in individual level is easy and completely prevents the individual from dracunculiasis, is not mean all the community member practice effectively(22).

This study was conducts in Gog district which is the only known endemic area in Ethiopia since 2010 and even if different measures were taken to interrupt the indigenous transmission by different governmental and non-governmental organization, the achievement was only decreasing the number of new cases. Since all the preventive strategy with adequate resource are in place and the effective preventive method of the disease (filtering drinking water) can be easily applicable at individual level, the main reason for the continuous occurrence of the case in study area may be associated with individual perception towards Dracunculiasis diseaseand its preventive behaviour. So that assessing the individual behavioral factors that affecting this condition and its associated factor will shows the road to facilitate the eradication campaign in the study area.

Chapter two: Literature reviews

Dracunculiasis disease preventive behaviors

Key intervention strategies to eradicate dracunculiasis are safe water supply, vector control using abate, health education and case management. Besides the worm itself and the stagnant water/copepods combination, the third element in the cycle of the disease is the human being. This is probably the key element, for without the people's cooperation and awareness none of the control strategies or intervention efforts will have much chance to succeed.

Filtering contaminated water through an ordinary cloth can easily remove adult cyclopid which over 1 mm long. Filtering water at house hold level may be easy, but that does not mean people will do it because the awareness level of community has influence on filtering their own water for the prevention of dracunculiasis. A study conducted in villages where endemicity was high in Nigeria's Oyo, Ogun and Ondo States in order to assess the acceptability and adequacy of funnel filter device shows that 38% of respondents, of whom 85% considered it very easy to use. On average only 82% of the respondents adopted correct procedure of practice(23).

A study conducted in Ogun State, South-West Nigeria as Case Study of Progress in Dracunculiasis Eradication. A total of 158 people examined in the three infected villages and 76 households For the KAP studies in the infected and at- risk non-infected villages .The result showed that, 81.5% of those from the infected villages knew infection was from drinking infected water. For treatment, apart from the winding of the worm around a stick, most from all villages (69.2%) claimed they used antibiotics while 12.8% used Shea butter, another 12.8% used herbs (24).

Perception of dracunculiasis and preventive behavior

Residents of endemic villages have been found to be the most motivated to get rid of dracunculiasis because they appreciate the improvement in their own lives and other benefits resulting from the eradication(22). Perception of individuals towards Dracunculiasis disease and its preventive behavior have its own role in the eradication of the disease.

Study from Kitgum district of northern Uganda, on Community perception and role in prevention of Dracunculiasis disease shows that most people could describe the cause and treatment of Co

(local name of dracunculiasis). More than 58% thought dirty or bad water was the main cause of Coo. 63.2% believed that drinking contaminated water was the cause. The perceived reasons for the increase were drinking dirty water (42.8%), migration (38.1%), no medicine (9.5%), and increased population (4.8%). A suggestion for community action to halt transmission of GW included was educating each other. Some community members' perceived boiling of water as tedious and difficult(25).

From study carried out in 12 villages in Akinyele Local Government Area (LGA) of Oyo State, Nigeria on Perception and Management of Dracunculiasis disease in infected and at risk non-infected communities, hundred and sixty households were sampled. 35.4% households in infected villages and 64.6% households in non-infected villages and the number of respondents that practice boiling and filtering of drinking water in infected villages is significantly higher than the number of respondents that practice same treatment in non-infected village. Some respondents use alum as a preventive measure against Dracunculiasis disease Shows symptoms perceived before bleb formation. Most (81.6%) use palm oil for treatment. The majority of the respondents from the infected villages (65.2%) and 66.1% from non-infected villages were ignorant of the fact that the dracunculiasis infection is caused by drinking contaminated water. Eighty one percent of the respondents from all areas believed that all ages are equally susceptible to infection. Finally the researcher recommended the necessity of educate the villagers on the role of ponds as transmission sites, on the need to boil water and filter drinking water and the inability of the alum to kill the parasites intermediate hosts(26).

Study conducted in Igwun river basin area of Imo State Nigeria on Behavioral aspects and their possible uses in the control of dracunculiasis (guinea-worm) 10.5% of the respondents associated dracunculiasis infection with the drinking of "polluted" water while most believed it was a familial trait (36.8%) or implicated their enemies (35.1%). As a result 36.8% believed Akwara was inherited. 35.1% thought enemies or gods caused Akwara. Just 10.5% made the connection between dracunculiasis infection and drinking water from contaminated streams, ponds, and lakes. Most dracunculiasis infected patients (42%) either just used the time-honored method of winding the emergent female worm around a small stick or the time-honored method in combination with other methods, such as herbalist treatment, consulting an oracle, and receiving Western medical treatment. 21% sought an oracle and received treatment from herbalists. 17%

sought an oracle and appeased the gods to achieve relief from dracunculiasis. 15% just received herbalist treatments. 5% only sought treatment at the hospital. Just 2 (3.8%) of the 53 patients with dressed dracunculiasis blisters and ulcers immersed the dressing into a water source while retrieving water. This low number helped reduce the transmission of the larvae from the blisters/ulcers to the water. Dracunculiasis was most devastating in Isi Ugwu, where people believed that drinking potable water separated them from their gods(27).

Filtration of drinking water

Since an adult cyclopid is over 1 mm long, it can easily be removed by filtering the water through an ordinary cloth. The filtration may be easy, but that does not mean people will do it. For millions of poor and mostly illiterate villagers, living in thousands of remote and frequently inaccessible communities and speaking hundreds of different languages, to change their behavior in this way is by any standard a major challenge to health education planning. It is remarkable that this has been achieved at all in practice, bearing in mind the low level of involvement of health education professionals in most national programs; with a few laudable exceptions, the approach adopted has been what Brieger(28) describes as “the behavioristic mode utilizing simplistic, professionally determined messages,” and in many countries of endemicity the involvement of health educators has been largely confined to the production of visual aids and a walk-on part in the training program.

The filtering of water builds on existing practices in the region of endemicity, as cloth or sieves are widely used in Africa to filter various liquids. Early eradication programs distributed cotton cloth, but this was sometimes used as clothing or for decoration, and homemakers also complained that it soon became clogged with the sediment in the water so that too much time was needed to do the family’s filtering.

Dracunculiasis disease is contracted when people ingest drinking water from stagnant sources containing copepods (commonly referred to as water fleas) that harbor infective dracunculiasis larvae. The contamination cycle begins when victims, seeking relief from the burning sensation caused by emerging Guinea worms, immerse their limbs in sources of drinking water, which stimulates the emerging worm to release larvae into the water. To interrupt the infection community safe water supply plays a crucial role since the copepod only live in shallow stagnant surface water as is found in man-made ponds, natural ponds and shallow wells.

from a total of 158 people examined in the three infected villages of Nigeria majority (65.8%) of the respondents get their drinking water from ponds, 15.8% from boreholes and a few(18.4%) from the well during the dry season(24).

Rational to use Health Belief Model

The health belief model (HBM) has been applied extensively to primary prevention research and will be the theoretical framework used in this study(29). HBM is a model that describes the decision-making process that individuals employ when adopting a health protective behavior. The HBM predicts behavior both from an individual's valuation of an outcome and the expectation that a specific action will result in that outcome(30). The HBM is comprised of six constructs. The first construct is perceived susceptibility which speaks to an individual's subjective belief that they are at risk of acquiring a negative health outcome. Perceived severity describes an individual's subjective belief in the extent of harm that can be caused by the disease. Perceived benefits include the advantages or benefits gained by engaging in a particular behavior. Perceived barriers include beliefs about the actual and imagined costs of practicing in a given behavior. Cues to action describe the forces that make an individual feel the need to take action. Finally, self-efficacy is the confidence an individual has in his/her ability to practice a behavior.

HBM domains used in this study include perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy.

Conceptual frame work

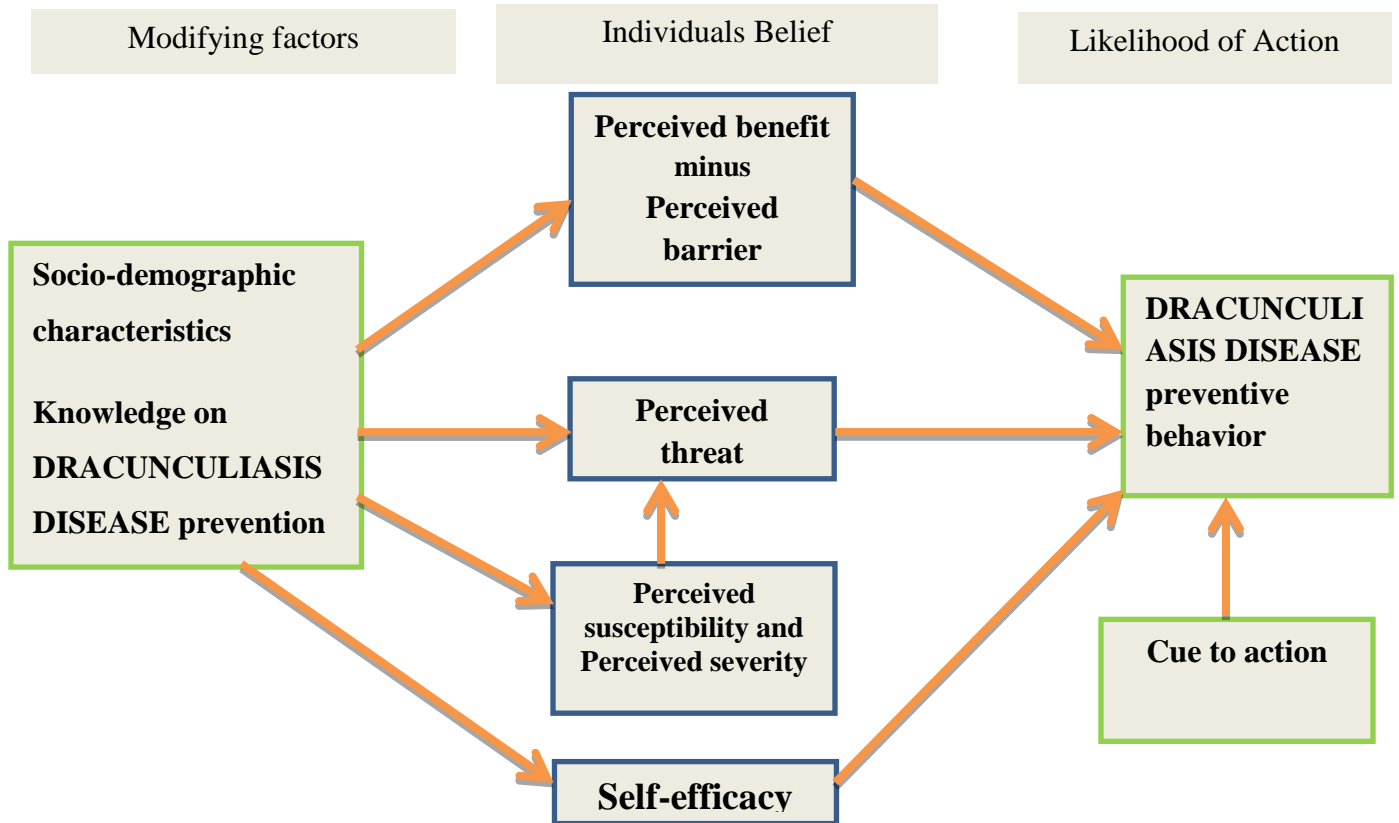


Figure 1: - Conceptual framework adopted from Health belief model to predict Dracunculiasis disease preventive behavior.

Significance of the study

Dracunculiasis affects people in rural, deprived and isolated communities without safe drinking water sources. The disease has considerable socio-economic consequences for poor people. It causes agonizing pain and incapacitates people for long periods of time, preventing them from working or attending school, which results in economic losses, increased poverty and malnutrition. Interventions against this disease usually involve aspects of human behaviour like health education and promotion. Since there is no existing medication or vaccine for Dracunculiasis disease the individual behavioral change on dracunculiasis preventive behavior is the effective methods to prevent the transmission.

The study area is the one with continuous report of the dracunculiasis case for the past decade when compared with other districts in the country; and moreover, there was no study done so far according to my knowledge and so far accessed online. By using HBM constructs assessing, the individual perceived susceptibility and severity of Dracunculiasis disease, perceived barrier and benefit of dracunculiasis preventive behaviour, cues to action for the preventive behavior, self-efficacy towards the preventive measure, knowledge towards the disease and the likelihood of preventive behavior of the study area to provides basic evidence for further intervention based on existing beliefs, to discover important recommendations for decision making bodies and programmers in the District, region and other concerned external authorities, and additionally to support the eradication of the disease and to help the disease no more the challenge for the people. It also lay out base line information for those parties who are interested to undergo research activities in the area.

Chapter three: Objectives

General objectives

To assess Dracunculiasis diseases prevention behaviors and associated factors among households in Gog district, Gambella Region, Southwestern Ethiopia, 2014.

Specific objectives

- To describe Dracunculiasis disease preventive behaviour among households in Gog district.
- To determine perceived threat related to Dracunculiasis disease among households in Gog district.
- To determine perceived net benefit related to Dracunculiasis disease preventive behavior among households in Gog district.
- To identify cues to action to Dracunculiasis disease preventive behavior among households in Gog district.
- To determine self-efficacy to Dracunculiasis disease preventive behavior among households in Gog district.
- To describe knowledge towards Dracunculiasis disease among households in Gog district.

Chapter four: Methods and materials

Study area and period

The study was carried out from March 3-7, 2014 in Gambella Region Gog district, which is located 888 km in the south west of Addis Ababa. It has 4 urban and 12 rural kebeles and according to the national census of 2007 the projected total population of the woreda is 22,287 with 11591(53%) male and 10696(47%) female. Currently, there are a total of 4845 Households in the woreda. It is characterized by hot and humid climate and shares internal border with Abobo district (currently dracunculiasis endemic district), Jor, Dimma, and Mengeshi districts and international border with Jonglei state of South Sudan Republic. It has 3 government health center and 2 NGO (Refugee Camp) health center. The people in the woreda are predominantly farmers. Main water sources in the villages include rivers and ponds, deep wells and a borehole.

Study design

Community based cross sectional study design was carried out in Gog district, Ethiopia.

Population

Sources population

All total population in Gog district was the source population for the study.

Study population

The study populations were all households from selected Kebele in the districts.

Study unit

The study unit was male or female household head.

Inclusion criteria

The respondent for the study was the head of the Households

Exclusion Criteria

Respondents were critically sick and unable to communicate to answer questions.

Sample size and Sampling technique /procedure

Sample size determination

Sample size determined by using single population proportion formula. Since there is no similar study done in the study area, sample size is calculated by assuming the rate of households filtering their drinking water is approximately 50% with 95% confidence level and margin of sampling error tolerated will be 5% to get an optimum sample size that were allow the study to look into various aspects of households.

Assumption

- ✓ P = is the proportion of households filtering there drinking water in districts (50%)
- ✓ D = Margin of sampling error tolerated- 5% (0.05)
- ✓ α = Critical value at 95% confidence interval (1.96).

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

Where, n= sample size, $Z_{\alpha/2}$ = confidence level= 1.96, P= the rate of households filtering their drinking water in the district= 0.5, d= precision (marginal error) = 0.05

Then,
$$n = \frac{(1.96)^2 * 0.5 (1-0.5)}{(0.05)^2} = 384$$

Therefore the required sample size were 384 and 15% non-response rate is added. The total sample size required was = 442

Sampling technique/ procedure

The total 16 kebeles of the district were stratified in to urban and rural areas for homogeneity characteristics such as geographical accessibility to drinking water which has effects on dracunculiasis disease transmission.

From selected a total of five kebeles, four from rural and one Kebele from urban was drawn by simple random sampling method from the total kebeles listed in each category.

Then the sampled populations were allocated proportionally to household size of each selected kebeles.

Finally households were selected by simple random sampling methods and one head of the household, either a wife or husband was interviewed. for a man has more than one a wife, and the household was included in the study, the man was considered as the head for his first wife and the rest wives were considered as heads for their own households. For households those head were not available in the house during data collection time, after three repeated visits of the house it was recorded as non-respondent.

Sampling frame of each Kebele (strata) was taken from Gog woreda Carter center Dracunculiasis disease eradication program.

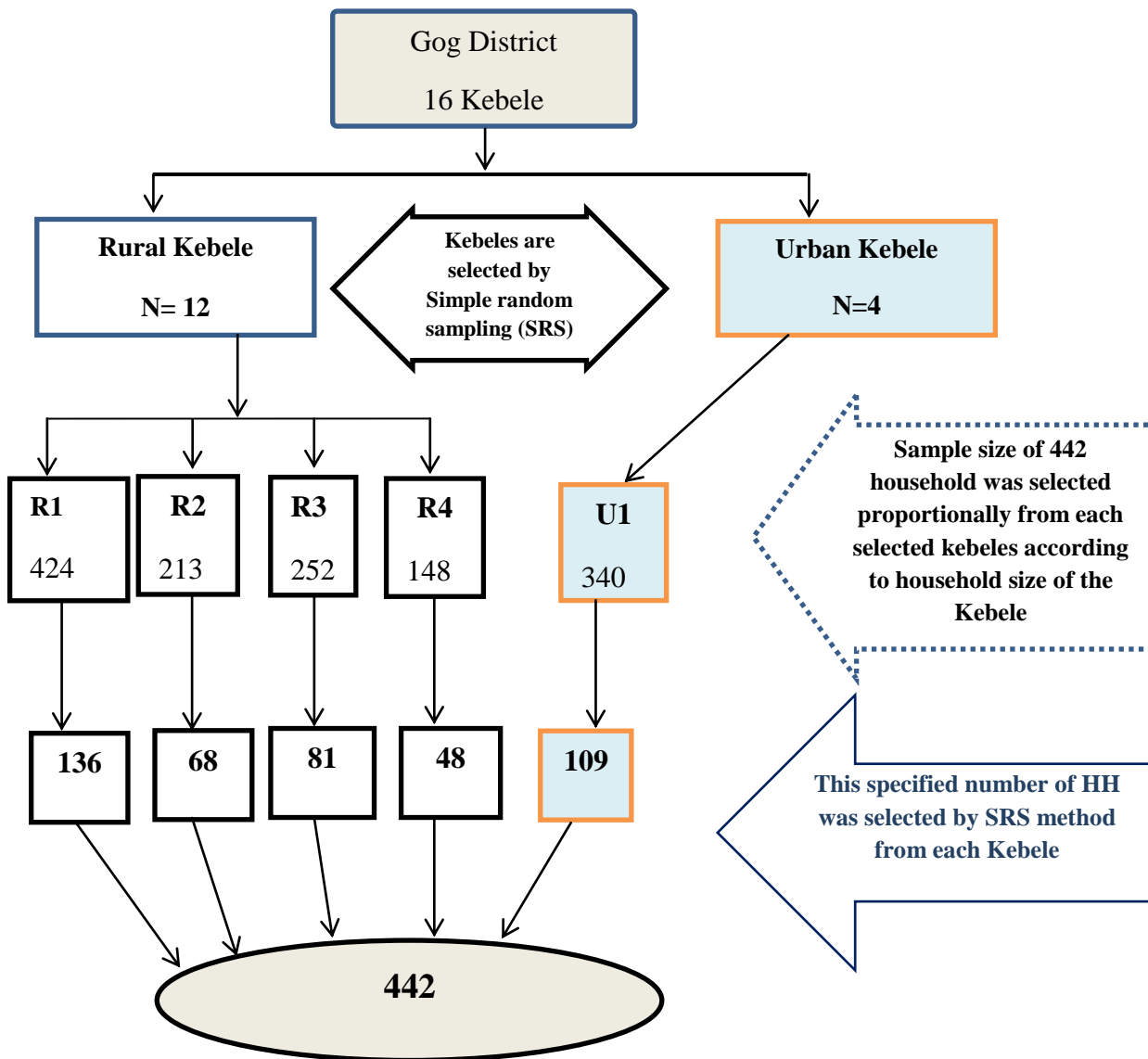


Figure 2: The schematic presentation of sample selection procedure in Gog district.

Variables

Dependent variable

Dracunculiasis disease prevention behaviour

Independent variable

Demographic and Socio-Economic characteristics (Sex, Age, Occupation, Income, Marital status, Education, Ethnicity)

Knowledge on dracunculiasis disease

Perceived susceptibility to Dracunculiasis disease

Perceived severity to Dracunculiasis disease

Perceived barrier of Dracunculiasis disease preventive behavior

Perceived benefit of Dracunculiasis disease preventive behavior

Cues to action to Dracunculiasis disease preventive behavior

Self-efficacy to Dracunculiasis disease preventive behavior

Operational and definition of terms

Dracunculiasis disease preventive behaviour: households water filtration behavior at home and during traveling far away from the village and avoid entering to water sources with having blister in the past two week. The individual response on a list of five “Yes or NO” questions was computed and individuals were categorized in to high and low Dracunculiasis disease preventive behaviors categories.

Knowledge on Dracunculiasis disease: the summation of the correct answer responded by the respondent from a list of knowledge questions which contains Dracunculiasis disease transmission, treatment, prevention methods from the statements of the items was measure individual knowledge.

Perceived threat of Dracunculiasis disease: the total sum score of individuals perceived susceptibility and severity of Dracunculiasis disease Measured through two HBM constructs with each having 5 point Likert scale items, such as perceived susceptibility consists of 6 items with possible range of (6-30), perceived severity 8 items with the possible score of (8-40).

Perceived net benefits of Dracunculiasis disease preventive behaviors: individuals perceived benefits minus perceived barrier of Dracunculiasis disease preventive behaviors. Measured through two HBM constructs with each having 5 point Likert scale items, such as perceived benefits and perceived barriers with each consists of 8 items with possible range of (8-40).

Cue to action to Dracunculiasis disease preventive behavior: condition that initiates the individual to practice the Dracunculiasis disease preventive behavior. Measured through 8 items with 5 point Likert scale and possible score range of (8-40).

Self-efficacy to Dracunculiasis disease preventive behavior: the individual confidence that he can successfully practice Dracunculiasis disease preventive behavior to prevent Dracunculiasis disease Measured through 7 items with 5 point Likert scale and possible score range of (7-35).

Instrument and Data collection procedure

Data collection tool

The questionnaire is adopted after reading different literature with studies that have similar objective and methods(31)(32) and it was comprise of 71-items which queried participant's dracunculiasis disease prevention behaviors. The components of instrument are Socio demographic which consists of (9 items);

Dracunculiasis disease preventive behaviour: were assessed through 5 items question which address the preventive behavior of the disease. Participants were asked, "Did you washed in streams/ ponds/ wells in the last two week? And did you filter drinking water today?" organized with (Yes or No) multiple responses. And finally the respondents were categorized in to high and low Dracunculiasis disease preventive behaviour.

Perceived susceptibility: sample scale item consists of; "How likely do you agree that you will get Dracunculiasis disease in the future?" were followed by five items, 5 point Likert scale (1=strongly disagree, 2=somewhat disagree, 3= neither agree nor disagree, 4= somewhat agree, 5=strongly agree). The construct was measured in context of dracunculiasis disease operationalized sub-scale having a score range of 6 to 30; higher scores reflect stronger agreement that at the risk of getting dracunculiasis disease.

Perceived severity; sample scale item consists of; “The thought of Dracunculiasis disease scares me” were followed by seven items, 5 point Likert scale (1=strongly disagree, 2=somewhat disagree, 3= neither agree nor disagree, 4= somewhat agree, 5=strongly agree). The construct was measured in context of dracunculiasis disease operationalized sub-scale having a score range of 8 to 40; higher scores reflect stronger agreement that more awareness regarding the potential seriousness of dracunculiasis disease.

Perceived benefits; measured according to perceived benefits to water filtration and avoid entering to water source; sample scale item consists of; “When I had filtered my drinking water I feel about dirt’s are removed” were followed by seven items, 5 point Likert scale (1=strongly disagree, 2=somewhat disagree, 3= neither agree nor disagree, 4= somewhat agree, 5=strongly agree). The construct were measured in the context of water filtration and avoid entering to water source behaviour of operationalized sub-scale having a score range of 8 to 40, higher scores were reflect stronger agreement that water filtration and avoid entering to water source can protect individuals from dracunculiasis disease.

Perceived barrier; measured according to perceived barrier to water filtration and avoid entering to water source; sample scale item consists of; “I feel funny about the use of filtering water for Dracunculiasis disease prevention” were followed by seven items, 5 point Likert scale (1=strongly disagree, 2=somewhat disagree, 3= neither agree nor disagree, 4= somewhat agree, 5=strongly agree). The construct was measured in the context of water filtration and avoid entering to water source behaviour of operationalized sub-scale having a score range of 8 to 40, higher scores reflect stronger agreement that water filtration and avoid entering to water source behavior have high barriers.

Self-efficacy; measured according to self-efficacy to water filtration and avoid entering to water source; sample scale item consists of;” I am confident that I can perform water filtration correctly” Were followed by 6 with 5 point Likert scale (1=strongly disagree, 2=somewhat disagree, 3= neither agree nor disagree, 4= somewhat agree, 5=strongly agree). The construct was measured in the context of confidence to develop water filtration and avoid entering to water source behaviour and operationalized sub-scale having a score range of 7 to 35, higher scores reflect stronger agreement that individuals have confidences to protect him from dracunculiasis disease

Cues to action; measured according to cues to action for water filtration and avoid entering to water source; sample scale item consists of;” I recall seeing video show, billboard ads or posters about water filtration during the past months” Were followed by 7 with 5 point Likert scale (1=strongly disagree, 2=somewhat disagree, 3= neither agree nor disagree, 4= somewhat agree, 5=strongly agree). The construct was measured in the context of cues to action for develop water filtration and avoid entering to water source behaviour and operationalized sub-scale having a score range of 8 to 40, higher scores reflect stronger agreement that individuals have cues to action to protect himself from dracunculiasis disease

Knowledge; consists of 8 items with (1=Yes, 2=No, 3=don't know), and other multiple response question. The responses were score as “0” for an incorrect answer and “1” for a correct answer and “9” for missing value or I don't know answers. And the total score were then obtained by summing all items, which range from 0 to 8 points. High scores showed high knowledge on Dracunculiasis disease and prevention behavior.

Data collection method

The questionnaires was prepared in English and translated to Anguwak language back to English for its consistency. The questionnaires were administered through 7 diploma level nurses professional with fluent Angnuak, English and Amharic language speaker by using face to face interviewing technique. Data collectors and 3 supervisors were trained for 3 days by the principal investigator on how to interview and fill the questionnaires based on a prepared instruction/ guidelines. During training, the importance of obtaining the respondents verbal consent and respecting their right to respond or not to respond to any part of the questions was emphasized, in addition to ensuring privacy and confidentiality. Respondents who are not present at home during data collection time were asked by returning back again until three times and if they are not present still the household were considered as non-respondent.

Pretest

Pretest of the questionnaire was carried out on 5% of respondents in Abobo district that have similar socio demographic characteristics with the households of the study area. During pre-test the interviewers and Supervisors were assess clarity; understandability and completeness of questions and some correction and changes were made based on the result of the test.

Data processing, analysis and presentation

After the data collection, each questionnaire was checked manually for its completeness and consistency. Data was entered into Epi-Data Statistical software version 3.1, cleaned and explored for outliers, missing values and any inconsistencies. For outliers and missed values found during the data exploration, causes was determined and if unable to determine causes, variables with missing value(s) and outliers were dropped out from analysis and exported to SPSS statistics version 16 for analysis.

The internal consistency of the scale was tested using Cronbach alpha. Descriptive statistics (including means, standard deviations, frequencies, and percentages) were calculated for demographics and knowledge characteristics. In addition cross tabulation was computed using dependent and in dependent variables to determine the proportions of respondents and the existence of association between independent variables and some selected socio demographic characteristics of household respondents. Odds ratio and their 95% of confidence interval was calculated to assess the strength of association between the variables. To see the relative effect of independent variable on the dependent variable, logistics regression analysis was carried out.

The effect of each HBM construct to overall HBM perception was assessed by logistic regression model. Variables with P-value less than 0.05 were used to declare association between factors and the dependent variables. The result was presented by frequency tables. Finally possible recommendations were made based on the finding of the study.

Data quality management

Data quality was ensured during instrument development, collection, coding, entry and analysis. The questionnaire first translated to Anguwa language and retranslated to English before data collection and different translator were used to keep the consistence of the questionnaire and necessary correction were taken.

Then data collectors was trained about the purpose of the study and how to administer the questioner, Role play by trainee was also done to strengthen their skills of administering questionnaire and how to approach with participants in the field.

The Instrument was tested on 5% of the respondents and correction was taken accordingly. During data collection, questionnaire was checked for its completeness on daily basis by

immediate supervisors. Incorrectly filled or missed questionnaire were sent back to the respective data collectors for correction, and the supervisors' were submitted the filled questionnaire to the principal investigator after checking its consistency and completeness. The investigator were also rechecked the completed Questionnaires to maintain the quality of data. There was daily discussion with data collectors and supervisors accordingly if there is a problem encounter during data collection. Data quality was also ensured during data coding, cleaning, entry to computer and during analysis.

Ethical consideration

The study was not having any experiment on human subjects. However, this study was obtaining ethical clearance from Research Ethics Committee of Jimma University. Permission was obtaining from Gambella regional health bureau, Gog woreda Health bureau, the woreda administrative counsel, Kebele council and informed consent was obtained from individual respondent. All the interviews with subjects were made with strict privacy after getting informed consent from the respondents and assuring the confidential nature of the responses. The right of the respondents to refuse answer for few or all of the questions was respected.

Dissemination plan

The findings of this study will be disseminated to college of public health and medical science and department of Health Education and Behavioral Science, Gambella Regional Health Bureau, Gog District Administration and Health Office. And also will be disseminated to different stakeholders that have a contribution to Eradicate Dracunculiasis disease in Ethiopia. Finally effort will be made to present in various seminars and workshops and for publication in international journals.

Chapter five: Result

Socio demographic characteristics of the study subject

A total of 429 respondents with a response rate of 97% were enrolled and participated in the study. The socio demographic characteristics of the respondents are presented in (Table 1). Two hundred and twenty four (54.2%) of the respondent were female and 205(47.8%) were male, the mean age of households were 30.21 (SD of 7.5) years with its median age of 29 years.

Majority of the respondent, 295(68.8%) was married and 85(19.8%) were single, 31(7.2%) were divorced and 18(4.2%) were widowed. More than half of the respondents were the follower of protestant religion 231(53.8%); Catholic were 134(31.2%), Muslim was 47(11%) and Orthodox was 15(3.5%). The predominated ethnic group were Agnuwa 387(90.2%) and followed by Nuer 12(2.8). 162(37.8%) of the respondent were can not read and write, 120(28%) were under 9th to 10th grade level categories. 125(29.1%) of the respondent were farmer, 81(18.9%) were students and 60(14.8%) were house wife. The mean family income was 838 (SD of 409.09) birr with its median of 800birr.

Table 1 Socio demographic characteristics of households in Gog district, Gambella region, 2014.

Variables(n=429)	Frequency	Percent
Sex		
Male	205	47.8
Female	224	52.2
Marital status		
Single	85	19.8
Married	295	68.8
Divorced	31	7.2
widowed	18	4.2
Religion		
Orthodox	15	3.5
Muslim	47	11.0

Protestant	231	53.8
Catholic	134	31.2
Ethnicity		
Angnuak	387	90.2
Nuer	12	2.8
Mejeng	7	1.6
Amhara	8	1.9
Oromo	15	3.5
Educational level		
Cannot read and write	162	37.8
First cycle	38	8.9
Second cycle	70	16.3
High school	120	28.0
preparatory	34	7.9
College and above	5	1.2
Occupational status		
Farmer	125	29.1
Merchant	32	7.5
Housewife	60	14.0
Solider	28	6.5
Tella seller	30	7.0
Daily laborer	16	3.7
Student	81	18.9
Home servant	9	2.1
Jobless	14	3.3
Civil servant	34	7.9

Knowledge about Dracunculiasis disease

The true answer of the eight knowledge question of the entire 429 respondent was summed and results were (Minimum 0.5 and Maximum 8, Mean 4.9, Median 5.1 with SD of 1.49). Were as response of the respondent on each knowledge question, the cause of Dracunculiasis disease majority of the respondent 412(96%) said that drinking water from stagnant water source, 41(9.6%) were said throwing a long rope in water and 24(5.6%) said that steeping on a dead guinea worms. Three hundred and seventy (86.2%) of the respondent said that blister is one of the symptoms of dracunculiasis disease and 351(81.8%) were said dracunculiasis partly out of the infected body part, 336(78.3%) was pain and infection were their response and 272(63.4%) were said swelling on any part of the body. Filtering drinking water as dracunculiasis disease prevention method was responded by 392(91.4%) of the respondents 181(42.2%) were said that boiling water, 82(19.1%) were responded that praying on the water can prevent dracunculiasis disease The role of individual when someone has dracunculiasis disease, the majority 348(81.1%) were said that staying away from any water source, 80(18.6%) were said that pulling the worm slowly out and roll it on a thin stick and 40(9.3%) respond that using of traditional medicine. About the chance of emerging more than two worms from the infected body at the same time, 333(77.6%) were answered yes response and 96(22.4%) were no response. 208(48.5%) yes and 220(51.3%) no response were responded about the prevention of dracunculiasis disease through treating water source by chemicals. About the curability of dracunculiasis disease 118(27.5%) were said yes response and 311(72.5%) said no response. 236(55%) yes and 193(45%) no response were given about the chance of getting the disease again throughout the life. Table 4 shows the summary of knowledge on dracunculiasis disease response percentage. (Table 2)

Table 2 Household's knowledge about dracunculiasis disease in Gog district, Gambella region, 2014

Variables	N (%)
Causes of Guinea worm	
Eating fresh fish or mud fish	2(0.5%)
Witchcraft	14(3.3)

Evil spirits	16(3.7%)
Having too many veins or broken veins	23(5.4%)
Stepping on a dead guinea worm	24(5.6%)
Throwing along rope in water source	41(9.6%)
Drinking water from stagnant water sources	412(96%)
Symptoms of Dracunculiasis disease	
Fever	42(9.8%)
Swelling	272(63.4%)
Blister	370(86.2%)
The Guinea worm partly out of the body	351(81.8%)
Loss of appetite	166(38.7%)
Nausea	100(23.3%)
Difficulty walking	207(48.3%)
Fatigue	84(19.6%)
Pain and infection	336(78.3%)
To prevent Dracunculiasis disease	
Boil drinking water	181(42.2%)
Filter drinking water	392(91.4%)
Add a few herbs to drinking water	70(16.3%)
Pray over water	82(19.1%)
If someone has Dracunculiasis disease	
Go to the witch doctor	4(0.9%)
Use traditional medicines (leaves, oil, cow dung)	40(9.3%)
Dip the infected part of the body in standing water	18(4.2%)
Cut the blister or the worm	23(5.4%)
Pull the worm slowly out and roll it on a thin stick	80(18.6%)
Get the village volunteer to visit and tend the worm	348(81.1%)

Stay away from water source	293(68.3%)
Is there a chance of more than one worm emerging at one time from a sick person?	
yes	333(77.6%)
No	96(22.4%)
Can Dracunculiasis disease be prevented by treating contaminated water sources by chemicals?	
Yes	208(48.5%)
No	220(51.3%)
Is Dracunculiasis disease curable/ treatable?	
Yes	118(27.5%)
No	311(72.5%)
If a person acquired dracunculiasis disease, he/she will not have the chance to get the disease throughout his/her life again?	
Yes	236(55.0%)
No	193(45.0%)

Dracunculiasis disease preventive behaviour

From the total of 219(51%) of the respondent having blister on any part of their body, most of them 168(39.2%) were washed or entered to water sources. Dracunculiasis disease preventive behaviors of households are presented in table 6. Two hundred and ten (49%) of the respondent were travelled away from the village and 152(35.4%) of them not filtered drinking water and only 58(13.5) were filtered.

Home level water filtration story of the respondents, 267(62.2%) of the respondent were not filtered their drinking water in past two weeks and only 58(13.5%) were filtered well. Sixty six (15.4%) of the respondent, pond water were the highest of all water sources drunk, during travelling far away from the village, 34(7.9%) were borehole, 34(7.9%) were river, 29(6.8) were drunk from the lake. Daily frequency of water filtration at home level, the majority 96(22.4)

were filtered two times in a day, 93(21.7%) one times, 24(5.6%) were three times and only 14(3.3%) of the respondent filtered four times.

The reasons of not filtering drinking water during travelling far away from the village was 42(9.8%) of the respondent's reason out that they do not have water filter, 40(9.3%) were forgotten water filtration pipe at home and 37(8.6%) were thirsty and they could not wait up to filtration time.

From the total of 429 respondents 145(33.8%) were have higher Dracunculiasis preventive behavior and 284(66.2%) were scores lower Dracunculiasis preventive behavior. (Table 3)

Table 3 Dracunculiasis disease preventive behaviors among households in Gog district, Gambella region, 2014

Variables	Frequency	Percent (%)
Did you washed/inters in streams/ ponds/ wells in the past two week		
No	51	11.9
Yes	168	39.2
Total	219	51.0
Filtrations water before drinking during travel far away from village in past two weeks		
No	152	35.4
Yes	58	13.5
Total	210	49.0
Water filtration at home in past two week		
No	267	62.2
Yes	162	37.8
Total	429	100.0
Dracunculiasis disease Preventive behavior		
No	284	66.2
Yes	145	33.8

Total	429	100.0
Source of water drinking during traveling far from village		
Pipe tap	28	6.5
Borehole	34	7.9
River	34	7.9
Lake	29	6.8
Pond	66	15.4
Stream	18	4.2
Total	209	48.7
Frequency of filtration in a day		
One	90	21.0
Two	96	22.4
Three	24	5.6
Four	14	3.3
Total	224	52.2
Reasons not filtering water when far away from village		
I don't have water filter	42	9.8
I don't know the use of water filtration	18	4.2
I forgotten filtering because i was thirsty	37	8.6
I have left water filter during my travel	39	9.1
I was drunk from safe sources	16	3.7
Total	152	35.4

Perception towards dracunculiasis disease and preventive behavior

The entire health belief model constructs were summed according to each items included in each perceptions. Perceived susceptibility were measured on its possible range of 6-30 and the observed result were 6-30 and Mean values of 19.26 with SD of 6.18. Perceived severity construct of possible range value was 8-40 and its observed value were 10-40 and its Mean value

of 28.18 with SD of 7.2. Perceived benefits constructs possible range values was 8-40 and its observed value were 16-40 and its Mean value score were 32.9 with SD of 6.9. Perceived barrier constructs possible range value was 8-40 and its observed value was 8-32 and Mean value score were 15.4 with SD of 5.1. Self-efficacy constructs' possible range value was 7-35 and observed value 7-35 and Mean value score of 30.8 with SD of 5.5. Cues to action constructs possible range value was 8-40 and observed value 14-40 and Mean value score of 35 with SD of 5.7. Table 5 shows the summery of HBM construct observed value. And the summation of perceived susceptibility and perceived severity were given perceived threat with mean 44.6 (SD of 9.14) with median score of 45. Perceived net benefits of Dracunculiasis disease preventive behaviors of the households were computed through the differences between perceived benefits and perceived barriers and mean score of perceived net benefits were 17.44 (SD of 8.59) with its median 18. (Table 4)

Table 4 dracunculiasis disease perception score of households at Gog district, Gambella region, 2014

Perception	Range		M	SD
	Possible	Observed		
Perceived susceptibility	6-30	6-30	19.26	6.18
Perceived severity	8-40	8-40	25.34	7.0
Perceived benefits	8-40	16-40	32.9	6.9
Perceived barrier	8-40	8-32	15.4	5.1
Self-efficacy	7-35	7-35	30.78	5.5
Cues to action	8-40	14-40	34.96	5.7

Perceived susceptibility

One hundred and eighty three (42%) of the respondent were perceived on their chance of getting Dracunculiasis disease in the future, 212(49.4%) of households was perceived that they had more chance of getting Dracunculiasis disease compared to others people and 226(52.7%) perceived

that their family members are at the risk of getting Dracunculiasis disease in the coming six month. (Table 5)

Table 5 Perceived susceptibility of households towards Dracunculiasis disease in Gog district, Gambella region, 2014

<i>Variables</i>	<i>N(%) agreed/ strongly agreed</i>
<i>The chance of getting Guinea worm disease in the future</i>	182(42.4%)
<i>The chance of getting guinea worm disease sometime in life</i>	179(41.7%)
<i>Have a good possibility of getting Guinea worm disease in the next six months</i>	197(45.9%)
<i>Great chances of getting Guinea worm disease</i>	212(49.4%)
<i>More chance of getting guinea worm disease Compared to other people of the same age</i>	199(46.6%)
<i>family members are at risk for getting Guinea worm disease in the coming six months</i>	227(52.9%)

Perceived severity

One hundred and eighty seven (43.6%) of the households perceived that guinea worm disease can be series disease, 182(42.5%) perceived that Dracunculiasis disease would make daily activities more difficult, 151(35.2%) of them were perceived that the thought of guinea worm disease scares them, And 145(33.8%) of the households perceived that getting Dracunculiasis disease would danger their job.(Table 6).

Table 6 Perceived severity of households towards dracunculiasis disease in Gog district, Gambella region, 2014

<i>Variables</i>	<i>N(%) agreed/ strongly agreed</i>
<i>The thought of Guinea worm disease scares me</i>	151(35.2%)
<i>getting Guinea worm disease, job would be in danger</i>	145(33.8%)
<i>problems I would experience with guinea worm disease would last a long time</i>	163(38.0%)
<i>guinea worm disease would threaten my role in the community</i>	174(40.5%)
<i>If had Guinea worm disease whole life would change</i>	154(35.7%)
<i>Getting Guinea worm disease would disrupt family life</i>	183(42.6%)
<i>Guinea worm disease would make daily activities more difficult</i>	182(42.5%)
<i>Guinea worm disease can be a serious disease</i>	187(43.6%)

Perceived benefits

Three hundred and eighteen (74.2%) of households perceived that benefits of not washing on water sources with having blister would safe their family from getting Dracunculiasis disease, 312(71.8%) of households perceived the benefits of filtering water to remove dirt, 290(67.6%) of them perceived that filtering drinking water allow them safe from guinea worm disease(Table 7).

Table 7 Perceived benefits of Dracunculiasis disease preventive behavior of households in Gog district, Gambella region, 2014.

<i>Variables</i>	<i>N(%) agreed/ strongly agreed</i>
<i>when I had filtered my drinking water I feel about dirt's are removed</i>	308(71.8%)
<i>when I complete filtering of drinking water with water filter I don't worry</i>	297(69%)
<i>completing Filtering water properly before drinking will allow me safe from</i>	310(72.3%)
<i>if I complete filtering water before drinking during the next year I will n</i>	279(65%)
<i>if I complete water filtrations before drinking I will be safe from the pain</i>	290(67.6%)
<i>when I had Not entering to water sources with emerged worm, I feel guinea w</i>	314(73.2%)
<i>when I hadn't entered to water sources with having blister, I fell my family</i>	305(71.1%)
<i>when I had avoided washing on water source with having blister, I feel my</i>	318(74.2%)

Perceived barrier

Three hundred and thirty four (82%) of households perceived barriers of pain acquired from Dracunculiasis disease allow to enter water sources, 349(81.3%) were had perceived barrier of not all their family members drunk filtered water, 322(75%) feels fenny about the use of water filter for guinea worm disease prevention, 322(75%) of the respondent perceive barriers of the inconvenience of getting water filter at house level and 265(59.6%) perceived that filtering of drinking water will take too much time. (Table 8)

Table 8 Perceived barriers of Dracunculiasis disease preventive behavior of households in Gog district, Gambella region, 2014.

<i>Variables</i>	<i>N(%) agreed/strongly agreed</i>
<i>I feel funny about the use of filtering water for guinea worm disease prevention</i>	322(75%)
<i>filtering drinking water will take too much time</i>	256(59.6%)
<i>i don't have enough money to buy cloth water filter</i>	228(53.1%)
<i>i feel getting cloth water filter is inconvenient at household level</i>	322(75%)
<i>not all the members of my family do drink from filtered water</i>	349(81.3%)
<i>i don't filter water because others do not filter their water</i>	338(78.8%)
<i>i can't away from water source during acquiring blister because I will get</i>	334(82.5%)
<i>i will always cross water source during my way to get in to the farm/market</i>	249(47.3%)

Perceived self-efficacy

Three hundred and seventy one (86.5%) of the households perceived confidences of taking water filter pipe during their travel to far from the village, 365(85%) were confident that they will not drink water before filtration during travelling far, 356(83%) were confident that they can perform water filtration correctly and 357(83.3%) were confident that they will not enter to water sources with blister. (Table 9)

Table 9 Perceived self-efficacy of Dracunculiasis disease preventive behavior of households in Gog district, Gambella region, 2014

<i>Variables</i>	<i>N(%) agreed/strongly agreed</i>
<i>i am confident that I can perform water filtration correctly</i>	356(83%)
<i>I am confident that I will filter my drinking water even if I am far away</i>	365(85.1%)
<i>I am confident that I can most often take water pipe filter with myself</i>	371(86.5%)
<i>no matter how I am in difficult circumstance like being on farming field</i>	333(77.6%)
<i>I am confident that I can always rely on using cloth filter to prevent my</i>	342(79.7%)
<i>I am confident that I will not enter in to any water sources being</i>	357(83.3%)
<i>I am confident that I will not enter in to water source during my way</i>	348(81.1%)

Cues to action

Three hundred and eighty four (89.6%) of the households cues to seeing Dracunculiasis disease infected person reminded them to avoid entering to water source, 375(87.4%) were cues to village based volunteers were discussing with them about avoiding of entering with them about avoiding of entering to water sources with blister and 357(83.2%) were cues to video show, billboard ads or poster about water filtration. (Table 10)

Table 10 Cues to action to dracunculiasis disease preventive behaviors of households in Gog district, Gambella region, 2014

<i>Variables</i>	<i>N (agreed/ strongly agreed)</i>
<i>I recall seeing video show, billboard ads or posters about water filtration</i>	<i>357(83.2%)</i>
<i>I have received advice from health extension workers about water filtration</i>	<i>356(82.9%)</i>
<i>Village based volunteers were discussing with me about water filtration</i>	<i>352(82.1%)</i>
<i>Seeing GWD infected person would help remind me to filter my water</i>	<i>344(80.2%)</i>
<i>I recall seeing video show, billboard ads or posters about avoiding entrance</i>	<i>349(81.3%)</i>
<i>I have received advice from health extension workers about avoiding entrance</i>	<i>350(81.6%)</i>
<i>Village based volunteers were discussing with me about avoiding entrance in</i>	<i>375(87.4%)</i>
<i>Seeing GWD infected person would help remind me to avoid entrance in to water</i>	<i>384(89.6%)</i>

Association between socio demographic characteristics and Dracunculiasis disease preventive behavior

Bivariate analysis explored the association of demographic variables, using p value <0.05 as the significant level and p value < 0.25 were candidates for multiple logistic regression. From the socio demographic characteristics variable, sex, marital status, educational level, occupational

status and income level has significantly associated with Dracunculiasis disease preventive behaviors. Female households are more likely to be engaged in Dracunculiasis disease preventive behavior compared with male respondents with (COR=1.83, 95% CI: 1.2, 2.75). The households marital status of divorced and widowed are less likely to be engaged in Dracunculiasis preventive behaviour than married households (COR=0.3, 95%CI: 0.1, 0.9) and (COR=0.1, 95% CI: 0.14, 0.8) respectively. Those households completed first cycle less likely to be engaged and high school and preparatory educational level are more likely to be engaged in Dracunculiasis disease preventive behavior compared with households which cannot read and write with (COR=0.5, 95%CI: 0.25,0.85), (COR= 2.33, 95% CI:1.09,5.3) and (COR=2.2, 95%CI: 0.7,1.12) respectively. Concerning the occupational status of the households, merchant and student was more likely to be engaged in Dracunculiasis disease preventive behavior compared with farmer households with (COR=4.8, 95% CI: 2.1, 10.6) and (COR=2.3, 95% CI: 1.3, 4.3) respectively. A one unit changes in family income level the log odds that household's engagement in Dracunculiasis disease preventive behaviors will be increased with (AOR=1.001, 95%CI: 1.001, 1.002). (Table 11)

Table 11 Association of socio demographic characteristics and Dracunculiasis disease preventive behaviors of household, at Gog district, Gambella region, 2014

Variable	Dracunculiasis disease preventive behavior		Beta	Crude OR (95% CI)
	Low	High		
	N (%)	N (%)		
Sex				
Male	150(73.2%)	55(26.8%)		1
Female	134(59.8%)	90(40.2%)	0.605	1.83(1.2,2.75)*
Marital status				
Married	190(64.4%)	105(35.6%)		1
Single	51(60%)	34(40%)	0.18	1.2(0.73,1.9)
Divorced	26(83.9%)	5(16.1%)	-1.056	0.3(0.1,0.9)*
widowed	17(94.4%)	1(5.6%)	-2.24	0.1(0.14,0.8)*

Religion				
Protestant	145(62.8%)	86(37.2%)		1
Orthodox	12(80%)	3(20%)	-0.86	0.4(0.11,1.5)
Muslim	36(76.6%)	11(23.4%)	-0.66	0.5(0.2,1.0)
Catholic	89(66.4%)	45(33.6%)	-0.16	0.8(0.5,1.3)
Ethnicity				
Angnuak	254(65.6%)	133(34.4%)		1
Nuer	10(83.3%)	2(16.7%)	-0.96	0.38(0.08,1.7)
Mejeng	6(85.7%)	1(14.3%)	-1.14	0.3(0.03,2.6)
Amhara	5(62.5%)	3(37.5%)	0.136	1.1(0.27,4.8)
Oromo	9(60%)	6(40%)	0.24	1.2(0.4,3.6)
Educational level				
Cannot read and write	113(70.6%)	47(29.4%)		1
First cycle	59(83.1%)	12(16.9%)	-0.7	0.5(0.2,0.85)*
Second cycle	51(68.9%)	23(31.1%)	0.08	1.0(0.6,1.9)
High school	45(50%)	45(50%)	0.87	2.4(1.4,4.1)*
preparatory	15(50%)	15(50%)	0.87	2.33(1.09,5.3)*
College and above	1(25%)	3(75%)	0.55	2.2(0.7,1.12)
Occupational status				
Farmer	92(74.8%)	31(25.2%)		
Merchant	13(38.2%)	21(61.8%)	1.56	4.8(2.1,10.6)*
Housewife	37(61.7%)	23(38.3%)	0.61	1.8(0.953,3.5)
Solider	23(82.1%)	5(17.9%)	-0.43	0.6(0.2,1.8)
Cultural drinking seller	23(76.7%)	7(23.3%)	-0.1	0.9(0.3,2.3)
Daily laborer	13(81.2%)	3(18.8%)	-0.38	0.6(0.18,2.5)
Student	45(55.6%)	36(44.4%)	0.855	2.3(1.3,4.3)*
Home servant	7(77.8%)	2(22.2%)	-0.165	0.84(0.16,4.29)

Jobless	11(78.6%)	3(21.4%)	-0.21	0.8(0.2,3.09)
Civil servant	20(58.8%)	14(41.2%)	0.73	2.07(0.93,4.6)
Age			-0.012	0.98(0.93,1.0)
Income level			0.001	1.001(1.001,1.002)*
Knowledge			-0.03	0.97(0.85,1.10)

NB: * significant at p value less than 0.05, OR: odds ratio

The association of health belief model components and Dracunculiasis disease preventive behaviors.

From bivariate analysis result of HBM components, perceived threat, and perceived net benefits were significantly associated with Dracunculiasis disease preventive behaviors with (COR=1.04, 95% CI: 1.016, 1.006) and (COR=1.04, 95% CI: 1.013, 1.064) respectively. Self-efficacy and cues to action were no significant association with Dracunculiasis disease preventive behavior. (Table 12)

Table 12 Association between HBM components and Dracunculiasis disease preventive behavior of households at Gog district, Gambella region, 2014

HBM constructs	Dracunculiasis disease preventive behavior	
	Beta	Crude OR (95% CI)
Perceived threat	0.038	1.04(1.016,1.06)*
Perceived net benefit	0.038	1.04(1.013,1.064)*
Self-efficacy	0.04	1.038(0.99,1.08)
Cues to action	-0.014	0.99(0.95,1.02)

N.B *perceived threat = perceived susceptibility + perceived severity*

Perceived net benefits = perceived benefit – perceived barrier

* Significant at p value < 0.05

Factors associated with Dracunculiasis disease preventive behaviors

Multiple logistic regression applying the enter method regressed the predictors variables those p values <0.25 in bivariate analysis included on the final regression analysis. The independent

variables those was candidates for these multiple regression analysis was, socio demographic variables such as sex, marital status, ethnicity, age, religion, educational level, occupational status and income level and from the health belief components, perceived threat, perceived net benefits and self-efficacy were included the final model to predict households Dracunculiasis disease preventive behaviors. The specification of the model identified seven significant predictors; marital status, religion, educational level, occupational status, income level, perceived threat and perceived net benefits were remained significant after adjusting others variables fitted in the model.

Being divorced and widowed households were 71% and 88% less likely to be engaged in Dracunculiasis disease preventive behavior than married households with (AOR=0.29, 95% CI: 0.09, 0.94) and (AOR=0.12, 95% CI: 0.013, 0.99), Orthodox religion followers households were 97% less likely to be engaged in Dracunculiasis disease preventive behaviors than protestant religion followers with (AOR=0.03, 95% CI: 0.001, 0.7). Households those completed high school and preparatory level of educational status were 2.68 and 2.65 times more likely to be engaged in Dracunculiasis disease preventive behavior than households those cannot read and write with (AOR=2.68, 95% CI:1.21,5.91) and (AOR=2.65, 95% CI: 0.86, 8.18) respectively.

Households that occupational statuses were Merchant were 4.9 times more likely to be engaged in the Dracunculiasis disease preventive behaviors than farmer households with (AOR=4.89, 95% CI: 1.0, 13.5).

A one unit increase in total family income increased the odds that households have been higher engagement in Dracunculiasis disease preventive behavior by 1% with (AOR=1.001, 95%CI: 1.001, 1.002)

Health belief model constructs which were predicted Dracunculiasis disease preventive behavior, For one unit increase in households perceived threat of Dracunculiasis disease, the log odds that the households will have higher engagement in Dracunculiasis disease preventive behavior will increased by 0.056 with (AOR=1.06, 95% CI: 1.03, 1.09). For one unit increase in households perceived net benefits of Dracunculiasis disease preventive behavior, the log odds that the households will have higher engagement in Dracunculiasis disease preventive behavior will increase by 0.036 with (AOR=1.04, 95% CI:1.003,1.07). (Table 13)

Table 13 Factors associated with household's Dracunculiasis disease preventive behaviors, Gog district, Gambella region, 2014

Variable	Dracunculiasis disease preventive behavior		Beta	OR (95% CI)	
	Low	High		Crude	Adjusted
	N (%)	N (%)			
Sex					
Male	150(73.2%)	55(26.8%)		1	1
Female	134(59.8%)	90(40.2%)	0.55	1.83(1.2,2.75)*	1.7(0.9,3.35)
Marital status					
Married	190(64.4%)	105(35.6%)		1	1
Single	51(60%)	34(40%)	0.56	1.2(0.73,1.9)	1.76(0.8,3.8)
Divorced	26(83.9%)	5(16.1%)	-1.25	0.3(0.1,0.9)*	0.29(0.09,0.94)*
widowed	17(94.4%)	1(5.6%)	-2.16	0.1(0.14,0.8)*	0.12(0.013,0.99)*
Religion					
Protestant	145(62.8%)	86(37.2%)		1	1
Orthodox	12(80%)	3(20%)	-3.57	0.4(0.11,1.5)	0.03(0.001,0.7)*
Muslim	36(76.6%)	11(23.4%)	-0.343	0.5(0.2,1.0)	0.7(0.3,1.8)
Catholic	89(66.4%)	45(33.6%)	0.23	0.8(0.5,1.3)	1.3(0.72,2.232)
Ethnicity					
Angnuak	254(65.6%)	133(34.4%)		1	1
Nuer	10(83.3%)	2(16.7%)	-0.96	0.38(0.08,1.7)	-
Mejeng	6(85.7%)	1(14.3%)	-1.14	0.3(0.03,2.6)	-
Amhara	5(62.5%)	3(37.5%)	0.136	1.1(0.27,4.8)	-
Oromo	9(60%)	6(40%)	0.24	1.2(0.4,3.6)	-
Educational level					
Cannot read and write	113(70.6%)	47(29.4%)		1	1
First cycle	59(83.1%)	12(16.9%)	0.3	0.5(0.2,0.85)*	0.75(0.30,1.86)

Second cycle	51(68.9%)	23(31.1%)	0.33	1.0(0.6,1.9)	1.40(0.61,3.18)
High school preparatory	45(50%)	45(50%)	0.98	2.4(1.4,4.1)*	2.68(1.21,5.913)*
College and above	1(25%)	3(75%)	0.87	2.33(1.09,5.3)*	2.65(0.86,8.18)*
Occupational status					
Farmer	92(74.8%)	31(25.2%)		1	1
Merchant	13(38.2%)	21(61.8%)	1.59	4.8(2.1,10.6)*	4.89(1.0,13.54)*
Housewife	37(61.7%)	23(38.3%)	-0.06	1.8(0.953,3.5)	0.94(0.37,2.37)
Solider	23(82.1%)	5(17.9%)	-0.66	0.6(0.2,1.8)	0.51(0.14,1.86)
Cultural drinking seller	23(76.7%)	7(23.3%)	-0.25	0.9(0.3,2.3)	0.78(0.24,2.50)
Daily laborer	13(81.2%)	3(18.8%)	-0.5	0.6(0.18,2.5)	0.61(0.12,3.01)
Student	45(55.6%)	36(44.4%)	-0.153	2.3(1.3,4.3)*	0.86(0.30,2.43)
Home servant	7(77.8%)	2(22.2%)	-1.22	0.84(0.16,4.29)	0.29(0.038,2.28)
Jobless	11(78.6%)	3(21.4%)	-1.21	0.8(0.2,3.09)	0.30(0.05,1.87)
Civil servant	20(58.8%)	14(41.2%)	-0.35	2.07(0.93,4.6)	0.69(0.22,2.168)
Age			-0.012	0.98(0.93,1.0)	-
Income level			0.001	1.001(1.001,1.002)*	1.001(1.001,1.002)*
Perceived threat			0.056	1.04(1.016,1.06)*	1.06(1.03,1.09)*
Perceived net benefit			0.036	1.04(1.013,1.064)*	1.04(1.003,1.072)*
Self-efficacy			0.04	1.038(0.99,1.08)	-

NB: * Significant at p values < 0.05

Chapter six: Discussion

In this study, majority sixty six percent of the household had low Dracunculiasis disease preventive behavior during two weeks of the study time. Fifteen percent of the respondent had been seen blister on any part of their body of whom the data shows that only 11.9% of them had not washed/ entered in to water sources in the last two week of the study time. This could be because households in the village uses water from unsafe sources, inaccessibility of safe water, seasonal waters was not properly protected by village volunteers, availability of seasonal water source in the village, ignorance of the symptom and this may lead them to wash/enter in to water sources with blister.

From the total of households thirty seven percent of them had filtered drinking water at home level in the past two weeks of study time. Majority of the households had not filtered their drinking water. This may be due to lack of water filter, ignorance of the disease, not accepting the use of water filtration for Dracunculiasis disease prevention, the time duration of filtration procedure takes and preference of the natural test of water, Study done in Nigeria shows that 66.1 percent of the respondent ignorant of the fact that the Dracunculiasis infection is caused by drinking contaminated water(33).

From the total of four hundred and twenty nine of households majorities of respondents ninety six percent's were knows Dracunculiasis disease is caused by drinking contaminated stagnant water and only 9.6 percent were said that throwing a long rope in water source. High percent of knowledge about the cause of Dracunculiasis disease may be due to the accessibility of information through village based volunteers assigned by Ethiopian Dracunculiasis eradication program, health extention workers and health professional and the district were also endemic areas for the disease. From the study conducted in South-West Nigeria and Uganda 81.5% and 63.2% knew infection was from drinking infected water sources respectively(24)(25). The discrepancies of our finding from these finding was may be due to Dracunculiasis disease eradication program intervention in the district were effective in educating the community.

The study shows that household's knowledge about the symptom of Dracunculiasis disease, 86.2 percent of the respondent knew that blister is one of the symptoms of Dracunculiasis disease and 81.8% were knew that Dracunculiasis partly out of the infected body part. This may be due to the

individual experience of the disease and households accessibility to information in the village. Filtering and boiling drinking water as Dracunculiasis disease prevention method was responded by 91.4 and 42.4 percent of respondents respectively and only 19.1 percent were responded that praying on the water as Dracunculiasis disease prevention. This may be due to peoples that resides in the areas where had the history of infection knew the prevention methods, the study done in Nigeria respondents were practice boiling and filtering of drinking water in infected villages.(26) The role of individual when someone has Dracunculiasis disease, the majority 81.1 percent's were knew that staying away from any water source, 18.6 percent were knew that pulling the worm slowly out and roll it on a thin stick and 9.3 percent respond that traditional medicine.

This study showed that Dracunculiasis disease preventive behaviors of households were affected by different factors. Among these being divorced and windowed households were 71% and 88% less likely to be engaged in Dracunculiasis disease preventive behavior than married households. This may be due to married household's leads their life on stable place and they may have income sources to buy water filter, the chance of moving from village to village will be decrease since they have family.

By its nature religion is individual's belief and opinions on the nature and places where people come together to pray. These gatherings of peoples are a good opportunity for different health messages. Peoples trust the message which is addressed through his religion leaders; from this study Orthodox religion follower's households were 97 percent less likely to be engaged in Dracunculiasis disease preventive behaviors than protestant religion followers. This may be due to protestant church are more actively participating on information dissemination about dracunculiasis disease preventions behavior to its followers, and taking parts for eradication program than other religion existing in village.

The study shows that households those completed high school and preparatory level of educational status were 2.68 and 2.65 times more likely to be engaged in Dracunculiasis disease preventive behavior than households those cannot read and write. This is may be due to the nature of education that it develops individual minds to thinks critically and increase self-responsibility of own health. Educated person can easily understand Dracunculiasis disease preventive behaviors from different media source and has the chance to practice them.

Understanding and practicing of Dracunculiasis disease preventive behaviors may be so difficult for those cannot read and write households

From the study result occupational status of the households were one of the factors affect the households Dracunculiasis disease preventive behavior, Merchant households had 4.9 times more likely to be engaged in Dracunculiasis disease preventive behavior than households occupational status were farmer. By its nature farming activities enable household to have more contact with different water source, farming area far from potable water source, the chance to cross water source, ignorance, preference of the natural taste of water, lack of water filter or pipe filter may be those factors affecting lowest engagement in Dracunculiasis disease preventive behavior of farmer households. From study done in Nigeria shows that majority 50 percent of infected individuals were farmers(24).

In this study households income level were affect Dracunculiasis disease preventive behavior, A one unit increase in total family income increased the odds that households have been higher engagement in Dracunculiasis disease preventive behavior by 1%. This may be due to household's water filter buying capacity and replacing of old water filter with new one may be the challenge of households with lower income level.

Perceived threat and perceived net benefits were significantly associated constructs of health belief model. Household's one unit increases in perceived threat of Dracunculiasis disease the log odds that the household engagement in Dracunculiasis disease preventive behavior will increase by 0.056. This could be due to households perception of the disease directly influence practice of its prevention behaviors. Study were done in Nigeria revels that 87.2% perceived infection of Dracunculiasis disease very series effect on their farm, 79.5% perceive its economic loss of infection and 71.8% clams that its serious adverse effect on social activities, and there perception were leads them to practice the prevention behavior, 88.2% were filtering drinking water(24).

This study shows that household's one unit increases in perceived net benefits of Dracunculiasis disease preventive behavior the log odds that the household engagement in Dracunculiasis disease preventive behavior will increase by 0.036. This could be as the individual perception of the benefits of preventive behavior increase engagement in preventive behavior's also increase.

From the study Oyo state, South-west Nigeria, respondents were perceived the benefits of water filtration and boiling prevents Dracunculiasis disease (15).

In this study even though self-efficacy and cues to action were not significant predictors of Dracunculiasis disease prevention behavior, they have association with Dracunculiasis disease preventive behaviour of households. One unit increases in self-efficacy to Dracunculiasis disease preventive behavior the log odds that the household engagement in Dracunculiasis disease preventive behavior will increase by 0.04. And a one unit increase in cues to action decreased the odds that households have been higher Dracunculiasis disease preventive behavior by 1 percent.

Chapter seven: Strength and Limitation of the study

Strength of the study

- ✓ The study is new in its kind that no other similar type of study in our country. This will be available base line data for planning and interventions of Dracunculiasis disease eradication in our country.
- ✓ The study was done using a theoretical model HBM and it has been good predictors of individual preventive behavior.

Limitation of the study

- ✓ Due to cross sectional nature of the study, it is difficult to know the behaviour or the predicting variables occur first.
- ✓ Social desirability bias may introduced since the data was collected using interviewer administer questionnaires.
- ✓ Lack of similar studies hinders the comparison of results with other finding'

Chapter eight: Conclusion and Recommendation

Conclusion

The conclusions drawn from this cross sectional study is that Dracunculiasis disease preventive behavior of households was very low. Entering to water sources having blister was high and water filtration behavior was low. Generally all the above factors contribute for households low Dracunculiasis disease preventive behaviors in the study area.

Marital status, religion, educational status, work condition and households income status are those significantly contribute for lower Dracunculiasis disease prevention behavior whereas sex, ethnicity, age and knowledge were no significant association with the behavior. Households Perceived threat of Dracunculiasis disease and perceived net benefits of Dracunculiasis disease preventive behaviors has also the most significant influence on Dracunculiasis disease preventive behavior of households whereas self-efficacy and cues to action had no significant relation with Dracunculiasis disease preventive behaviors.

Recommendation

- MOH, EPHA, GRHB, GRWAB and different partners, zonal woreda administrative should avail safe water supply for the community.
- Woreda health bureau should develop effective IEC materials that include the perceived threat and perceived net benefits of Dracunculiasis disease and its preventive behaviors.
- Woreda and Kebele administrative counsel should promote effective community participation at all segments of work environment.
- Dracunculiasis disease eradication programmers should focus continuous provision of water filtration for households.
- All religion organization in the woreda should actively participate on Dracunculiasis disease eradication program in the district.
- Programmers and different partners should design eradication plan and strategy that focus households.
- Health professional, health extention workers and village based volunteers should work to increase positive perception towards Dracunculiasis disease preventive behaviors.
- Further studies are needed to identify preventive behaviour of Dracunculiasis disease by using the comparative study between districts highly at risk and districts of not at risk in the region at all.

Reference

1. World Health Organization. Working to overcome the global impact of neglected tropical diseases: first WHO report on neglected tropical diseases. 2010 p. 172.
2. Ernesto Ruiz-Tiben, Donald R. Hopkins TKR and RLK. Progress Toward the Eradication of Dracunculiasis (Guinea Worm Disease). *Emerg Infect Dis*. Atlanta, Georgia, USA; 1995;1(2):58–60.
3. Donald R. Hopkins MLE. Progress Toward Global Eradication of Dracunculiasis January 2012 – June 2013. *Morb Mortal Wkly Rep*. The Carter Center, Atlanta, Georgia.; 2013;62(42):830–3.
4. Ruiz-Tiben DRH and E. Dracunculiasis (guinea worm disease): case study of the effort to eradicate guinea worm. In: Selendy JMH, editor. first. Jone wiley and Sons, Inc.; 2011. p. 125–32.
5. World Health Organization. Dracunculiasis eradication: global surveillance summary. *Wkly Epidemiol Rec* 83. 2008;159–67.
6. Center WC, Research, Training and Eradication of Dracunculiasis C. GUINEA WORM WRAP-UP #223 [Internet]. Mailstop C-09, 1600 Clifton Road NE, Atlanta, GA 30333, USA; 2014. p. 1–9. Available from: <http://www.cdc.gov/parasites/guineaworm/publications.html#gwwp>
7. World Health Organization. Dracunculiasis (guinea-worm disease) Fact sheet N°359 [Internet]. 2013. Available from: <http://www.who.int/mediacentre/factsheets/fs359/en/index.html>
8. Awoyemi TT, Sowunmi FA. Socio-economic burden of guinea worm disease in Ogun State : A discriminant analysis approach. *African J Agric Res* [Internet]. 2009;4(11):1138–47. Available from: Available online at <http://www.academicjournals.org/AJAR>
9. Hopkins DR, Ruiz-tiben E, Downs P, Withers PC, Roy S. Dracunculiasis Eradication : Neglected No Longer. *Am Soc Trop Med Hyg*. 2008;79(4):474–9.
10. Hopkins DR, Ruiz-Tiben E, Ruebush TK et al. Dracunculiasis Eradication: Delayed, Not Denied. *Am J Trop Med Hyg*. 2000;62(2):163–8.
11. Watts SJ, Brieger WR YM. Guinea worm: an in-depth study of what happens to mothers, families and communities. *Soc Sci Med*. 1989;29:1043– 1049.

12. Muller R. Guinea worm disease: epidemiology, control, and treatment. *Bull World Health Organ.* 1979;57:683–9.
13. Callahan K, Bolton B, Hopkins DR, Ruiz-tiben E, Withers PC, Meagley K. Contributions of the Guinea Worm Disease Eradication Campaign toward Achievement of the Millennium Development Goals. *PLoS Negl Trop Dis.* 2013;7(5):7.
14. Sharon Roy ER-T. *Eradication & Control Programs: Guinea Worm.* 2009. p. 53.
15. Morenikeji O AA. Progress in dracunculiasis eradication in Oyo state, South-west Nigeria: a case study. *Afr Heal Sci.* 2010;10:297–301.
16. WHO Collaborating Center for Research Training and Eradication of Dracunculiasis. Guinea worm Wrap-up #34,to address time remaining to eradicate Dracunculiasis. 1991 p. 8.
17. WHO Collaborating Center for Research Training and Eradication of Dracunculiasis. Guinea worm Wrap-up #35,to address time remaining to eradicate Dracunculiasis. 1992 p. 7.
18. Daniel M. Keller P. Guinea Worm Eradication in Ethiopia Predicted Close at Hand. *Medscape Medical News* [Internet]. 2012 Jul 9; Available from: <http://www.medscape.com/viewcollection/32513>
19. WHO Collaborating Center for Research Training and Eradication of Dracunculiasis. Guinea worm Wrap-up #45,to address time remaining to eradicate Dracunculiasis. 1994 p. 16.
20. World Health Organization. Progress reports Report by the Secretariat,134th session Provisional agenda item 13.2. 2013 p. 1–27.
21. WHO Collaborating Center for, Research, Training and Eradication of Dracunculiasis C. Detect every case! Contain every worm! Trace every source! GUINEA WORM WRAP-UP #221. Mailstop C-09, 1600 Clifton Road NE, Atlanta, GA 30333, USA,; 2013;3.
22. Ruiz-Tiben DRH& E. Strategies for dracunculiasis eradication. *WHO Bull OMS.* 1991;69(3):533–40.
23. H.A. Akinsola o. o. K. Copepod filters for guinea-worm control - users have their say. *World Heal Forum.* *World Health Forum;* 1997;18:270–3.

24. Morenikeji Olajumoke AA. Progress In Dracunculiasis Eradication: Ogun State, South-West Nigeria As Case Study. *J Am Sci.* 2009;5(4):189–93.
25. Omar MA, Sufi QM G-OA. Community perception and role in prevention of Guinea worm disease. *PubMed - Index Medlin.* 1993;5(5):305–12.
26. Morenikeji O A OAB. Perception and management of guinea worm disease in infected and at risk non- infected communities in Oyo state, Nigeria. *Ann Afr Med.* 2008;7:51–4.
27. Parasitol A. Behavioural aspects and their possible uses in the control of dracontiasis (guinea-worm) in Igwun river basin area of Imo State, Nigeria. *PubMed - Index Medlin.* 1989;33(4):205–10.
28. Brieger WR. Health education to promote community involvement in the control of tropical diseases. *Acta Trop.* 1996;61:93–106.
29. Rosenstock IM. Why people use health services. *Milbank Mem Fund Q.* 1966;44:Suppl:94–127.
30. Sharma M RJ. Theoretical foundations of health education and health promotion. Sudbury, MA: Jones and Bartlett Publishers; 2008.
31. Adam P. Knowlden MS. Health belief model predictors of undergraduate students engagement in short messaging services while operating a motor vehicle. *Saf Sci Monit.* 2012;16(1):1–10.
32. Ross TP, Ross LT, Rahman A, Cataldo S, Carolina S. The Bicycle Helmet Attitudes Scale : Using Among Undergraduates. *J Am Coll Heal.* 2010;59(1):31–3.
33. Morenikeji O A OAB. Perception and management of guinea worm disease in infected and at risk non- infected communities in Oyo state, Nigeria. *Ann Afr Med [Internet].* 2008;7:51–4. Available from: <http://www.annalsafmed.org/text.asp?2008/7/1/51/55681>

Annex 1: Verbal Consent

Hello, my name is _____. I am working as data collector for the study conducted by Jimma university post graduate student ----- on Dracunculiasis disease Prevention Behavior and Associated Factors among Households in Gog District, Gambella Region, Southwestern Ethiopia. I want to interview you about your knowledge and perception towards Dracunculiasis disease and preventive behavior in order to collect information necessary for developing appropriate strategies and interventions to eradicate the disease. To attain this purpose, your honest and genuine participation by responding to questions is very important and highly appreciable. I expect the interview may take about 10-20 minutes. You do not need to provide your name. Please be assured that all the information gathered will be kept strictly confidential. You can prefer not to respond to all or some of the questions and you can stop the interview at any time.

Are you willing to participate in our study?

Thank you for your cooperation!!!

Name of Kebele.....

Name of data collector

Kebele code

Sign

House no

Supervisor name

Date of interview.....

Sign

Annex: 2 English Questionnaires

Questionnaire No -----

Data collector code No -----

Part 1 Socio Demography related questions

No	Questions	Response and coding	Skip to
101	sex of the respondent	Male1 Female.....2	
102	Age years	
103	Religion	Orthodox 1 Muslim2 Protestant3 Catholic.....4 Others specify5	
104	Ethnicity	Angnuak1 Nuer2 Mejeng3 Amhara..... 4 Oromo..... 5 Other (specify).....6	
105	Marital status	Single1 Married..... 2 Divorced.....3 Widowed.....4	
106	Educational status	Can't read and write1 Grade 1-42 Grade 5-83 Grade 9-104 Grade 11-125 College and above6	
107	Occupation	Farmer.....1 Merchant.....2 House-wife.....3 Solider.....4 Borde/ tella seller.....5 Daily laborer.....6 Student.....7 Home servant.....8 Jobless.....9 Civil servant10 Others (specify).....12	
108	Monthly family income (Approximately)? Birr No income 1	

		Don't know 2	
		No response 3	
109	Total number of members of the household	Male ----- Female	

Part 2.knowledge related to Dracunculiasis disease

No.	Questions and Filters	Coding categories	Skip to
201	Tell me what is/are the causes of Guinea worm?	Eating fresh fish or mud fish1 Witchcraft2 Evil spirits3 Having too many veins or broken veins4 Stepping on a dead guinea worm.....5 Throwing along rope in water source6 Drinking water from stagnant water sources7 Other99 (Specify).....	
202	What is/are symptoms of Dracunculiasis disease?	Fever1 Swelling2 Blister3 The Guinea worm partly out of the body.....4 Loss of appetite5 Nausea6 Difficulty walking7 Fatigue8 Pain and infection9 Other99 Specify.....	
203	How do you prevent Dracunculiasis in your community?	Boil drinking water1 Filter drinking water.....2 Add a few herbs to your drinking water.....3 Pray over water.....4 Others specify	
204	If someone has Dracunculiasis disease in your community, What do you do to him/her?	Go to the witch doctor1 Use traditional medicines (leaves, oil, cow dung)2 Dip the infected part of the body in standing	

		water3 Cut the blister or the worm ...4 Pull the worm slowly out and roll it on a thin stick5 Get the village volunteer to visit and tend the worm6 Stay away from water sources7	
205	Is there a chance of more than one worm emerging at one time from a sick person?	Yes1 No2 Don't know..... 88	
206	Can Dracunculiasis disease be prevented by treating contaminated water sources by chemicals?	Yes1 No2 Don't know..... 88	
207	Is Dracunculiasis disease curable/treatable?	Yes1 No2 Don't know..... 88	
208	If a person acquired Dracunculiasis disease, he/she will not have the chance to get the disease throughout his/her life again?	Yes1 No2 Don't know..... 88	

Part 3. Constructs of Health Belief Model items

Perceived susceptibility to Dracunculiasis disease

S.no	Question	Response				
		Strongly disagree(1)	somewhat disagree (2)	“neither agree nor disagree(3)	Somewhat agree(4)	strongly agree(5)
301	How likely do you agree that you will get Dracunculiasis disease in the future?					
302	How likely do you agree it is that you will get Dracunculiasis disease sometime in your Life?					
303	How likely do you agree it is that you will Have a good possibility of getting Dracunculiasis disease in the next six months?					
304	How likely do you agree it is that your chances of getting Dracunculiasis disease are great?					
305	Compared to other people your age, how					

	likely would you agree that you get Dracunculiasis disease more?					
306	How likely do you agree that at least one of your family members are at risk for getting Dracunculiasis disease in the coming six months?					

Perceived severity of Dracunculiasis disease

S.no	Question	Response				
		Strongly disagree(1)	somewhat disagree (2)	“neither agree nor disagree(3)	Somewhat agree(4)	strongly agree(5)
	I am now going to read you some list of people opinions on severity of Dracunculiasis disease Please tell me your level of agreement on the following statements					
307	The thought of Dracunculiasis disease scares me					
308	If I get Dracunculiasis disease, my job would be in danger					
309	Problems I would experience with Dracunculiasis disease would last a long time					
310	Dracunculiasis disease would threaten my role in the community					
311	If I had Dracunculiasis disease my whole life would change					
312	Getting Dracunculiasis disease would disrupt my family life					
313	Having the Dracunculiasis disease would make daily activities more difficult					
114	Dracunculiasis disease can be a serious disease					

Perceived benefit of Dracunculiasis disease preventive behavior

S.no	Question	Response				
		Strongly disagree(1)	somewhat disagree (2)	“neither agree nor disagree(3)	Somewhat agree(4)	strongly agree(5)

	I am now going to read you some list of people opinions on the benefits of practicing Dracunculiasis disease preventive behavior. Please tell me your level of agreement on the following statements					
315	When I had filtered my drinking water I feel about dirt's are removed					
316	When I complete filtering of drinking water with water filter I don't worry as much about Dracunculiasis disease					
317	Completing Filtering water properly before drinking will allow me safe from Dracunculiasis disease					
318	If I complete filtering water before drinking during the next year I will not have a chance of Dracunculiasis disease					
319	If I complete water filtrations before drinking I will be safe from the pain because of emerging worms.					
320	When I had Not entering to water sources with emerged worm, I feel Dracunculiasis disease was prevented					
321	When I hadn't entered to water sources with having blister, I fell my family members would be safe from Dracunculiasis disease					
322	When I had avoided washing on water source with having blister, I feel my entire village prevented from Dracunculiasis disease					

Perceived barrier of Dracunculiasis disease preventive behavior

S.no	Question	Response				
		Strongly disagree (1)	Somewhat disagree (2)	“neither agree nor disagree(3)	Somewhat agree(4)	strongly agree(5)
	I am now going to read you some list of people opinions on the barriers to practice Dracunculiasis disease preventive behavior. Please tell me your level of agreement on the following statements					
323	I feel funny about the use of filtering water for Dracunculiasis disease prevention					

224	Filtering drinking water will take too much time					
225	I don't have enough money to buy cloth water filter					
326	I feel getting cloth water filter is inconvenient at household level					
327	Not all the members of my family do drink from filtered water					
328	I don't filter water because others do not filter their water.					
329	I can't away from water source during acquiring blister because I will get relief when I put it in to water sources					
330	I will always cross water source during my way to get in to the farm/market place					

Self-efficacy to Dracunculiasis disease preventive behavior

S.no	Question	Response				
		Strongly disagree (1)	somewhat disagree (2)	“neither agree nor disagree(3)	Somewhat agree(4)	strongly agree(5)
	I am now going to read you some list of people opinions on their confidence to practice Dracunculiasis disease preventive behavior. Please tell me your level of agreement on the following statements					
331	I am confident that I can perform water filtration correctly					
332	I am confident that I will filter my drinking water even if I am far away from my home					
333	I am confident that I can most often take water pipe filter with myself during my travel away from the home to make my drinking water more safer					
334	No matter how I am in difficult circumstance like being on farming field I am sure that I don't drink contaminated water source till I get back home, for the prevention of DRACUNCULIASIS DISEASE					
335	I am confident that I can always rely on using cloth filter to prevent myself and my					

	family from Dracunculiasis disease					
336	I am confident that I will not enter in to any water sources being having emerged Dracunculiasis for the prevention of Dracunculiasis disease transmission					
337	I am confident that I will not enter in to water source during my way to get in to the farm/market place					

Cues to action to Dracunculiasis disease prevention behavior

S.no	Question	Response				
		Strongly disagree(1)	somewhat disagree (2)	“neither agree nor disagree(3)	Somewhat agree(4)	strongly agree(5)
	I am now going to read you some list of people opinions on their cues to action to practice Dracunculiasis disease preventive behavior. Please tell me your level of agreement on the following statements					
338	I recall seeing video show, billboard ads or posters about water filtration during the past months					
339	I have received advice from health extention workers about water filtration					
340	Village based volunteers were discussing with me about water filtration					
341	Seeing Dracunculiasis disease infected person would help remind me to filter my water					
342	I recall seeing video show, billboard ads or posters about avoiding entrance in to water sources having blister during the past months					
343	I have received advice from health extention workers about avoiding entrance in to water sources having blister					
344	Village based volunteers were discussing with me about avoiding entrance in to water sources having blister					
345	Seeing Dracunculiasis disease infected person would help remind me to avoid entrance in to water sources having blister					

Part 4.Dracunculiasis disease preventive behavior

No.	Questions and Filters	Coding categories	Skip to
401	Did you see symptoms like Swelling/ blister on any part of your body since last two week? (observe)	Yes1 No2	If no skip to 403
402	Did you washed in streams/ ponds/ wells in the past two week?	Yes.....1 No2	
403	Did you arrived far away from the village in the past two week (seven days)	Yes1 No2	If no skip to 406
404	From which source of water did you drank when you are far away from your home?	Pipe / tap.....1 borehole.....2 River3 Lake4 Pond5 Stream6 Other specify7	
405	Did you filter the water before drinking?	Yes1 No2	
406	If Q405 no why?	-----	
407	Did you filter drinking water today?	Yes1 No2	
408	Did you filter your drinking water yesterday?	Yes1 No 2	
409	Did you filter drinking water last two week (past 14 days)?	Yes1 No 2	
410	In a day, how many times do you filter drinking water?	One1 Two2 Three3 Four4 Five and above5	

Annex: 3 Anguwa Questionnaires

Man Bee Yunī-böocīthī Mar Jīmma

Køølec Mar Jööt dēel Mar Jiy ki caany Mar øt-jaath

Dipartmen mar pwöc jööt dēel ki wēel bēet o-dhaanhø, pīēc ki løk pīēc moi ajiingnge kipper kwäänö mar taw cēēi , i jöör bēet gwøk røk ki gø iththa-kiic jø Gøøk ki ya-atut Gambēla thāang buut-piny mar bāat cwīic ni jöotta bang kun päth cäng yie ki yi Ithoopiia.

Pēeny jīēc acaara

Ongat-beer/Nyingat-beer dēerī jööt?

Aani nyengnga cwøl.....Tier gīna öoa kipire ,aööi kiper käl döötti ,ki køør kwäänö man ni tīic obwöc øt-göör jīmma Yunī-böocīthī en,bāat taw cēēi. Kpier manøgø-nø, amanynya man pēenynya iinī ki yi jöör bēet gwøk røk ki taw cēēi kēel ki møøk nyīēedi? Ne dee gīn løgi løø kipere .Döötti moi ki yaa-nguudī pergi leth, kiper eni jāppö ki jöo mo kīththa bāat tīic man raany taw cēēi ki gø. Gīn mii kwaa-kwaaø ki gø mo duunnö ki pwöc angøøni? bee cäänö /løk pīēc moi ni kargi ki ngäadhē. Gīn mo di-caanø wøk kiperi bungngö man thiinh en. Thuwø nyengngi ba maar göör piny. Pīēc man kädö ki di-giige 10 – 20. Teek bungngö yie man dwøgi pīēc gi bēet , kanyo manynyi-gø yie løny man ngøli-gø.

Yii jūö ki man tīi bāat kwäänö man? Kiper manøgø – nø iina pwöc!!

Nyeng kabale.....Ngīi mar kabale.....kuthur mar øttø.....

Nīr dwāāi.....

Ngatta käl løk pīēc.....pīrma

.....

Nyeng dī lēey Pīrma

Piëc 1. Piëc moa näk ree egudö ki bëët dhaanhö

Kuthur	Piëc	Lök piëc	Päär bang
101	Īinangøøni ?	Dicwøø.....1 Dhaagø.....2	
102	Cwiiiri moi adii ?	Cwiiiri.....	
103	Øt-jwøk man lämi yie amane ?	Ørthødøk.....1 Mucilim.....2 Prøthec-thaan.....3 Kathølik.....4 Mør/møøk.....5	
104	Wijur mari angøøni ?	Anyuwa.....1 Nuwäär.....2 Majang.....3 Amäärä.....4 Orømø.....5 Mør.....6	
105	Nywöm dagø jiri ?	Bungngö.....1 Dagø.....2 opääö.....3 cī-thøø wala jwörö.....4	
106	Göör i göödī ya dīi ?	Abakwäänö wala abagöödö.....1 Kīpil 1-4.....2 Kīpil 5-8.....3 Kīpil 9-10.....4 Kīpil 11-12.....5 Køølec ki maal....6	
107	Tiic mari angøøni ?	Tiipuur.....1 Tiigadha.....2 Dhaang-paac.....3 Thabanynya.....4 Tiigath- böördhī...5 Tiigulbäth/bat.....6 Nyilaarøt-göör.....7 Ngat tiic mar paac....8 Bungtiic.....9 Møøk ne-dagø....10	
108	Gwel adii o jootti ki yi-dwääi?	Bīrri..... Bung-gwel.....1 Kuuää.....2 Bungduuī jira.....3	
109	Kwään jø paari gi bëët adii ?	Cwøw..... Mään.....	

Piëc 2 Kwänynyö mo ree egäabö ki täw cëëi

Kuthur	Pīęc	Løk pīęc/Duuī	Päär bang
201	jöö/jiēdhī mo muu Cēēi ki gi?	Bee ki ri cam rēēō mo nyään kaamar Luuth.....1 Bee ki ri nyīi-twōngī.....2 Öōi ki ri jiwēēiya-anägō.....3 Bee kanyo nāk da-läär mo thöōth mo rānynyō.....4 Bee ki ri wäāth bāāt twök cēēi moa nāk othow..5 Leeng thøøl mo bäär yi-naam.....6 Maath pīi mo pīiā-guula/leela...7 Mør/møøk.....99	
202	Ngīc-cē wala nyuuththē mo tāw cēēi bee?	.Līēēth dēēl.....1 .Dijil dēēl ki kanyo öō wök ki yie.....2 .Kare wēēnnō.....3 .Kar dheē bööt oo tumē ni løøngngi.....4 .Dhee/thāängē öōa wök ki ri dēēl.....5 .Dhi-cwīny di-dēēdō.....6 .Lāām cwīny.....7 .Wäāth di-mānō.....8 .øøc-dēēl piny...9 .Rāām ki wēēnnō.....10 Mør/møøk.....99	
203	Īththa kiic jø poo tāw cēēi mānīgø ni dīi?	Bee ki man moor pīi.....1 Bee ki man thiiw pīi.....2 Bee ki man buut pīi ki bøøge.....3 Bee ki man lām bāātē.....4 Mør/møøk dagø?.....99	
204	Nāk di-dhaanhø mo tiere da-cēēi ya tut mari otīiyi-gø ni dīi?	Bee ki man cii banga ajooa ki gø.....1 kønyī-kønyø ki jir-paac (bøøge,maaw, ciēth dhiang).....2 Tīiyi-tīiō nee ci ith pīi moo maath.....3 Kanynya nāk obööt bee ki man tuiyigø wala man ngøli cēēi mana en-dēērē.....4 Bee ki man tuudī cēēi wök määth o meenigø ri jaath.....5 Bee ki man cii bang ngat tīi-cēēi o caani-gø jirē.....6 Bee ki man tīiyi gø nee ba ci ith-pīi...7	
205	Løny man ö cēēwē wök ki ri dēēl mo kaala aciel ki yie aciel?	.Bee kare.....1 .Paththa kare.....2 .Kuuää.....88	
206	Tāw cēēi løny ki man mānī ki jør leele ki jaath?	.Kare.....1 .Paththa kare.....2 .Kuuää.....88	
207	Tāw cēēi løny ki man	.Kare.....1	

	cangnge dēel ki kīinē?	.Paththa kare.....2 .Kuuää.....88	
208	Nāk iinu mak taw cēēi ennø, i ba cing magø kēēt?	.Kare.....1 .Paththa kare.....2 .Kuuää.....88	

Piēc 3 Piēc mo nyooththa ngäadhē bäät bëet gwøk røk ki taw cēēi ki i nyimē

Kuthur	Piēc	Løk				
		piēc				
		Dēera ki gø ni bārē(1)	Ki kany mo thiinh dēera	Aba kööi ni yaa iinö wala ni yaa	Ki kany mo thiinh yaa	Yaa jiiö ni bārē(5)
301	Jiri da ngäadhē ki man nāk i ba mak taw cēēi kēēt					
302	Ngäadhē dagø jiri ki kwöör møk man nāk i mak taw cēēi i nyimē					
303	Dagin mo nënō jiri ith dwädē abiciel nyim man nāk i mak taw cēēi mangø					
304	Gum dēel mo päl dagø mo nënō jiri ki man ö iini ni mak taw cēēi					
305	Iini ki iththa kiic jø moga noo rømi gø ,nënnō mari dagø mo päl ki man jitti ki cēēi					
306	Ki ri jø dhi-øttø mari di dhaanhø mo yii ngäadhø mo lany man magi cēēi ,dwädē abiciel nyim					

Bëet gwøk dēel ki taw cēēi gin

Kuthur	Piēc	Løk piēc				
		Dēera ki gø ni bārē(1)	Ki kany mo thiinh dēera kigø(2)	Aba kööi ni yaa jiiö wala ni yaa kwierø(3)	Ki kany mo thiinh yaa jiiö(4)	Yaa jiiö ni bārē(5)
307	Taw cēēi dhaanhø wēegē can					
308	Nāk iinu mak cēēi ii caarø ni tiic mari wēegē rānynyö					
309	Cigirē mo taw cēēi ni waany ki kany mo yie bäär dēel					
310	Tiiē mo doo löny tiic iththa kiic jiy män taw cēēi mänö					

311	Näk dēer dhaanhø di cēēi, bēettō mar dhaanhø bārē dak					
312	Ngat dēerē di tāw cēēi, bēet jø dhi-øttø mare gwäiyō					
313	Bēettō dēel ki tāw cēēi, tīrē mo i cāng ba lony ni jōöt ki tīic					
314	Tāw cēēi lony man nyaae oo tumē ni teek					

Bēet gwøk dēel ki tāw cēēi gīn duuē ri ngith

		Dēera ki gø ni bārē(1)	Ki kany mo thiinh dēera kigø(2)	Aba kōōi ni yaa jīō wala ni yaa kwierø(3)	Ki kany mo thiinh yaa jīō(4)	Yaa jīō ni bārē(5)
315	Kanyo näk pīi mo maath moi yii thiio, i cādō ni jammi moa riyyø yii käl wøk ki yīth-pīi					
316	Kanyo näk pīi yii thōorō ki thiio ni wøp, bung gīn mo caari kēet kiper cēēi					
317	Thiiv pīi ni wøp nyim maath, i tīrē tīō ni gowøe ki tāw cēēi					
318	Thiiv pīi ni wøp nyim maath, kiper cwino öōi i ba jitti gum dēel man magi cēēi					
319	Näk mo pīi moi yii jiangngø ni wøp, ibøth ki rāam cēēi mo öo wøk ki ri dēel					
320	Ni näk mo i kir ci yīth pīi ni tieri di-cēēi mo omulwøk, i ngāadhø ni cēēi yii mänō ki mungö					
321	Näk mo i kir ci yīth pīi ni tieri obööt/løongngi ki cēēi, ii ngāadhø ni jø dhi-øttø mari gi yii gwøø ki tāw cēēi					
322	Näk mo i kir lwøk i Leela ki tieri mo obööt cēēi, ii ngāadhø ni jøøa atut moi yii gwøø ki tāw cēēi					

Bēeta ataa mano nyaac tāw cēēi ki gø

Kuthur	pīec	Duui/løk
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		pięc				
		Kira jüö	Kira jüö	Aba kööi	Yaa jüö	Yaa jüö dic(5)
323	Löny man ngiëeri bääť joo kõny røggi ki püi ni di-thiiø ne täw cëei mäni					
324	Thüö ki püi kädö ki caae mo thööth					
325	Jiri bung birri mo rømø ki man ngëei ka adhiinga					
326	Jittö ka adhiinga mar thiiw püi, paa gin mo beer kiper jø dhi-øttø mari					
327	Jiri da ngäadhë ni jø dhi-øttø mari gi bëet gi mädhö ki püi moa näk othiiø					
328	Kiper ma näk jø møøk ba thüö ki püi, iini thøø i ba -thüö ki püi					
329	Kari ba tiyi ni bäär ki kar püi näk mo tieri da cëei, kiper noo rwaagi tieri yie rääm ni- wääw					
330	Iini i nguttö Cooth ki yi leela kanyo aa yi pwödhö wala kar gadha					

Ngäadhö ki dëel kiper gwøk røk ki täw cëei

Kuthur	pięc	Duui/løk				
		pięc				
		Kira jüö ni	Kira jüö ki	Aba kööi ni	Yaa jüö ki	Yaa jüö dic(5)
331	Iini i ngäadhö ki dëeri man näk püi löny ki thiiw jiri ni kare					
332	Këel mo kari bäär ki paac mari, jiri da ngäadhë ki man thiiwi püi mo maath					
333	Kanyo aai wøk ki yi paac, i kädö koo piirrø nio omäththi-gø ki pi-leela					
334	Këel mo iinu näk riew-wi mo nyiëedi yi pwödhö wala wøk i ba mäththi ki püi mo riy-yø këel kanyo duui paac					
335	Jiri da ngäadhë cooth man näk kõny røk ka adhiinga kiperi wala kiper jø dhi-øttø mari o mänë mänö ki täw cëei					
336	Iini i ba cii yith püi mooi nø jaak näk mo tieri da cëei mo dheer omulwøk, kiper jøw moga ne ba mange					
337	Iini ba löny ki man cii yith püi kanyo cäadhü ni cøøa i pwödhö wala kar gadha					

Acaare mo par wic mo kännö ki tiiic mo gwokka dëel kiper taw cëëi

Kuthur	Pïec	Kwierre/Ngäätthë				
		Jira bäär dic(1)	Jira bäär määtthë(2)	Kira kwierre	Yaa-jiö määtthë(4)	Yaa-jiö dic (5)
338	Wii pari parø dwääi mana pöödhö man näk iinu räangö ki viidiö,biiil-böörd wala pøther-ri mo nyoththa i jöör thiiö ki pii					
339	Iinu kädö ki pwöc bang ngat theena ek-theencen mo cäänö kiper i jöör thiiw pii					
340	Ngat tii cëëi acäänö ki iini kiper thiiö ki pii					
341	Jittö mari ki dhaanhø mo tuu ki taw cëëi I caarø ni duunnö kiper wic man thiiwi pii moi					
342	Wii pari parø dwääi mana pöödhö man näk iinu räangö ki viidiö,biiil-böörd wala pøther-ri mo nyoththa i jöör thiiö ki pii					
343	Pwöc dagø mo ii-lwørø bang ngat teena ek-teencin mo nyooththa män dhaanhø mo tiere obööt ki man ba ci i-pii					
344	Ngat tii-cëëi acäänö ki iini kiper man ba cii yith- pii näk mo tieri da-böödö mar cëëi					
345	Jittö mari ki dhaanhø mo tuu ki cëëi mo kir ci I pii, ii-caarø ni ciippö ki pwöc jiri Ki man ba cii yith pii näk mo tieri Obööt ki böödö mar cëëi					

Täk pïec 4 Jieeth män dëel ki taw cëëi

Kuthur	Pïec	Løk pïec: Eë wala Bungng-gö	Päär bang
401	Yith juu ariew moa näk opöödhö da nyuuththë ma jootti dëeri kamar wëennö wala böödö?	Eë.....1 Bungng-gö.....2	Näk mo løk pïec be bungng-gö päär bang 403

402	Yīth juu ariew moa nāk opödhö, iīnu lwøk i pī- Leela, Jøøro wala iith?	Ēē.....1 Bungng-gö.....2	
403	Yīth juu ariew moa nāk opödhö, iīnu ya wøk ki yaa-tut mari?	Ēē.....1 Bungng-gö.....2	Nāk mo løk pīēc be bungng-gö päär bang 405
404	Yīth juu ariew moa nāk opödhö kanya aai wøk ki yi-paac, iīnu maaththa pīāngø?	Pī-böömba.....1 Pī-iith.....2 Pī-naam.....3 Pī-puul.....4 Pī-Leela.....5 Pī-jøøro.....6 Mør/Møø.....7	
405	Nyīm maath, pīi moi thiiwi-thiiø o bēēdē?	Ēē1 Bungng-gö.....2	
406	Nāk mo løk pīēc mari bee bungngö, akiperngø?	. -----	
407	Dīcāngī pīi mo maath yi-thiiø?	Ēē.....1 Bungng-gö.....2	
408	Yaa wäärē pīi moa maath yi-thiiø?	Ēē.....1 Bungng-gö.....2	
409	Jwøk mana pödhö pīi moa maath yi-thiiø?	Ēē.....1 Bungng-gö.....2	
410	Ki yi-cāng akwörē dīi ni-thiō ki pīi mo maath?	Yie-aciēl.....1 Kwöörē ariew.....2 Kwöörē adāk.....3 Kwöörē angween...4	

“Thank you very much”