

**PERCEPTIONS AND EXPERIENCES OF PEOPLE IN
GAMBELLA REGION OF ETHIOPIA ON GUINEA WORM
DISEASE ERADICATION INTERVENTIONS**

by

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DECLARATION

I declare that **PERCEPTIONS AND EXPERIENCES OF PEOPLE IN GAMBELLA REGION OF ETHIOPIA ON GUINEA WORM DISEASE ERADICATION INTERVENTIONS** is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references and that this work has not been submitted before for any other degree at any other institution.

A handwritten signature in black ink on a light-colored background. The signature is cursive and appears to read 'Getachew Temeche Sisay'.

SIGNATURE

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14 December 2012

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ABSTRACT

Introduction: Guinea worm disease (GWD) is a painful, disabling disease caused by the parasite *dracunculus medinensis*. The implementation of the global GWD eradication campaign resulted in a decrease of global burden of disease and several countries have been proclaimed free of the disease. Though, Ethiopia has implemented the GWD eradication programme since 1992 the disease remains endemic in the Gambella region.

Purpose of the study: The purpose of this study was to explore the perceptions and experiences of the community of Gambella region on Guinea worm disease (GWD) eradication interventions.

Methodology: A qualitative study paradigm with a phenomenological research design was employed to collect data using focus group discussions, in-depth individual interviews, document reviews, and observations. The study participants were determined by purposive sampling. Qualitative data analysis involved transcription, data entry, and management of verbal information followed by coding, categorizing into themes. Interpretation of the data was done using triangulation methodology with appropriate mechanisms for validity and trustworthiness.

Result: The study found that there are gaps in the perceptions and understanding of the community and programme implementers about the achievement and application of the various interventions on the eradication of Guinea worm disease. Health education programme was not fine-tuned to the eradication of GWD by community participation. Community perception was not at the required level for the eradication of GWD due to the low success of the educational intervention.

Conclusion: continuous health education targeting the community with clear objectives of helping to eradicate GWD was found to be limited in its coverage. In addition, provision of water filters necessary for GWD eradication was inadequate. Moreover, the community did not have clear understanding of the causes of GWD and its eradication strategy.

It is hoped that the findings of this study would contribute significantly to the GWEP in Gambella region, as well as elsewhere where GWD may be endemic.

Key words

Eradication; *dracunculiasis*; guinea worm; intervention strategies; Gambella.

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List of abbreviations

CAQDAS	Computer Assisted Qualitative Data Analysis Software
CDC	Centres for Disease Control and Prevention
EDEP	Ethiopia dracunculiasis eradication programme
FGDs	Focus group discussions
FMoH	Federal Ministry of Health
GRHB	Gambella Region Health Bureau
GW	Guinea worm
GWD	Guinea worm disease
GWDE	Guinea worm disease eradication
GWEP	Guinea worm eradication programme
HEWs	Health extension workers
HDI	Health and Development International
MMWR	Morbidity and Mortality Weekly Report
MDGs	Millennium development goals
NGO	Non-government organisation
RHB	Regional Health Bureau
SNNPR	Southern Nations Nationalities Peoples' Region
SSGWEP	South Sudan Guinea Worm Eradication Programme
TCC	The Carter Centre
UGWEP	Uganda Guinea Worm Eradication Programme
UNICEF	United Nations Children's Fund
VBVs	Village-based volunteers
WHA	World Health Assembly
WHO	World Health Organization

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CHAPTER 1

Orientation to the study

1.1 INTRODUCTION

Guinea worm disease (GWD) or *dracunculiasis* is a painful, disabling disease caused by the nematode parasite *dracunculus medinensis* (*D medinensis*). The disease has a low mortality rate but causes an enormous amount of morbidity and has a serious negative economic impact on affected villages. Persons become contaminated with *D. medinensis* by drinking water from stagnant sources such as ponds that have infected copepods (water fleas) with Guinea worm larvae that act as intermediate hosts for the parasite. At present, there is no effective drug to treat or vaccine to prevent *dracunculiasis* available. In addition, persons who contract *D medinensis* infections do not develop immunity (Hopkins, Ruiz-Tiben, Ruebush, Diallo, Agle & Withers 2002a:163-168).

1.2 BACKGROUND TO THE PROBLEM

1.2.1 Global occurrence of GWD

In 1980, the Centres for Disease Control and Prevention (CDC) in Atlanta, United States of America, initiated the global GWD eradication campaign. It was adopted as a sub-goal of the *International Drinking Water Supply and Sanitation Decade, 1981-1990* (Hopkins, Ruiz-Tiben, Downs, Withers & Roy 2008:474-479). In 1986, the World Health Assembly (WHA) called for the eradication of *dracunculiasis* (GWD) at a time when an estimated 3.5 million cases occurred annually in 20 countries in Africa and Asia and 120 million persons were at risk for the disease (CDC 2005). Because of slow mobilisation in countries with endemic disease, the global dracunculiasis eradication programme did not achieve the 1995 target date for eradicating *dracunculiasis* set by WHA in 1991. In 2004, the WHA set a new target for 2009. However, despite considerable progress towards global eradication, that target was also not met (Hopkins, Ruiz-Tiben, Downs, Withers & Maguire 2005:669-675; MMWR 2010:1239-1242).

Despite the absence of a drug or vaccine and the only diagnostic being a painful emergent worm, the transmission of GWD has been eliminated in Asia and is presently only in Mali, Ghana, Sudan, and Ethiopia. Several African countries have reported no cases for over a year and await the formal certification of the absence of transmission, while the World Health Organization (WHO 2008) formally certified Benin, Guinea, Mauritania, and Uganda free of transmission recently. This progress reveals the effectiveness of case containment and copepod control using *temephos larvicide* and water filtration, backed up by health education, community commitment, and regular surveillance and reporting from endemic villages.

The implementation of the global GWD eradication campaign resulted in a decrease of global burden of disease and several countries have been proclaimed free of the disease.

1.2.2 GWD eradication campaign in Ethiopia

In August 1990, the Ethiopian Ministry of Health organised a national steering committee for the eradication of *dracunculiasis* with the primary responsibility of determining the extent of the disease nationwide. The steering committee designed two approaches: a passive surveillance approach, whereby all regional health departments were requested to collect morbidity data on *dracunculiasis* from all health facilities within their respective regions on a monthly basis, and an active case search approach in selected highly suspected regions of the country based on the available suggestive statistical data.

The Ethiopian GWD eradication programme was introduced in 1992 and a case search was conducted throughout the country in 1993. The then administrative regions selected for the national active case search were West Gojjam, Metekel, Assossa (including Kamashi), South Wollo (including Afar), West Shoa, North Omo, South Omo, Keffa and Gambella. The survey confirmed that the disease is endemic in six districts of Gambella Regional State, namely Abobo, Akobo, Gambella, Gog, Itang and Jikawo. The survey also indicated that one district of the Southern Nations Nationalities Peoples' Region (SNNPR), namely Kuraz (recently named as Nyangatom), in South Omo Zone was also endemic for GWD. In 1994, a number of interventions were initiated in endemic areas. These included 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 in the eradication process (Gebre, Alamerew & Tesfaye 2006:674-691).

In 1995, one hundred and thirty-three (133) GWD cases were reported from 47 endemic villages in the six districts, which represented a reduction of 84.3% from 1994. The number of cases has been reduced by more than 98% between 1994 and 2010. Indigenous transmission has been interrupted from South Omo since 2001 and zero indigenous case report is maintained so far. However, GWD continues to be reported from Gambella region. In the preceding 5 years (2006 to 2010), Ethiopia reported 83 GWD cases, in which one indigenous case in 2006, zero indigenous case in 2007 and 38, 24, and 20 indigenous GWD cases in 2008, 2009 and 2010 respectively from Gambella region. The annual incidence of GWD cases in Gambella region has decreased significantly since 1994 but the main goal of the programme, namely interruption of indigenous transmission was not achieved (FMoH, Ethiopia 2010:1)

1.3 STATEMENT OF THE PROBLEM

Ethiopia has implemented the GWD eradication programme since 1992. Despite effective and cheap intervention to eradicate GWD, Ethiopia has remained endemic since 1994. Of the two endemic foci, the South Omo zone has interrupted transmission of the disease since 2001 while the Gambella region still reports indigenous cases. The implementation of effective and community-acceptable interventions therefore requires assessing and identifying the factors that limit the interruption of GWD transmission in Gambella region. This includes determining the practical value of interventions used and identifying the fundamental ingredients of success and/or failure in the programme. Of the two known endemic areas in Ethiopia, interruption of indigenous transmission of GWD was achieved in one endemic focus after about eight years of implementation of interventions. However, despite relentless efforts in implementing similar intervention measures the disease remains endemic in the Gog district of Gambella region.

For the researcher, this raised the question of why the disease remains endemic in this area of Gambella region. Accordingly, the researcher wished to examine and understand people in the region's perceptions and experiences of Guinea worm disease eradication (GWDE) interventions.

1.4 PURPOSE OF THE STUDY

The purpose of this study was to explore and understand the perception of the community and those implementing Guinea worm eradication programme (GWEP) in Gambella region on the failure of the GWEP. The study will also analyse and describe conditions that delayed interruption of indigenous transmission of GWD in Gambella region. In order to achieve its purpose, the objectives of the study were to

- explore and understand the perceptions and experiences of people in Gambella region on interventions of GWDE
- explore and understand the perception and experience of GWEP implementers to interventions of GWD eradication, in Gambella Region
- make pertinent recommendations for the eradication of GWD in Gambella region

1.5 SIGNIFICANCE OF THE STUDY

Countries and organisations supporting GWD eradication would be helping to reduce the suffering of some of the world's most underprivileged people. Ethiopia would benefit from the enhanced culture of disease prevention and social equity afforded by the programme.

Interventions against tropical diseases usually involve aspects of human behaviour. Interventions such as GWD that have a large behavioural component require health education and promotion. The findings of this study should contribute significantly to the national programme staff and the affected communities in the study areas, as well as elsewhere.

1.6 FOUNDATION OF THE STUDY

The study was based on meta-theoretical, theoretical, and methodological assumptions.

1.6.1 Meta-theoretical

GWD is a good candidate for eradication for several biological reasons. First, the disease has a limited geographic distribution and the marked seasonal occurrence allows for periods of more intensive intervention. Second, transmission is only from those with clinical disease and there is no known animal reservoir. Third, because symptoms develop within one year after infection, with predictable timing, the disease is easy to recognise and diagnose, which facilitates identification and containment of active cases. Finally, effective preventive measures such as health education and water filtration are available to prevent transmission (Greenway 2004:495-500).

Due to the rapid decline of cases during the first few years, Ethiopia appears to be close to interrupting transmission initially. However, the country is lagging behind other countries that started the eradication campaign with high numbers of cases. This may be due to problems unique to Ethiopia. An assessment of the interventions implemented in Ethiopia and comparing results in endemic sites where GWD eradication was achieved needs to be conducted. All the interventions that apply a behavioural component and educational interventions lead to success if designed and implemented properly. Missing this component or applying it inappropriately may lead to failure or lagging of the programme.

1.6.2 Theoretical

Given the transmission cycle of the parasite and the absence of an effective vaccine, a number of interventions seem a priori worth considering:

- (i) provision of safe water supply
- (ii) filtration of drinking water to remove cyclops
- (iii) searching for patients with active cases and proper management of cases
- (iv) ensuring that patients avoid contact with ponds
- (v) killing or removing cyclops in ponds

The active participation of community members in endemic villages during health education sessions and the proper use of cloth filters during collection of drinking water from the ponds are critical to prevent the disease. These can be achieved if the village

volunteers provide health education properly and if community members attend health education sessions regularly. In addition, the village volunteers are expected to monitor proper use of cloth filters by villagers (Hopkins, DR & Ruiz-Tiben, E. 1991: 533-540).

1.6.3 Methodological

Health education and community mobilisation are important aspects of GWD eradication. Health care service providers and communities must know about the disease in order to take action against the disease, such as preventing people with worms from entering and contaminating drinking water supplies. The knowledge acquired informs people on the use of water filters to protect against GWD and understand the need for safe chemical larvicide in their water supplies.

The role of VBVs and other programme staff is critical for achieving effective health education for the community. Investigation of the application of the key interventions using focus group discussion with community members and in-depth interview with programme coordinators at all levels will help to identify the gaps and delays in interruption of indigenous transmission in the region (WHO.1996:263; World Bank 2006).

1.7 SCOPE OF THE STUDY

The study was conducted in the Gambella regional state in Ethiopia and covered former endemic and GWD endemic districts and villages.

1.8 RESEARCH DESIGN AND METHODOLOGY

The researcher adopted a qualitative design for the study. A qualitative approach was considered appropriate to determine if there is any gap in the knowledge and practices of the affected community on the transmission and prevention of GWD.

Data were collected by means of five focus group discussions with key informants and in-depth interviews with five district and regional programme coordinators (WHO 1996:204; WHO 1996: 178; World Bank 2007).

1.9 DEFINITIONS OF KEY TERMS

For the purposes of this study, the following terms are used as defined below:

- **Dracunculiasis:** GWD or *dracunculiasis* is a painful, disabling disease caused by the nematode parasite *dracunculus medinensis* (*D medinensis*). A case of *dracunculiasis* or GWD refers to an individual exhibiting or having a history of a skin lesion with emergence of a guinea worm (WHO 1988).
- **Imported case:** An imported case is an infection acquired in a place (another country or village within the same country) other than the community where detected and reported.
- **Case containment** is the condition achieved through (1) the disease is detected <24 hours after the worm emergence; (2) the patient has not entered any water source since the worm emerged; (3) a volunteer has managed the patient properly, by cleaning and bandaging the lesion until the worm has been fully removed manually and by providing health education to discourage the patient from contaminating any water source (if two or more emerging worms are present, transmission is not contained until the last worm is removed); and (4) the containment process, including verification of dracunculiasis, is validated by a supervisor within 7 days of emergence of the worm.
- **Former guinea worm endemic:** A village reporting zero indigenous cases for at least three calendar years.
- **Guinea worm endemic village:** A village with one or more active indigenous cases during the previous and/or current calendar year.
- **Guinea worm never endemic:** A district that never had an indigenous case since the beginning of the programme.
- **Kebele:** The lowest administration unit in Ethiopia, commonly defined as a sub district.
- **Neglected tropical diseases:** A group of communicable diseases of public health importance such as Dracunculiasis, Onchocerciasis, Lymphatic filariasis, Schistosomiasis, Trachoma, which normally do not draw much attention and effort towards their control in the countries where they are endemic, regionally and globally (FMoH of Ethiopia).
- **Pre-certification stage of eradication** is approximately one year (i.e., one incubation period for *D medinensis*) after reporting their last indigenous case.

1.10 OUTLINE OF THE STUDY

Chapter 1 briefly describes the problem, purpose and significance, research design and methodology, and ethical considerations of the study, and defines key terms.

Chapter 2 discusses the literature review conducted for the study.

Chapter 3 covers the research design and methodology.

Chapter 4 presents the data analysis and interpretation.

Chapter 5 briefly discusses the findings and limitations of the study and makes recommendations for practice and further research.

1.11 CONCLUSION

This chapter outlined the problem, purpose and significance of the study, and the research design and methodology. Key terms were also defined. Chapter 2 presents the literature review undertaken for the study.

CHAPTER 2

Literature review

2.1 INTRODUCTION

This chapter discusses the literature review conducted for this study. A literature review is undertaken to assist researchers to comprehend and extend their knowledge of the phenomenon under study (Polit & Beck 2001:105). The purpose of a literature review is “to determine the extent to which the topic under study is covered in the existing body of knowledge” (Babbie & Mouton 2001:565). The researcher therefore reviewed literature on GWD or dracunculiasis, eradication and containment of the disease.

The global campaign to eradicate *dracunculiasis* began as an initiative of the US CDC in 1980, under the auspices of the international Drinking Water Supply and Sanitation Decade (1981-1990). The WHA adopted the first resolution calling for the “elimination” of dracunculiasis in 1986 but set no deadline. Two years later, African ministers of health set a target date of 1995, which was confirmed by the WHA in 1991. In 2004, Ministers of Health of the remaining endemic countries and the WHA set a new target date of 2009 (MMWR 2010:1239-1242).

The fight against GWD represents one of the most successful international collaborations and is particularly interesting because the intervention is, at its heart, behaviour change. Success depended on the campaign’s ability to reach poor, isolated communities and convey essential messages about how to handle water and prevent the disease. This was possible because of the steady commitment of donors and technical supporters, as well as national governments (Hopkins et al 2000b:163-168).

2.2 BIOLOGY OF THE DISEASE

2.2.1 Basic parasitology

Dracunculus medinensis is the only nematode worm to have been shown unequivocally to be transmitted through drinking water. The adult female worm measures up to 1 m long and 2 mm in diameter. The head end of the worm is rounded with a triangular mouth. Most of the body of the worm is taken up with a double uterus. The adult males remain small, about 4 cm in length.

The worm resides in connective tissues where it does no harm until it migrates down (usually to the legs and feet). Here lytic secretions from glands in the head probably combined with irritant effect of the larvae cause a blister that eventually ruptures to expose the head of the worm. When the head is doused in water the uterus is extruded through the mouth of the worm and larvae are expelled into the water (Ruiz-Tiben & Hopkins 2006:275-309).

2.2.2 Life cycle

GWD is characterised by the emergence of a female worm (60-100 cm long) from a blister usually, but not solely, located on the lower leg. The pain from the blister becomes so excruciating that the leg feels as if it is on fire, compelling the infected person to plunge it into cold water to relieve the burning sensation. This action ruptures the blister, causing the worm to release thousands of larvae. The larvae reach an infective stage after being ingested by tiny crustaceans or copepods, also called water flea. Figure 2.1 illustrates the life cycle of GWD.

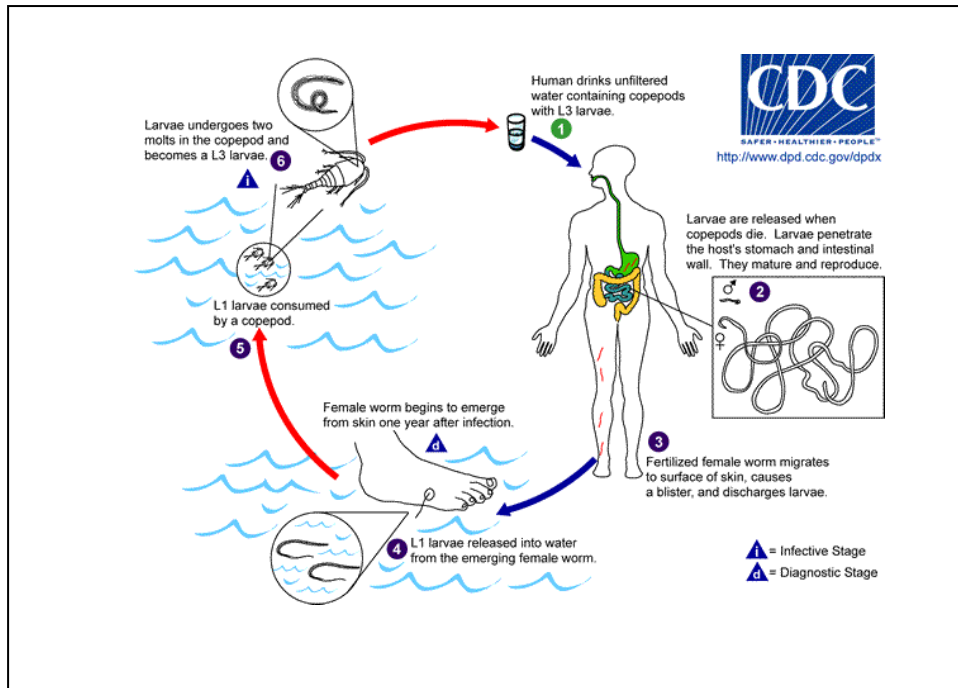


Figure 2.1 Life cycle of *dracunculiasis*
 (<http://www.dpd.cdc.gov/dpdx/guineaworm>)

People swallow the infected water flea when drinking contaminated water. This action kills the water flea but liberates the infective larvae, which penetrate the wall of the intestine and migrate throughout the body as they mature and reproduce fertilised female worms, migrate under the skin tissue until they reach the lower limbs, forming a blister or swelling from which they eventually emerge to pierce the skin. The migration and emergence of the worm may take 10 to 14 months after infection (Cairncross, Muller & Zagaria 2002:223-246; Tayeh & Cairncross 2009:1431-1436).

2.3 CLINICAL FEATURES

The first clinical feature in most cases is the appearance of the blister, which measures about 3 cm diameter within a few days. The site of the blister is usually preceded by burning, intense itching and urticaria. The blister then ruptures and the worm extrudes, about 1 cm per day. Left to itself and assuming the site does not become secondarily infected, the worm track will resolve within about 6 months. Secondary infection is frequent, however, affecting more than 50% of cases and this can cause severe pain

and disability, and rarely death. If the worm breaks before complete removal, the remnant can cause severe inflammation and scarring. *Dracunculiasis* is rarely fatal, though it can be severely disabling (Hochberg, Ruiz-Tibe, Downs, Fagan & Maguire 2008:722-728; Njepuome, Hopkins, Richards, Anagbogu, Pearce, Jibril, Olayemi, Sofola, Withers, Ruiz-Tiben, Miri, Eigege, Emukah, Nwobi & Jiya 2009:691-698).

2.3.1 Diagnosis

The absence of obvious symptoms even if *D medinensis* parasites (guinea worms) are present in the body is a problem for the early diagnosis of GWD. The long asymptomatic period is a characteristic of the disease, and demands the development of immunodiagnostic methods for the early detection of the disease (WHO 2008; Hopkins et al 2002b:163-168).

The first noticeable symptom of the disease is the appearance of a red, itchy papule that rapidly transforms into a blister. Patients who have had previous infections become aware of the worm and can already predict the expected days of the parasite's emergence. Obtaining samples of juveniles for study can only be done after the blister has ruptured. The procedure is done by placing cold water directly on the wound; this stimulates the release of juveniles from the uterus of adult female worms. Then the juveniles are mounted on a slide, and can be seen actively moving under a low-power microscope. The diagnosis of *dracunculiasis* becomes simple when a part of the worm emerges from the wound. In order to recognise the morphology of the parasite, however, it is important that the worm does not dry out and disintegrate. An intermittent sparganum may be diagnosed as *dracunculiasis* (Hopkins et al 2002b:163-168).

2.3.2 Treatment

As the guinea worm emerges through the dermal lesion, the affected person pulls it out slowly and carefully (to minimise inflammation and pain) by winding a few centimetres of the worm each day onto a stick. This painful process may take several weeks, as the worm may be up to 1 m long. The pain can be relieved with wet compresses on the lesion and the use of an oral analgesic. The risk of bacterial super-infection can be reduced with the use of topical antiseptics or antibiotic ointment. In one study the mean duration of disability from GWD was 50% shorter among patients who had been given

antibiotics as well as instructions and supplies to clean and dress their wounds than among those who did not receive any intervention. No anti-helminthic medication is effective against the disease, and there is no vaccine. Prevention is the only effective intervention to reduce the incidence of GWD (Greenway 2004:495-500).

2.4 SOCIO-ECONOMIC IMPACT

The social and economic effects of the disease are attributed mainly to the temporary disability suffered by infected persons. More than half of patients are unable to leave their beds for about a month, which generally coincides with the peak season of agricultural activities, when labour is in maximum demand. This can lead to malnutrition among children in households whose able members are affected. For this reason, in Mali the disease is called “the disease of the empty granary”. Children miss school when they have guinea-worm and when they substitute for sick members of their households (Ruiz-Tiben & Hopkins 2006:275-309).

2.5 GWD ERADICATION INITIATIVE

2.5.1 Global eradication

In 1986, the World Health Assembly (WHA) (Resolution 39.21) resolved to eliminate GWD country by country in association with the United Nations “International Drinking Water Supply and Sanitation Decade”. By that time, based on passive reporting mostly, there were about 120 million people at risk of contracting *dracunculiasis* infection in African countries and an estimated 20 million persons at risk in India and Pakistan. The WHA repeated its position in 1997 and in 2004 adopted a further resolution calling for the eradication of the disease by 2009 (Tayeh & Cairncross 2007:1403-1408).

At the commencement of the eradication campaign, twenty countries were endemic for *dracunculiasis*. By the end of 2004, the transmission of the disease had interrupted from nine countries (including all three affected Asian countries); the number of infected persons had been reduced by more than 99% from an estimated 3.5 million persons in 1986 to 16,026 cases in 2004; the number of disease-endemic villages had been reduced from more than 23,000 in 1993 to 3,109 in 2004, and the WHO had officially certified 168 of the world's 192 countries as free of GWD (Hopkins et al 2005:669-675).

During the 60th WHA held in Geneva, a meeting on the eradication of GWD was held on 16 May 2007 with Ministers of Health or their representatives from nine endemic countries (Burkina Faso, Côte d'Ivoire, Ethiopia, Ghana, Mali, Niger, Nigeria, Sudan and Togo). The aim of the meeting was to review the status of GWD eradication and measures needed for interrupting transmission of the disease in all countries by the end of 2009. The goal of "the completion of eradication by 2009" was adopted on 19 May 2004 by the Geneva declaration and on 22 May by Resolution WHA57.9 urging (WHO 2008).

In 2004, Uganda recorded no indigenous cases of GWD for the first time. The last indigenous case was reported in July 2003. A total of three cross-border cases imported from South Sudan were reported in Uganda in 2004 and were contained. During its national case search in 1991-92, the Ugandan Guinea Worm Eradication Program recorded 126,639 cases in 2,677 endemic villages of sixteen districts. In 1993, Uganda reported the second highest number of cases in the world (42,852), exceeded only by Nigeria (75,752) (CDC 2005).

The factors that contributed to this success included political will and commitment at all levels right from the onset of the programme, allocation of adequate resources by Government and donors to implement the programme activities, community ownership of the programme, the provision of safe drinking water supply in all endemic villages, improvement in the security situation in Northern Uganda, and improvement in the general health care delivery system and infrastructure following the decentralisation policy. The main strategies focused on surveillance, case management and containment, provision and maintenance of safe drinking water supply, the application of *Abate*® in unsafe drinking water sources, distribution of cloth and pipe filters for straining unsafe water as well as advocacy and social mobilisation, training and human resources development, programme monitoring and evaluation. The community involvement approach was adopted to ensure ownership and sustainability of the programme. The political will and commitment at all levels remained high throughout the programme and were key factors in the success of the programme and in interrupting the transmission cycle within a short period. The interventions were introduced sequentially and rapidly scaled up to cover all the endemic villages within a short period. Training of village-based health volunteers (VHVs), health education, advocacy and social mobilisation as well as reporting attained 100% coverage in all the endemic

villages by the end of 1993. During the same period, filter distribution, vector control and case containment attained an average of more than 50% coverage in all villages. By 1995 the safe water coverage in the endemic villages had reached 80% and full coverage by 2001 (Country Report on Dracunculiasis Eradication in Uganda 2008:20-31; Barry 2006:1-2).

A study on Uganda's successful GWD eradication programme reveals innovations, by testing and adoption of strategies such as the pond care takers, case containment centres, and cash rewards for reporting of cases, but no single innovation or intervention was responsible for Uganda's success. Other important factors include the programme's early decision to distinguish between endemic and non-endemic villages and focus intensively on the former for targeting health education, filter distribution, and application of ABATE larvicide, as well as the relentless increase in the intensity, quality, and number of interventions as the programme progressed. Perhaps the most important factors in Uganda's success, however, were the sustained support of the programme by the Government of Uganda, including strong leadership provided by Ministry of Health officials, and the support provided by more than nineteen external agencies and donors. Support by the government was manifest in numerous ways, including high-level participation in the annual National Guinea Worm Conference (the vice-president, minister of foreign affairs, prime minister, minister or state minister of health in different years) and designation of the programme as a priority in the national five-year plan. In 1999, the President of Uganda cited the success of the UGWEP in appealing for votes in northern Uganda during his campaign for re-election in 2001. The programme's leaders practised hands-on supervision, including spot checks, and promptly replaced health workers who performed poorly (Rwakimari, Hopkins & Ruiz-Tiben 2006:3-8). It was estimated that the programme cost about \$5.6 million between 1992 and 2004. The annual budget of the entire UGWEP was about \$400,000 in 1998 and in 2000, but rose to \$853,000 in 2001 to include additional expenditures by United Nations Children's Fund (UNICEF) for improved drinking water supply in endemic villages, and fell to \$285,000 in 2002 (Barry 2007:2561-2564).

Nigeria, which was home to more cases of dracunculiasis than any other country in the world, with 653,620 cases in 5,879 villages in 1988/89, reported zero cases of *dracunculiasis* for thirteen consecutive months by the end of December 2009. This signalled the end of transmission of the disease (CDC 2010a).

Much attention was paid to motivating VBVs and health workers, who were the backbone of the programme, by providing incentives such as meals and travel allowances, special GWD T-shirts, printed cloths and book bags, and by providing health education materials, cloth filters, other supplies, constructive supervision, and feedback (Miri, Hopkins, Ruiz-Tiben, Keana, Withers, Anagbogu, Sadiq, Kale, Edungbola, Braide, Ologe & Ityonzughul 2010:215-225). Health education methods included as many channels of communication as possible as often as possible, including personal and group talks by village volunteers, traditional, religious, and political leaders; town criers; radio jingles, posters and flip charts; short plays or skits by amateur theatre troupes; school lectures, and contests. The programme used prominent persons such as General Gowon for the fight against GWD. Cash incentives for reporting and isolation of new cases were widely introduced in 2006. The reward for reporting a case of *dracunculiasis* increased from 1,000 Naira (approximately US \$8) in 2007 to 10,000 Naira in 2009. The numbers of investigated rumors of Guinea worm cases increased from 27 (1 of which was confirmed) in 2005 to 176 in 2006, 192 in 2007, 526 (none of which was confirmed) in 2008, and 238 in 2009 (Miri et al 2010:215-225).

The Nigeria GWD Eradication Programme cost approximately \$37.5 million during 1988-2009 including \$ 4.4 million by the government of Nigeria. The total additional cost of providing clean drinking water sources to disease-endemic villages is unknown because the existence of such projects was hard to monitor. The known costs of targeted water supply projects in Guinea worm-endemic villages in Nigeria were \$35.6 million, including \$25.6 million from the government of Japan in 1988-1992, and the remainder from other partners. The programs in Uganda and Nigeria shared similar characteristics of a sound technical approach, innovations, willingness to replace non-performers promptly, strong political backing (less constant in Nigeria), and careful monitoring of surveillance and intervention data, with prompt appropriate response to such data, and adequate financial support (Njebuome et al 2009:691-698).

In Ghana, there were more than 500,000 cases since the inception of the eradication campaign. Over four million cloth filters, and more than one million pipe filters were distributed and 72,000 litres of ABATE®Larvicide was also used to treat ponds. Ghana's GWD eradication programme finally achieved the demise of the worm (CDC

2011a). In Ghana, although a stable country with an effective health system, an outbreak of GWD occurred when the water supply in Tamale failed and commercial water sellers sold contaminated water from a lake behind a dam. Emergency measures resulted in a drop in cases from 3,358 in 2007 to 242 cases in 2009 and *Foul Water Fiery Serpent* shows the Carter Centre's dedicated work in helping achieve this (<http://www.thelancet.com>).

Since the Comprehensive Peace Agreement signed in January 2005, Sudan has greatly intensified interventions against GWD to officially end the more than two-decade long civil war. In 2007, 22,322 villages were under surveillance by the Southern Sudan Guinea Worm Eradication Programme (SSGWEP), of which 1,765 villages reported endemic disease. This programme reported an increase to 15,539 cases in 2006, from 5,569 cases reported in 2005, as a result of reporting from endemic areas that became newly accessible after the official end of the civil war. The SSGWEP has deployed some 28,000 village volunteers, supervisors, and other health staff working on the programme full time. In 2007, the SSGWEP reduced the number of cases reported by 63% compared with 2006 (to 5,815), and improved its rate of reporting to 70% of endemic villages (from 63% in 2006). The SSGWEP recently appointed a retired bishop as eminent spokesperson and advocate for the campaign. Northern Sudan has reported no endemic cases of dracunculiasis since 2001. Sudan exported three cases to Ethiopia and four cases to Uganda in 2007 (MMWR 2007:813-817).

The South Sudan Guinea Worm Eradication Program (SSGWEP) reported 1,698 cases of dracunculiasis in 2010, of which 1,264 (74%) were contained. In January-June 2011, SSGWEP reported a provisional total of 801 cases (77% contained, compared with 72% contained during January-June 2010), an increase of 8% compared with the 745 cases reported for the same period in 2010. All of South Sudan's increase in cases occurred in the state of Eastern Equatoria (a state that borders Ethiopia in the south-west), which had 27% more cases than the same period a year before. Endemic areas outside of Eastern Equatoria reported 72% fewer cases during January-June 2011. In June 2011, South Sudan's cases were fewer than the same month in the previous year for the first time (171 cases in June 2011 compared with 241 cases in June 2010, a reduction of 29%). During 2010, a total of 732 villages reported one or more indigenous cases; during January-June 2011, a total of 366 villages reported indigenous cases. The peak

transmission season in South Sudan is March through October (MMWR 2011:1450-1453).

2.5.2 Eradication programme in Ethiopia

In 1988, African Ministers of Health voted to eradicate *dracunculiasis* by the end of 1995, a target date that was endorsed by UNICEF in 1989, and the WHA in 1991 (Hopkins et al 2000b:163-168). Following the resolution of the African Ministers of Health, the Ministry of Health in Ethiopia organised a national steering committee for the eradication of *dracunculiasis* in August 1990. The steering committee was primarily charged with responsibility of determining the magnitude of the disease nationwide. Two approaches were designed by the steering committee to collect data: a passive surveillance approach, whereby all regional health departments were requested to collect morbidity data on *dracunculiasis* from all health facilities within their respective regions on a monthly basis; and an active case search approach in selected highly suspected regions of the country based on the available suggestive statistical data.

During that time, areas selected for the national active case search were: West Gojjam, Metekel, Assossa (including Kamashi), South Wollo (including Afar), West Shoa, North Omo, South Omo, Keffa and Gambella (Gebre et al 2006:674-691).

2.5.3 Epidemiology

The EDEP was established in 1992. After its establishment, a case search was conducted throughout the country in 1993. In this survey, it was confirmed that the disease is endemic in six districts of Gambella Regional State namely: Abobo, Akobo, Gambella, Gog, Itang and Jikawo. The survey also indicated that one Woreda of SNNPR, namely Kuraz, in South Omo Zone was also endemic for *dracunculiasis* (see figure 2.2).

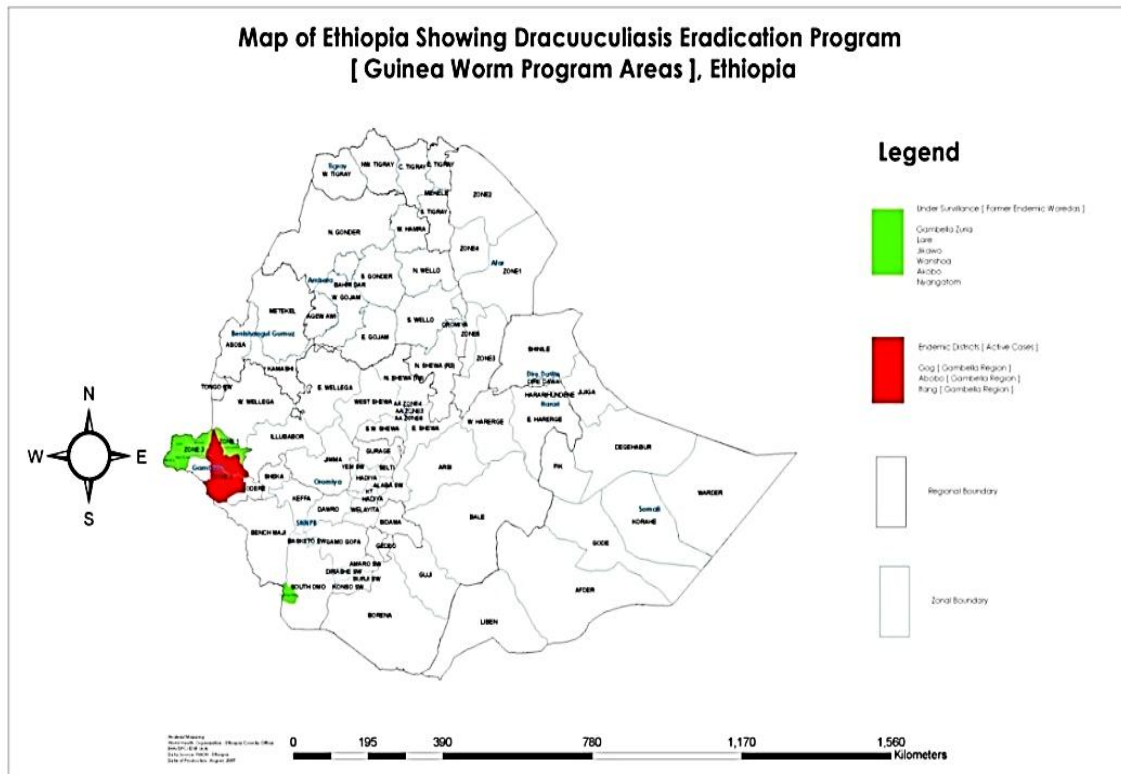


Figure 2.2 Map of GWD programme areas, Ethiopia
(FMOH, Ethiopia 2010:1)

Dracunculiasis is exclusively a rural disease by its very nature and in most cases the victims are marginalised population groups without access to health care and other social services.

2.5.4 Disease trend

Following the establishment of an EDEP in 1992 and its implementation in 1994, there has been a steady decrease of the disease in Ethiopia (see figure 2.4). Indigenous GWD transmission has been interrupted in South Omo zone since 2001 but Gambella region remains endemic for the disease (FMOH, Ethiopia 2010:1).

After reporting zero cases for 12 consecutive months in 2007, cases emerged rapidly in 2008. The zero report achieved in 2007 might have been due to missed cases as a consequence of poor surveillance, contamination of ponds, and imported cases from neighbouring countries.



Figure 2.3 Emerging guinea worm
(Investigator of this study)

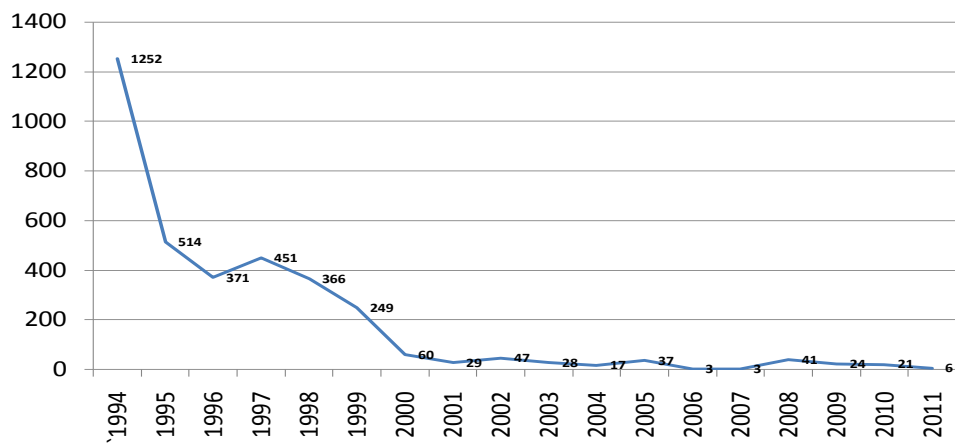


Figure 2.4 Annual incidence of GWD cases, 1994 to 2011
(FMoH, Ethiopia 2012:4)

2.5.5 Interventions

2.5.5.1 Health education and community mobilisation

Health education and community mobilisation should be emphasised as a priority because they are the least costly intervention available, and are a necessary base for the other interventions. The goal of health education and community mobilisation is to get the same basic messages to endemic populations repeatedly, using all appropriate channels. The three essential messages are:

- Drinking contaminated water is the only source for GWD infection.
- Prevent persons with emerging worms or blisters from entering ponds.
- It is important to filter or boil drinking water from ponds, and drinking water from safe sources.

The VBV's are an important resource for the health education messages but need to be reinforced by influential community members such as traditional, political and religious leaders. Teachers, church, youth and women's associations would also contribute significantly if proper training were provided. The mass media such as radio and printed materials, including posters and brochures, need to be developed in the local languages. These activities should also focus on improved supply and proper use of cloth filters, early case detection and reporting of suspected cases, and community participation (Hopkins & Ruiz-Tiben 1991:533-540).

2.5.5.2 Provision of safe water

The provision of a safe source of drinking water, such as a borehole and properly constructed hand-dug well, is the most desirable intervention. It gives many other important benefits but this is most expensive of the interventions. The overall goal of the eradication programme should be to try to get safe wells provided or rehabilitated in as many of the identified endemic villages as possible and as quickly as possible, especially in the most highly-endemic, densely-populated areas. Among priority areas with the latter characteristics, the highest priority should be given to localities with the greatest agricultural potential (Cairncross et al 2002:223-246).

Gebre et al (2006:674-691) found that provision of safe water supply has been widely implemented in both endemic regions of the country. A wide range of safe water supply options were explored. Hydro-geological surveys were conducted to determine the appropriate technology for the provision of safe water supplies. Hand-dug wells were provided for most of the accessible endemic villages where the hydro-geological formation permitted its implementation. Other options employed for the improvement of safe water provisions include: pond protection (fencing ponds and assigning guards), infiltration systems, machine-drilled boreholes, hand-drilled tube wells, community sand filters, roof rain catchments, and ground rain catchments. Seasonal migration of the endemic communities to and from riverbanks posed a lot of challenges in planning and implementing various water supply schemes. In addition, large numbers of pipe filters (straw filters) were provided to mobile population groups like shepherds, hunters, and travellers. The provision of individual household monofilament cloth filters, at least twice a year, has been in place in all endemic and at-risk villages since 1994 (Gebre et al 2006:674-691)

2.5.5.3 *Filtration of drinking water*

The adult cyclopid is more than 1 mm long and can easily be filtered using an ordinary cloth. Filtration of drinking water is easy, but that does not mean people do it. The disease is found in remote areas where millions of poor and mostly illiterate villagers live. These villages are remote and often inaccessible communities. This makes it difficult for the villagers to access health care. Two types of filters were supplied by the programme, the monofilament cloth filters that can be used for households and straw filters (a piece of 10 to 20 mm diameter plastic pipe, 100 to 200 mm long having a material fixed in one tip) to be used individually during a journey or to the fields. Regular health education should be provided to community members on proper handling of the filters during washing otherwise it can easily be damaged (CDC 2005).

2.5.5.4 *Early case detection and management*

Critical examination of the case containment activities in early 1999 revealed shortcomings such as socio-cultural limitations in some localities, and inaccessibility of some remote villages during the heavy rains. This led to poor compliance with case containment standards. International case containment standard calls for prompt

detection of each and every case before or within 24 hours of worm emergence. It further requires putting in place immediate and complete containment measures so that there is no possibility of transmission to other persons. This challenge prompted the Ethiopian programme to take a critical step in refining the case containment strategy. In order to effectively prevent individuals with emergent Guinea worms from transmitting the disease to others, the EDEP began treating these individuals as “inpatients”, for the first time in South Omo in 1999. This approach emphasised the use of case containment centres (houses) for the treatment of all suspected and confirmed cases of *dracunculiasis*, and provided food, water, shelter, and in-kind incentives such as blankets and bed sheets, particularly, for those individuals willing to stay in the containment centres until the Guinea worm was manually extracted.

2.5.5.5 Treatment of ponds using Abate® chemical

The application of the Abate® chemical (*temephos*) to surface sources of drinking water, mainly ponds, kills Cyclops and is an effective measure to prevent transmission. Treatment of drinking-water sources should be carried out monthly throughout the transmission season (WHO 2008; Ruiz-Tiben & Hopkins 2006:275-309; Morenikeji, Ajulo & Odaibo 2005:55-58).

2.5 CURRENT STATUS OF GWD

By 2009, there were six endemic countries globally, all located in sub-Saharan Africa. Niger and Nigeria came out of the endemic countries list early in 2010 after reporting zero indigenous cases for more than twelve consecutive months. Ghana, the second country next to South Sudan that reported the highest number of guinea worm cases since 2002 came off the endemic countries list in May 2011. As of July 2011, South Sudan reported 703 GWD cases, Ethiopia, Mali and Chad reported 6, 3 and 2 GWD cases respectively (CDC 2010b).

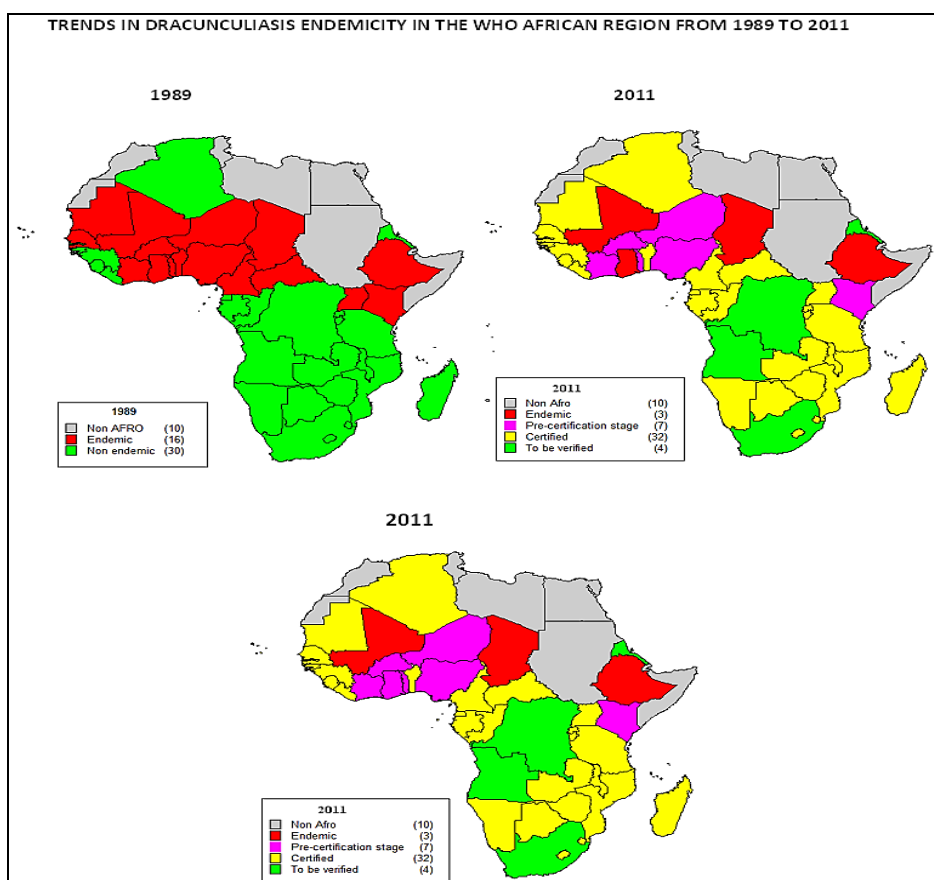


Figure 2.5 Trends in *dracunculiasis* endemicity in the WHO African Region, 1989 to 2011 (WHO 2011)

After more than twenty months with no known endemic cases, EDEP reported 41 cases in ten communities in 2008. This included the case of a 60 year-old man reported in October 2008 that had no history of travel to Sudan. Most cases occurred were associated with Awukoy village in Gambella Region. Although the sources of infection of most of the cases reported in Ethiopia in 2008 are still uncertain, it seems clear that endemic transmission was still occurring during 2008.

The evaluation team consisting of representatives of WHO, The Carter Centre and the CDC, conducted a joint mission to Ethiopia in collaboration with the EDEP and health officials of Gambella Region during December 3-7, 2008. The team observed several weaknesses in surveillance and supervision which need to be corrected immediately. (CDC 2009).

Ethiopia reported six indigenous cases, plus two cases imported from South Sudan, in January-June 2011. This is a reduction of 50% from the twelve indigenous cases reported during the same period of 2010. 88% (7/8) of all cases were contained, versus 85% (11/13) of all cases reported in January-June 2010. In Ethiopia Pond guards have been established in the four main affected villages and along two main walking paths in Gog District (Gambella Region), where all indigenous cases are located (CDC 2011b).

2.6 CONCLUSION

This chapter discussed the literature reviewed on the eradication, containment and status of GWD. Chapter 3 describes the research design and methodology of the study.

CHAPTER 3

Research design and methodology

3.1 INTRODUCTION

This chapter describes the research design and methodology including the population, sample, data collection methods, and analysis. The researcher followed a qualitative descriptive phenomenological approach.

3.2 RESEARCH DESIGN

The researcher wished to know why the disease remains endemic in the Gambella region. Accordingly, the researcher selected a phenomenological qualitative research design focused on exploring perceptions of people that have experienced the GWEP as community members or as GWEP implementers. The essence of qualitative research is that multiple realities exist and thus create meaning for individuals studied. Individuals who participate in social actions come to know and understand phenomena through these interactions (Streubert & Carpenter 1999:16; WHO 1996:263; World Bank 2006).

3.3 RESEARCH METHOD

Qualitative study used to explore the study topic from the perspective of beneficiaries and implementers of GWEP in the Gambella region were close observation, careful documentation, and thoughtful analysis. This enables the researcher to suggest ways for application of eradication majors and provides the basis to bridge conceptual and attitudinal differences and gap between the community and GWEP implementers.

3.3.1 Study area

Gambella National Regional State is one of the nine regional states of the Federal Democratic Republic of Ethiopia, located in the western part of the country between 7° 13" N to 8° 17" N latitude and 33° 52" to 35° 02" E longitude. The region shares borders

with South Sudan in the west, Oromia Regional State in the east, Southern Nation Nationalities Peoples Regional State (SNNPR) in the south and Beneshangul-Gumuz Regional State in the north. Gambella region has a total surface area of 25, 274.88 square kilometres. The Regional capital, Gambella town, is 766 km west of Addis Ababa. The region is divided into three administrative zones and twelve districts. Six of the districts were identified as endemic for GWD.

3.3.2 Study population

The study population was located in five districts: Abobo, Gambella Zuria, Gog, Itang, and Larie (GRHB 2003) (see chapter 2, figure 2.2). The study areas are forest-savannah lowland ranging from 300 to 500 meters above sea level and with a largely hot, humid, and moist climate having mean annual average temperature of 28⁰C with mean annual rainfall varying from 900-1500 millimetres. The rainy season extends from May to October, with July and August being the heaviest rainfall months. The majority of the population live along the banks the Baro, Gillo, Akobo, and Aluero rivers. According to the 2007 population and housing census, the projected total population of 404 villages in five districts is around 125,469 with an average household size of 4.6 (5.0 rural and 3.9 urban). Of the population, 52.4% are males while 47.97% are females (Federal Democratic Republic of Ethiopia Population Census Commission 2007).

There are two dominant ethnic groups in the study area: Agnua and Nuer. The Agnua tribe resides mainly in Abobo, Gambella Zuria, and Gog districts while the Nuer tribe lives in Laree district. Both tribes share Itang district and are found extending westwards towards the Jongli state in South Sudan. The population is largely engaged in subsistence farming, animal husbandry, fishing, and cotton plantations. Most of the population lives along the banks of rivers. According to official data, 65% of the population have access to health care service. The region has one hospital, 18 health centres, 49 health stations/health posts, and 16 rural drug vendors (GRHB 2003).

3.3.3 Sampling

In qualitative research, the focus is on the quality of information obtained from the persons, situations, events or documents sampled. Thus, the depth of information needed to gain insight into a phenomenon determines the sample required. The number of participants in qualitative study is adequate when saturation of information is

achieved in the study area. Saturation of data occurs when additional sampling provides no new information, only redundancy of previously collected data (Burns & Grove 2009). The focus was to collect information on a range of experiences, perspectives, and behaviours. The guiding principles of sampling in this qualitative research is to determine which and how to select, access and convenience to the study's research objectives and the characteristics of the study population. Therefore, in this study the researcher used purposive sampling method.

Purposive sampling of individuals among the community members in the study area for focus group discussions, and GWEP implementers for in-depth interview was done according to criteria relevant in addressing the study objectives. The following inclusion criteria were applied for selecting the participants:

- Villagers (both sexes) who lived in Guinea worm endemic/former endemic villages and involved during GWDE interventions.
- Guinea worm eradication programme coordinators involved during guinea worm eradication interventions (before 2008 in former endemic districts).

The following exclusion criteria applied for selecting participants:

- Villagers living in non-endemic villages.
- Villagers living in endemic areas who were not involved during Guinea worm eradication interventions.
- Guinea worm programme coordinators who were assigned after 2008 in former endemic districts.

Potential participants for FGD were informally approached to see how the study is viewed and to identify those willing to participate in the study. Further consultation with potential participants enabled getting their informed consent.

3.3.4 Sample size

The total sample size consists of 43 individuals. Thirty-seven participants were involved in five focus group discussions, one focus group per district, to explore community perception and experience. Heterogeneous discussion groups representing different

members of the community and consisting of 6 to 9 participants per FGD in each district were recruited after getting their explicit informed consent. Six GWEP coordinators, one from each district, and one regional, were selected for in-depth interview to explore the perspective from the implementer side.

Documents from the five-district GWEP offices, health centres and the regional GWEP were also reviewed to collect secondary data. Researcher observation was conducted during all FGDs and at relevant sites.

3.4 DATA COLLECTION

People's words and actions represent the data of qualitative inquiry and this requires methods that allow the researcher to capture language and behaviour. The data collection methods used in this study were focus group discussions, individual In-depth interviews, document reviews, and researcher observations (WHO 1996:204; WHO 1996: 178; World Bank 2007).

3.4.1 Focus group discussions (FGDs)

Focus group discussions provide valuable information or insights when the memories, ideas and experiences of individual members are stimulated when listening to others verbalise their experiences. Semi-structured discussion guide consisting of a list of open-ended questions were used for FGDs. The questions included perception, experience, and opinion of participants. All the questions were framed in such a way that they included a main question, follow-up questions, and probes. The study began with an open-ended general question that later moved to greater precision as detailed information emerged. Topics for discussion were framed around the major eradication interventions. These included:

- perception and understanding of GWD and how the disease is transmitted
- views on the use and protection of drinking water sources, and on use of filters
- awareness of the cash reward scheme for information on those infected with GWD and their attitude towards its importance

- participation and opinion during treatment of ponds with Abate chemical and collaboration on the guinea worm eradication programme
- experience on GWD surveillance activity

Translators of Amharic-Agnua and Amharic-Nuer languages conducted the interviews with translated discussion guides. The criteria for selection of translators included their educational background, their fluency in the Amharic language, and their willingness to assist during the interviews. Training exercise was conducted on how to use probes, conduct discussions, and maintaining consistency in all discussions.

Pre-emptive explanation was given at the start of each FGD. The FGDs were then encouraged to be interactive and allowing the informant to be free to raise all the issues that came to their minds on the study questions. Subsequent questions follow from the participant's responses. The researcher used detail-oriented, elaboration, and clarification probes as indicated in the guide with flexibility (annexure 6 and 7). Cash was given in one district only, at the end of the discussion to cover the lunch cost based on the request made by FGD participants. The discussions were tape recorded upon consent and notes taken. Pictures were also taken upon consent of participants to inform the general situation.

Conducting an FGD with two persons, one as moderator and the other as a facilitator, recording, picture taking, transcribing is useful in managing the discussions without interruption. The researcher's role was predominantly listening and tape recording while the interpreter is focused in leading the discussions. The researcher ensures uniformity of procedures and assist the moderator in when needed in the five FGDs conducted, one per study district (figure 3.1).

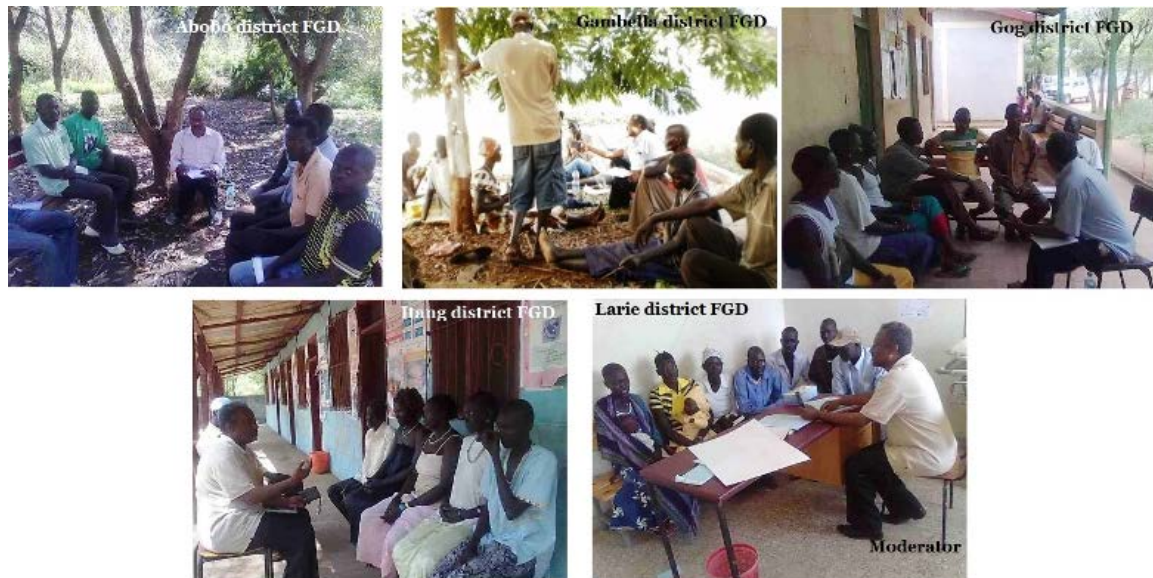


Figure 3.1 FGD sessions in five districts

3.4.2 In-depth interviews

Individual in-depth interviews are particularly useful for gaining insight into the experience of individuals. Individuals are encouraged to expand upon their answers to specific questions by providing explanations, rationale, and additional context and related issues. The interviewer used a checklist of topics to guide the interview which may simply be an informal conversation.

Individual respondents, often called ‘key informant’ were chosen purposively, because they have special insight into the topic of interest. In these interviews, an interview guide was used to direct the interviewer through the main topics to be covered. From this, the interviewer develops his/her questions and format to fit the individual respondent. Consent for in-depth interviews was obtained from five district programme coordinators and one regional coordinator.

In-depth interviews were conducted with respective district guinea worm programme coordinators except in Itang district where there had not been a programme coordinator for two years (figure 3.2). One coordinator who had worked for more than 15 years in Gog district was also included to get deep insight. The interview was conducted using open-ended question guides at the place of choice of each participant. Each interview was tape recorded with consent and notes taken.



Figure 3.2 In-depth interviews with GWEP district coordinators

3.4.3 Document reviews

The examination of documents is especially important to investigate patterns and trends from the past from secondary data sources. The collection of secondary data by examination of documents can provide confirmatory evidence of the information obtained from in-depth interviews and observations by way of triangulation. The examination of documents focuses on material, which includes official reports, surveillance data, photographs, and so forth. Checklists were used to guide document reviews (see annexure 6).

3.4.4 Researcher observations

The best way to gain a 'rich picture' of a setting is to see what is happening, rather than depending on other sources of information. Observation is the technique of obtaining data directly in their natural state as undisturbed as possible. Information from observation was recorded in a notebook. Checklists that were prepared as the research

evolved guided the researcher's observations (see annexure 6). The best way to gain a picture of a setting such as presence of certain activities or materials is to see what is happening, rather than depending on respondents only.

3.4.5 Data collection instruments

Data collection instruments used to capture verbal information for this study includes note taking, audio recording, photography, and photocopying. Field notes were taken during all interviews, discussions, document review, and observations as supplement and to record any impression of the researcher. Audio records with prior consent of participants captured FGDs and in-depth interviews. Photography was used to document observations where needed. Documents needed for further screening were collected by photocopying with permissions.

3.5 DATA ANALYSIS

Data analysis was an ongoing process as part of all the study procedures (table 3.1). Preliminary manual analysis was an inherent part of the data collection. While collecting data the researcher, keep records, write up interviews, impressions, notes from focus groups, make constant comparisons, compare notes and make adjustments. The researcher wrote a one-page contact summary report immediately after each major interview or focus group. This ongoing analysis and modification of the questions was vital in following an emergent research design (WHO 1996:263; Seidel 1998).

Table 3.1 Considerations for data analysis while collecting data

Key considerations in the early phase of data analysis	
Record-keeping	<ul style="list-style-type: none"> • Keep good records • Write up interviews, impressions, notes from each interview or focus group • Make constant comparisons while progressing • Compare notes with other data sources and make adjustments
Writing contact summary report	<ul style="list-style-type: none"> • Write a one page summary immediately after each interview or focus group <ul style="list-style-type: none"> ○ Include all the main issues ○ Include any major information obtained ○ What was the most interesting, illuminating or important issue discussed, or the information obtained? ○ What new questions need to be explored?
Using helpful tools	<ul style="list-style-type: none"> • Create a separate file for own reactions during the study, including feelings, hunches, and reactions • File ideas as they emerge • Keep a file of quotations from the collection process for use in bringing the narrative to life when writing report
Getting ready for the data analysis	<ul style="list-style-type: none"> • Make sure all of the information is in one place • Make copies and place originals in a central file • Use copies to write on, cut and paste as needed

(WHO 1996:263)

Data analysis involves verbatim transcription of tape-recorded textual information and translations, manual data management assisted with computer, data clearing, and entry into word processor. During analysis, the researcher attempted to see how the participants' stories and perceptions were shaped and how the narratives were situated in the broader physical and socio-cultural environments in which the participants live. To understand complex issues from the perspective of informants, questioning, reflecting, rephrasing, analysing, and verifying was done in the course of the study. The analysis primarily focused on textual data in the form of expanded field notes and transcripts of recorded interviews (World Bank 2007).

Analytic procedure follows coding the data, checking for reliability and developing of categories. Sorting and sifting bringing order to the data to reveal patterns and themes. After drawing-out themes and patterns, the researcher interprets the data and analyses content. Analysis of the data was shared with a peer before final interpretation. Content

analysis of collected data was made manually assisted with word processing software and matrices developed to organise information (see chapter 4).

3.6 TRUSTWORTHINESS, CREDIBILITY, DEPENDABILITY AND TRANSFERABILITY

Validity in qualitative research is to test whether the data is plausible, credible, and reliable, and means the "truth" of the study (WHO 1996:263). The researcher did the following activities and procedures to address the credibility, dependability, trustworthiness and transferability issues of the study and ensure that credible findings were more likely by preventing researcher bias in the study.

- The researcher provided enough information about the perspective, sampling, and choice of subjects, and data collected in order to determine with some confidence the validity or "truth" represented in this study.
- The researcher employed purposive sampling in order to collect data that represented the range of realities of participants taking caution to identify both what is excluded as well as, what is included.
- The researcher actively participated in the data collection procedures to avoid erroneous reported data and kept detailed and accurate records of everything documented and organised appropriately for retrieval purposes.
- The researcher exercised utmost care to detect any potential bias and inclination that may influence the conclusions made about the data to minimise the likelihood of the researcher's values creeping into the interpretation of data.
- The researcher was even-handed as possible; focused on the most relevant effects, carefully sorted out description, analysis, and opinions in order to achieve the relevance of the study.
- The researcher followed a "triangulation of methodology", to address research questions, but also, for enhancing reliability, by cross-checking and bringing together different sources of information to converge or conform to one interpretation, and uses inference descriptors that are close to what the subjects said or what was recorded as field notes.

- The researcher discussed the interpretations and conclusions of the findings with a peer who is not involved in the study but is interested in what the researcher is doing and got an in-depth opinion about the data and challenge what the researcher wrote.

3.7 ETHICAL CONSIDERATIONS

Ethics deals with matters of right and wrong. *Collins English Dictionary* (1991:533) defines ethics as “a social, religious, or civil code of behaviour considered correct, especially, that of a particular group, profession, or individual”.

The researcher obtained approval from the Department of Health Studies at the University of South Africa (see annexure 8) and from Gambella Region Health Bureau (see annexure 7) to conduct the study. The researcher respected the values and interests of the community, the dignity of the participants, explained the purpose and significance of the study to them, and obtained explicit informed consent from each participant. The respondents were assured of confidentiality and anonymity and informed that they could withdraw from the study at any time, if they so wished (Streubert & Carpenter 1999:38; WHO 1996:72). The researcher ensured scientific honesty through establishing a relationship of trust with the participants (Streubert & Carpenter 1999:36, 37).

3.8 CONCLUSION

This chapter described the research design and methodology, including the study area, population and sample, data collection and analysis, and ethical considerations. Chapter 4 presents the data analysis and interpretation.

CHAPTER 4

Data analysis and interpretation

4.1 INTRODUCTION

This chapter describes the data analysis and interpretation and the results.

4.2 DATA MANAGEMENT AND ANALYSIS

4.2.1 Data management

4.2.1.1 Translation and transcription

Verbatim transcription of tape-recorded textual information was made in the local language used and translated into Amharic language and then back translated to the local language. An independent translator for accuracy checked translation. The Amharic version was then translated into English with back translation check. Researcher field notes were used with each translation to cross check authenticity.

4.2.1.2 Data entry and management

The central analytic task in qualitative research – understanding the meaning of texts cannot be computerised in the way numerical data are. Computer Assisted Qualitative Data Analysis Software (CAQDAS) is usually used for mechanical analysis techniques to save time and effort when dealing with a large amount of data. Examples of CAQDAS include, NVivo, Atlas, ethnograph, hypersoft and code-a-text. Software programs cannot analyse the data and help the researcher decide which bits to code as what and why. They are only a research tool (Basit 2003; Lewins & Silver 2004).

The starting data collected includes 12 hours of recorded cassettes and written notes (table 4.1). In this study, due to the manageable size of the data, a combination of manual and word processing software, MSOffice Word 2007 and MS OneNote 2007 were used for manipulation such as cutting, copying, pasting, marking, selecting, merging, storage, and retrieval (Carney, Joiner & Tragou 1997).

Table 4.1 The size of starting data

Methods	Number of files	Instruments	Transcript
FGD	5	6 cassettes(1 hour each)	115 pages
In-depth interview	6	6 cassettes(1 hour each)	130 page
Documents review	1	Notebook	10 pages
Observations	1	Notebook	25 pages
All	13	12 cassettes and 2 notebooks	280 pages

The English translations were entered by typing into word processor using MS Word software. The data from the observational notes, document reviews, and memos were also entered into word processor using MS Word. Each interview, document reviews, and observational notes, named, checked for consistency, and language was put into a central file in a folder indicating starting files.

Six in-depth interviews, five FGDs, document review notes, and observational notes accompanied with researcher impression notes and contact summary reports formed the final documents used for analysis. One page contact summary report was prepared regularly immediately after each interview or focus group discussion which includes all the main issues, any major information obtained, the most interesting and illuminating.

The researcher created a separate file for his own reactions during the study to record feelings, hunches, and reactions. The researcher wrote down each observation that he captured while collecting data such as; body language, immediate thoughts, reactions, and interpretations. These were kept in separate notes.

4.2.2 Data analysis

4.2.2.1 Data coding

A set of categories were developed based on the themes of the study and the study questions as a priori codes (table 4.2). These categories were tabulated against code words assigned for each code and specific identification colour. Code categories were made to be inclusive (all examples fit a category), mutually exclusive, defined precisely (what are properties) and all data fits some category (exhaustive). A master list (i.e., a list of all the codes developed and used in the study) was kept.

Copies of original files were made and the copies of each original file formatted to have large right margins forming the second set of files. The files were used to write on, cut, and paste as needed. The second set of each transcribed data file was read and divided into meaningful analytical units (i.e., segmenting the data). When meaningful segments were located, they were coded with appropriate code word. Again, whenever a meaningful segment of text is found in a transcript, a code or category name to signify that particular segment was assigned.

Table 4.2 Code categories

Major interventions	M Codes	Colour identification
Abate® chemical	[#ACHM#]	Red
Distribution of filters	[#DFIL#]	Orange
Safe water provision	[#SWPR#]	Yellow
Containment and reward	[#COCR#]	Green
Surveillance	[#SURV#]	Blue
Health education	[#HEDU#]	Indigo
Training of workers	[#TVBV#]	Violet

This process was continued until all the data were segmented. Initially numerous codes were generated by reading through responses, identifying related data with no concern over the variety of categories.

4.2.2.2 Organisation of information

In each file, code segments on the hard copy were highlighted with a marker and marked similarly on the soft copy. The researcher used the right margin for writing comments.

Using the copy and paste facility, similar code marked data from each FGDs document was collected in a file named with the code word forming the FGD document for the code. Files for in-depth interview were formed in a similar way.

After initial coding, the codes were reviewed and less useful ones were eliminated, smaller categories were combined into larger ones, or very large categories subdivided. At this stage, organising codes into larger themes was conducted. Then, the codes were re-applied to new segments of data each time an appropriate segment was encountered. This procedure facilitated the process of identifying and naming interesting information in the data files. The next step was to bring order to the data; i.e., disassembling and reassembling the data set based on coding scheme. During this process, the data was “sorted” and “sifted”.

All the above stages were repeated for each transcript. Then each category was collected from all the transcript files into one file by following the colour highlight for identification. All the categories or themes were collected and examined in detail and the fit and relevance to the theme considered (figure 4.1).

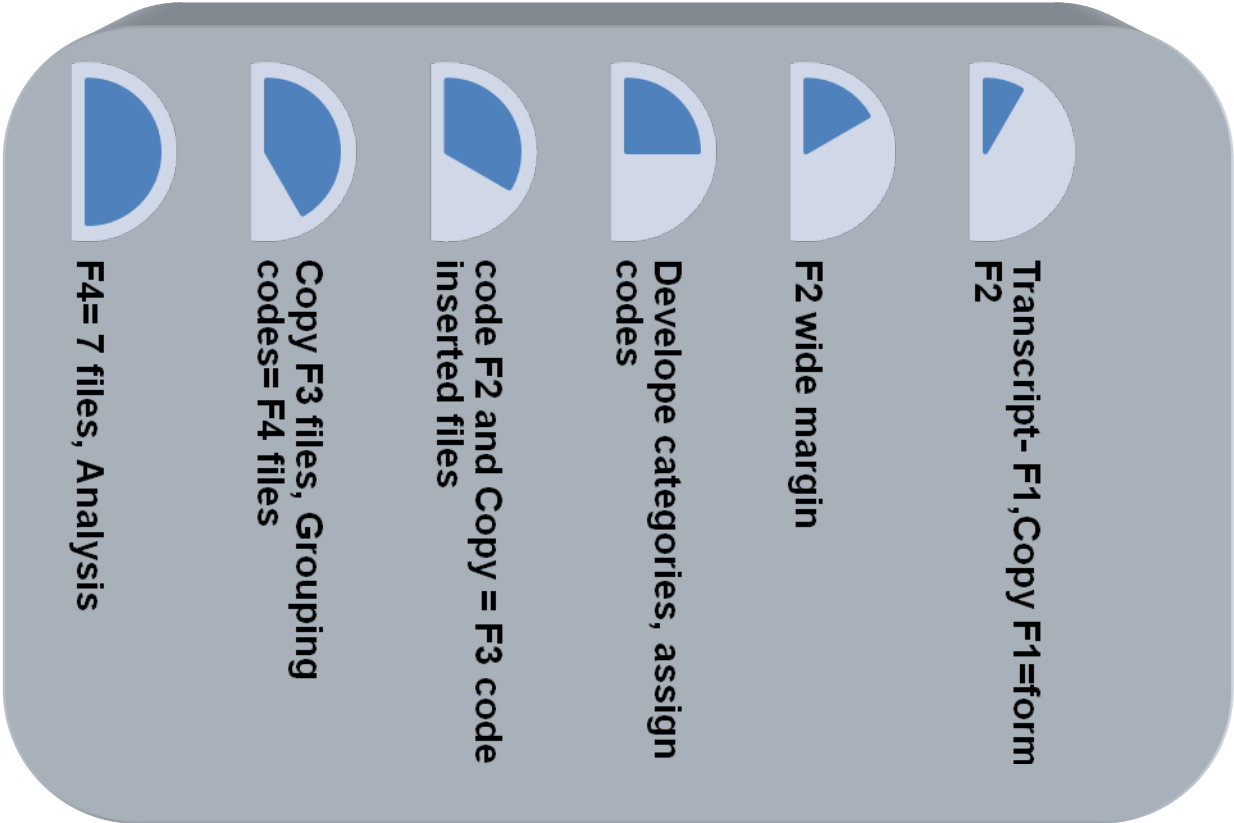


Figure 4.1 Steps of organising documents

Once the entire transcript data was categorised into intervention categories/themes, using an initial information organiser-working template (table 4.3), a review was made in order to ensure that the information was correctly and appropriately categorised. It was also rechecked against the original transcripts to ensure that all the information had been categorised.

Table 4.3 Information organiser table

Files	INTERVENTIONS						
	Abate®	Filters	Safe water	Containment/ Reward	Surveillance	HEand Com Mob	Training/ HWs
FGD							
Abobo							
Gambella							
Gog							
Itang							
Larie							
In-depth interview							
Abobo							
Gambella							
Gog							
Itang							
Larie							
Observation							
Region							
Districts							
Village							
H.facilities							
Document review							
Region							
District							
H facilities							

4.2.3 Analytic interpretation

Content analysis was conducted for the qualitative data collected through interviews, FGDs, observation, and document reviews. Content analysis is a systematic approach to qualitative data analysis that identifies and summarises the messages that the data are sending. It is used when working with narratives such as diaries or journals, or to analyse qualitative responses to open-ended questions on surveys, interviews, or focus groups. The aim of content analysis is to make sense out of the data collected and to highlight the important messages, features, or findings (WHO 1996:263; Seidel 1998; World Bank 2006).

The content was analysed on two levels:

1. Basic level or the manifest level: a descriptive account of the data; i.e., this is what was said, but no comments or theories as to why or how.
2. Higher level or latent level of analysis: a more interpretive analysis that is concerned with the response, as well as what may have been inferred or implied.

The researcher goes over and over the data to ensure a thorough content analysis.

Methods triangulation- The use of multiple research methods to study a phenomenon was applied for analysis of each theme (figure 4.2). Observational and document review data derived from working template were organised using summary template (table 4.4).

Table 4.4 Document and observational data review template

Interventions evaluated	Observation	Document review	Conclusion
Abate® treatment			
Filters			
Safe water			
Containment/reward			
Surveillance			
Health education and community mobilisation			
Training of workers			

Information from FGDs and in-depth interviews derived from working template was organised using at least one qualitative data analysis worksheet shown below (table 4.5) for each intervention topic. The researcher carefully read all of the data that pertains to the first intervention question and writes down each opinion, idea, or feeling that pertains to the expectations for that intervention question in the “Topics” column of the worksheet.

Table 4.5 Data analysis template

Data file name:		
Intervention Topic:		
Color, code, or symbol:,		
Question	Quotes	Findings
1.		
2.		
3.		
4.		
Etc.		

The rest of the worksheet was completed in the following way. Quotes that best represent each topic extracted and inserted from notes. Researcher’s conclusions about specific points were entered in the “Findings” column.

The researcher read find meaning, relation, contrast, and make conclusions based on information compiled using the work sheet. The researcher summarises and organises findings for each Guinea worm eradication intervention from each method of data collection in terms of common words, phrases, themes, or patterns, and compare and contrast findings. Triangulation (figure 4.2) was employed in bringing together different sources of information to converge or conform to one interpretation. With the convergence of information from different sources (documents, discussions, interviews, and observations), and settings, it is possible to make a powerful argument that the interpretation is more credible. Among the four data collection methods employed in the study, any three of the data collection methods were used to verify and analyse information.

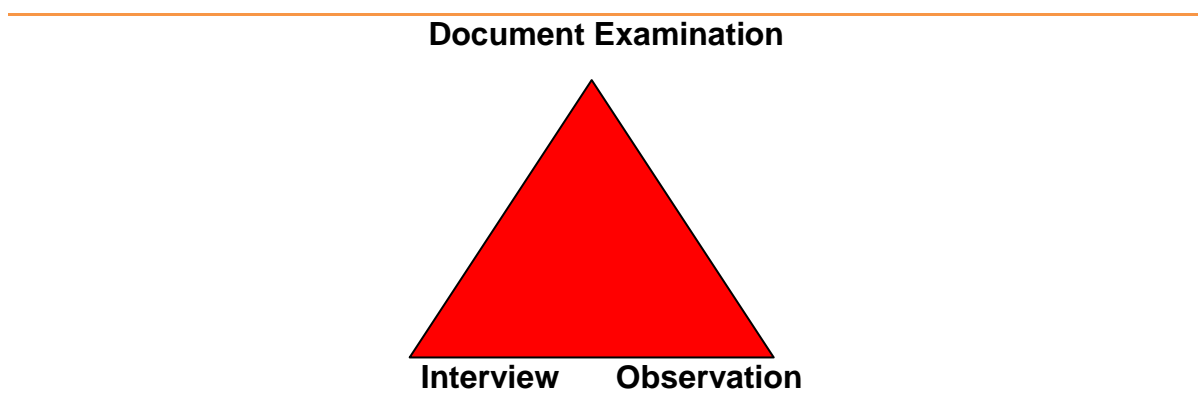


Figure 4.2 Triangulation of methods

The researcher analyses and interprets the data by looking for meaning and significance in the textual data from different sources and for alternative explanations and other ways of understanding the data. Interesting perspectives even if only said by one or two people were also highlighted. With the intention of obtaining information, questions, and other possible ways of interpreting the data the researcher share drafts with peers for review and compare the findings and derived conclusions.

4.3 RESEARCH RESULTS

The research results are presented following the pattern of themes of the research question.

4.3.1 Sample characteristics

The demographic profile of FGD participants is shown in table 4.6. Occupations of FGD participants include Guinea worm (GW) village volunteer, District Council member, Farmers, Health workers, Agriculture extension workers, police and teachers.

Table 4.6 Demographic profile of FGD

Age Class	Abobo			Gambella			Gog			Itang			Larie			Total		
	F	M	T	F	M	T	F	M	T	F	M	T	F	M	T	F	M	T
20-24	0	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	2	2
25-29	0	4	4	0	0	0	1	1	2	4	1	5	1	0	1	6	6	12
30-34	0	2	2	0	1	1	1	1	2	0	0	0	2	2	4	3	6	9
35-39	0	0	0	1	4	5	0	2	2	0	0	0	0	2	2	1	8	9
40-44	1	1	2	0	1	1	0	0	0	0	0	0	0	0	0	1	2	3
45+	0	0	0	0	1	1	0	0	0	0	1	1	0	0	0	0	2	2
Total	1	8	9	1	7	8	2	5	7	4	2	6	3	4	7	11	26	37

Six in-depth interview participants, male, one coordinator from each district, and one regional coordinator have participated. The document sources and observations sites in the study are given in table 4.7.

Table 4.7 Document source and observations sites

Document source	Observations sites
Region	Five district offices
District	Village water sources
Health centre	Health centres

4.3.2 Understanding and perceptions of community on GWD

4.3.2.1 Health education

The FGD participants were asked if there was any health education session in their respective villages. Most of the participants, confirmed that they had attended health education programmes in their villages at least once in the previous three years.

Participants mentioned that VBVs had provided the health education previously, but since 2010 health extension workers did so. Village-based volunteers were selected only in a few villages that reported GWD cases. Health education was carried out in those few villages only. Presently, health extension workers have been assigned to each kebele and health education on GWD has been carried out in most villages. During the last three years, after interruption of the disease, the health education activity was not regular. In Abobo and Gog districts, the health education was provided at least once a week while in the remaining three districts it was infrequent.

Regarding materials used during GWD health education most of the participants responded that health extension workers used posters while some mentioned that brochures were also used as a tool for health education. Video films, dramas, and community criers were used only in Gog district to educate the community. In most districts, the health education was carried out in the villages mainly under a tree. In some villages where it was difficult to gather community members together, health education activity was carried out from house to house. During the health education session, the major topics covered included filtering/boiling pond water before drinking, being aware of the disease and reporting persons having any lesion to health extension workers. Voluntary participation during cleaning and treatment of ponds with chemicals was also included in the education.

In discussing the question for acceptance of messages, one participant explained, “people will not accept boiling of water. The best option is filtering using cloths”. The other participant added, “But some people did not practice what they have learned because of their lower life standard. They say, “Let me die, for which better life I have to worry, whether I live or die, it is similar”. They failed to practice lessons given because of their low economic status. ... Anyway, it is better to distribute filters”. This was an interesting core issue of concern to be addressed by education.

The discussion with programme coordinators revealed that HEWs had contributed to educating the community on GWD. The health extension programme was established in the region recently (about four years ago) and all kebeles now have at least two HEWs.

HEWs are expected to visit each village at least once in a week to carry out health education and surveillance on epidemic prone diseases, including GWD. However, HEWs are mainly focusing on the health components of the millennium development goals (MDGs), not for GWEP. The claim of GWEP coordinators, therefore have no bearing considering the nature of an eradication programme.

All the district coordinators mentioned that in the past great effort required to organise a meeting with community members since community members were living in widely scattered area. The resettlement programme carried out recently in Gambella region show a benefit to bring community members together. It is easier to organise health education campaigns if the communities are grouped together. However, even though they live together, they work in remote forest areas and it is there that the danger of contracting the GWD remains a challenge.

Researcher observations reveal that there is no GW poster posted at village level, while available on the walls of district health office and all 5-health centres visited. This is surprising as posters were misplaced, or absent where they are needed most at village level. There is no document of any kind about the provision of health education in two districts, Gambella zuria and Itang; old health education documents from 1996 to 2003 was observed in Larie district but no data since 2004; health education documents were available in Abobo district showing number of educational sessions conducted on weekly basis. Regular health education sessions report was available in Gog district where an international organisation, The Carter Centre is supporting the GWEP. The

researcher witnessed posters, brochures and flip charts were stored at Regional health bureau and at district level. In general, from all the information gathered using documents, observations, interviews and discussions, the perception and understanding about the disease and the interventions is not satisfactory. The programme has also failed to provide health education session regularly in all districts except Gog in contrast to the adjacent Sudan where more than 100,000 health education sessions were held annually in 2002, 2003, and 2004 (Hopkins et al 2005:669-675).

Education and community mobilisation activities in Gambella region were conducted by health workers only, and no collaboration by other sectors is documented or stated. Other sectors, political, cultural, social, and economic, exert powerful influences and affect health – both by influencing the determinants of health and by their impact on health systems. In implementing community mobilisation on guinea worm eradication, the involvement of political, ethnic, or religious leaders and the participation of other sector offices such as agriculture, and education bureaus who are working closely with the community are of vital importance.

Health education and community mobilisation should be emphasised as a priority because they are the least costly of the interventions available and are a necessary base for the other interventions (Hopkins & Ruiz-Tiben 1991: 533-540). Health education and community mobilisation should be conducted using as many appropriate channels of communication as possible, and messages tailored to different audiences and objective conditions of the target community with the participation of all stakeholders. The efforts in Uganda, Nigeria, Ghana and Sudan (Barry 2006:1-2; Miri et al 2010:215 - 225; Hopkins 2008) can give an insight to the ways of conducting health education and mobilising the community.

Like other tropical diseases interventions, GWD has biomedical behavioural continuum, having biomedical interventions and behavioural intervention component, which relies on active community participation. This depends on the extent of education effort in increasing understanding of the disease, the acceptance for eradication methods and behavioural change. Health education and community mobilisation are at the heart of GWD eradication. Teaching communities about the disease should be tailored to address the signs and symptoms, ways of transmission and spread, methods of eradication and the impact of the disease in the health education activities for GWDE.

Convincing and mobilising villagers to take action against the disease include preventing people with emerging worms from entering and contaminating drinking water supplies; reporting of new cases and the cash reward; using of safe water sources for drinking, using of water filters properly and consistently, and the need and safety of using chemical treated water. Health education is very important for the success of every component of the intervention strategies and it is a continuous process.

GWEP village volunteers are at the front lines of GWD active surveillance and provide many of the interventions. The selection, appropriate training, motivation, and support of village volunteers, their commitment, and educational messages tailored to the specific locality using well-designed methods and variety of media are crucial for the success of GWEP in the region. Furthermore GW cases treated have got education and could be an asset to be used in the educational activity, since they can explain their experience to their community in a more convincing way.

4.3.2.2 *Community perceptions*

During the focus group discussion, most of the participants mentioned the name of the disease in local languages- as Chuet in Nuer tribe and Chay in Anguak tribe. The large majority of the participants believed the worm emerged in the legs only while some knew that the infection could occur in any part of the body. A larger majority claimed they have observed a patient with an emerging worm in the past. In the discussion, a woman participant explains worm emergence figuratively, “Abdomen, pointing with fingers ..”. [Translated – worm emerging.]

Nearly half of the participants had not seen a worm emerging recently but had heard that somebody had the disease in the past while some had heard about the disease when attending a session on GWD health education from the educators that the worm could emerge from any part of the body. Some of them observed GWD cases in the villages while others observed them at health facilities. Most of the participants explained that the worm is long but could not estimate its length, while some indicated that the worm was about one meter in length.

Most participants did not know the incubation period of guinea worm after acquiring infection. These participants explained that the disease would manifest the signs and symptoms immediately after drinking the contaminated pond water. Only few participants indicated that it would take about one year to manifest the signs and symptoms of the disease. More than half of participants mentioned the two most important signs of the disease: swelling and emerging of a worm from the affected part, and some mentioned additional symptoms of the disease such as burning sensation, itching, and pain. In relation to the main cause of infection, only few of the participants explained that drinking pond water having infected Cyclopes could result in the disease.

One former village-based volunteer participant explained, “When a patient enters into pond and other people drink pond water without filtering then those people that drink the pond water will have the disease. If the pond is not treated with Abate® then the pond will be able to transmit the disease”.

A woman from Gog district, current endemic district, also explained how the disease is transmitted: “When a patient with GWD enters a pond then the pond will be contaminated with the disease and then when any of the family members drink that pond water without filters or boiling then the person will have the disease”. One participant also forwarded an example of exaggerated understanding. The participant stated, “What I knew is, it is the worst disease and kills people, I mean, when it reaches high stage or enter to nerves it could kill”.

During the discussion, issues related to delay of the disease interruption in Gog district were raised and the participants from Abobo, Gambella Zuria, and Larie districts mentioned the presence of a lot of ponds and few clean water sources (pump water) as the main reasons why Gog remain endemic. Participants also mentioned that health workers did not apply Abate® chemical to all ponds in Gog because the area is very vast and health workers are few. Some of the ponds are found in forests where people are not permanently living. When community members visited these forest areas for routine activities, such as for hunting and farming, they used these untreated ponds without filtering.

Abobo participant elaborates, “I have travelled to Gog recently and visited up to Atheti and Wuchini villages. These areas are covered with forest. If a guinea worm case

crosses the forest area, he might contaminate the pond and nobody could be aware about the patient. He may stay in the forest for longer period and health workers will not be aware about the patient. When other people visit the same area and drink the contaminated water, they will be infected with the disease. This is the main cause for GWD to remain endemic in the region. It would have been good if there were enough number of clean water sources". Another participant replied, "People are moving deeper to South Sudan, even up to Juba ...". [The former person interrupted.] "... Between Pochalla and Juba, there are Murulie tribes. They cross the border, came to Gog, and even up to Gambella town to cattle raiding. They hide in the forest. If any of these people has guinea worm disease, they contaminate ponds that will result contamination of other people. The Murulie tribes did not have knowledge on guinea worm disease. They move from one area to the other as a result". These interesting discussions were valuable for the understanding of GWD by participants.

Before concluding all the sessions, the participants were asked what action needed to be taken. The participants recommended regular health education and distribution of both cloth and straw filters as important measures to eradicate GWD in the area. The participants also mentioned the presence of GWD in the region as a failure of health workers to provide proper health education to the community. Another reason could be the traditional shifting cultivation farming style carried out by community members in Gog district. They have a culture of shifting farming land every two years. This makes them penetrate far into the forest area where they use untreated pond water. Other participants indicated that people in Gog are not willing to accept and practise what they have learned from health workers on proper utilisation of filters.

Furthermore the danger of GWD re-emergence was reflected from participants of formerly endemic district, as one participant mentioned, "On my side, I have a fear, I have heard that people in Awukoy village who were resettled in one place have left the new village and scattered to different places for farming where there is only pond water as source for drinking. After agricultural activities the farmers become tired and will pay no attention for their health. They simply drink pond water without filtering and this is a big threat for guinea worm disease".

Most of the participants confirmed that health extension workers (HEWs) from health posts provided supervision and gave advice concerning infectious diseases. HEWs are

responsible to the control and prevention aspects for all diseases. GWEP need a committed staff because efforts needed for eradication are not addressed equally as prevention and control of other diseases. In addition to the workload on HEWs, they cover several villages, and cannot and should not be considered as replacement to the role of village based volunteers for GWEP.

During in-depth interviews with the programme coordinators, all of them believed that the awareness of the community on the GWD eradication programme is still low. All suggested a need for additional efforts to increase community awareness. Two of the programme coordinators indicated that the programme used different approaches, such as coffee ceremony, community criers, posters, brochures, and mass media to raise community awareness on GWD. Over the last three years, all intervention activities were limited in Gog district except the distribution of posters and brochures.

Most coordinators mentioned lack of capacity including financial problems at district level to carry out these activities. All agreed that the present resettlement programme had a benefit for awareness creation activities. None of the programme coordinators had conducted any assessment to check the level of community awareness in the last three years except Gog district. None of the programme coordinators explained the core reason for the delay of disease interruption in Gog and the possible risk of GWD emergence in the neighbouring areas. It is evident that the understanding of the community and partly blaming the failure of GWEP staff in the eradication activity is reasonable.

4.3.3 Interventions on drinking water

4.3.3.1 *Safe water supply*

Most of the focus group participants indicated that there were many boreholes fitted with pumps in their respective districts and people were using this water. At the same time, however, there were areas that used pond water as a source of drinking water. There were two endemic villages in Gog district using pond water as source for drinking. The same was true in the remaining districts. The participants could not specify the number of villages with boreholes and that used river water. However, the supply of potable

water had improved in the past five years compared to the beginning of the GWD eradication programme.

According to the participants, most people in Gambella Zuria, Itang and Larie districts used the Baro and Akobo rivers as a source of drinking water. Some community members of Abobo district bordering Gog district used the Alwero River as a source of drinking. Almost half of the population in Gog district also used Gog River as a source of drinking. The participants were of the opinion that the community members would not drink pond water if they had other options. Participants mentioned sickness, such as GWD, diarrhoea, schistosomiasis, bloody diarrhoea, and amoeba as results of using pond water.

Concerning preference, the participants were in favour of drinking water from a borehole to a pond. The FGD participants stated that when they went to farms, community members used pond water due to lack of other options, including filters. Participants also pointed out that prior to having health education; they had preferred water from ponds instead of boreholes. Most of the participants reported further that everybody in the community was now aware of the advantages of clean water sources, such as rivers, springs and boreholes.

The participants also mentioned the good opportunities of resettlement (villagisation) activities carried out in all districts in eradication of GWD from the region since boreholes and health posts were constructed in most of the newly established villages. However, people travelled back from their new villages for farming and cattle grazing where they would drink the pond water. Efforts are made in Gog district to use straw filters while they stay in the forest for farming. The researcher had a chance to see community members while collecting water from boreholes (figure 4.3).



Figure 4.3 Community members collecting water from boreholes in Larie and Itang districts

According to the regional and district programme coordinators, the provision and availability of safe water supply had increased over the last five years. The community's acceptance of and behaviour to clean water had improved. The programme coordinators emphasised that in areas where there were no boreholes or rivers, community members were challenging district councils for the construction of boreholes. During a visit to one village in Gog district, queues of people waiting to collect water from borehole was noticed, showing the interest for safe water source.

The GWEP advocates for the development and repair of safe drinking water sources which is economically challenging for poor countries. Safe drinking water for avoiding GWD includes safe water sources (tap water, flowing rivers, and protected wells), chemically treated ponds, and filtered water. FGD participants and programme coordinators confirmed the increase in the provision of safe water sources and community awareness on the importance of safe water use to prevent GWD except in some community members.

The availability and use of water from rivers and streams in Gambella Zuria, Itang and Larie districts has also contributed to the interruption of GWD, Despite relatively improved the behaviour of the community in safe water use, need to further strengthen

to avoid use of pond water while moving for agricultural activities away from the villages. Participants indicate the focus needed to this aspect repeatedly.

4.3.3.2 The use of filters

All the districts except Gog had stopped distributing filters to community members. They stated that the distribution of filters was interrupted four years ago in three districts. In Abobo district, the distribution of filters was stopped in 2010.

The participants stated that The Carter Centre (TCC) was the partner organisation that supplied the filters. However, TCC withdrew from all districts where GWD transmission was interrupted and terminated supplying the filters to all districts except Gog. Straw filters were distributed to those that travelled long, such as for hunting and farming. Cloth filters could be distributed for home use to filter pond water into jars and pots.

In Gog district, where filters are still distributed, the village volunteers went and provided health education on how to use them to community members. In addition, the GWD field supervisors visited the farmers frequently to check the availability and condition of filters. The researcher had a chance to see a woman using cloth filters while collecting pond water (figure 4.3).



Figure 4.4 A woman using cloth filter in collecting water from a pond in Gog district

The participants in Gog district confirmed the distribution of straw filters to all people and community members hung their filters up when they travelled out of their villages. They confirmed that health education was provided and follow-up made on proper use of the filters. The participants from Gog district explained the procedure of filter distribution: the village volunteers were trained at district level on how to use filters. On their return to their respective villages, they would provide education to the villagers on the proper use of filters.

Programme coordinators in three districts confirmed that no filters had been distributed since 2007. In Abobo district, distribution of filters had stopped since 2010. The programme managers in the four districts explained that the health workers had advised the community to use any piece of cloth as a filter.

No filters are found at regional health bureau stock. TCC supplied filters to Gog district only and as a result Gog district had enough cloth filters for the year in stock. The researcher has seen some villagers hanging straw filters and filtering during collecting water in Gog. Data on number of filters distributed to villagers was observed in Gog and old document in Abobo district. There is no previous years document on distribution of filters in the other districts. Filter distribution needs to be documented and kept in proper place as historical evidence. Abobo and Larie districts participants emphasised the importance of filters in few villages bordering to Gog. Gambella region guinea worm eradication programme needs to discuss with partners such as TCC and WHO, to resolve the problem of providing filters to guinea worm at risk villages.

4.3.3.3 Chemical treatment of ponds with Abate®

Most of the participants explained that the treatment of ponds had stopped in four of the five districts for long period. Treatment of ponds with Abate® chemical was carried out only in Gog district. Recently, community members used chemical, named as “water guard”; distributed freely from regional health bureau to prevent diarrheal diseases.

Some of the FGD participants mentioned involvement in cleaning ponds. However, most of the participants had no experience in support of treating ponds with Abate® chemical® nor had they observed when ponds were treated. In Abobo district, the participants explained that treatment of ponds had stopped since 2009. The district

health office had informed them that treatment of ponds was now limited to Gog district. Treatment of ponds with Abate® chemical should be carried out at four- to six-weeks intervals, but most of the participants were not aware of this.

The FGD participants from Gog district confirmed that all ponds in at risk villages of Gog district were treated with Abate® chemical but could not estimate the number of ponds treated or the frequency. They stated that there were Abate® chemical teams responsible for treating ponds and the teams knew the details of Abate® treatment,

During the discussion with FGD participants, few of them mentioned the importance of accurate measurements of Abate® chemical application. A participant from Abobo district states: “If concentrated, it will kill bigger living organisms and when these dead bigger organisms decay will have bad smell where people will show no interest to drink water from this pond”.

The regional and district programme coordinators reported that the treatment of ponds with Abate® chemical was interrupted in Gambella Zuria, Itang and Larie districts eight years ago. However, one pond in Itang was treated in 2009 after a GWD case was reported. In Abobo district, the treatment of ponds with Abate® chemical was in place until mid-2009. The district health office had requested the continuation of treatment in villages at risk where pond water was used as a source for drinking. However, the partner NGO did not accept the proposal since indigenous GWD transmission was interrupted in the 4 districts including Abobo.

The programme coordinator of Gog district indicated that treatment of ponds with Abate® chemical was carried out regularly in all ponds that were assumed to be at risk for GWD with an interval of a month. The coordinator stated that all ponds would be tested for the density of Cyclops before treatment and again two to three days after treatment to validate the effect of the treatment. All the programme coordinators expressed the need to treat ponds in areas that are potentially at risk for GWD.

There were no documents on list of ponds and number of ponds treated by Abate® chemical in Gambella and Itang. There is document on list of ponds treated and amount of Abate® used in Gog and old documents in Abobo and Larie districts. List of ponds treated with Abate® chemical need to be handled properly for certification process.

To control the copepod vector for GWD, the GWEP recommends a measured amount of approved chemical larvicide, such as Abate®, into the water sources that are suspected to be contaminated. This chemical kills the copepods and prevents people becoming infected with GWD when they drink the water, which again pose acceptability problem in some communities due to taste. Chemical treatment have challenges including needs qualified staff, determining volume of variable size ponds, tracing ponds in remote areas and seasonal ponds.

4.3.4 Surveillance

4.3.4.1 Active case search

Surveillance encompasses active case search, identification, management (containment and treatment), and reporting. Active surveillance strategy involves provision of cash reward for early reporters of GWD case.

More than half of the focus group participants have seen GWD cases in the villages in their respective districts a long time ago except in Abobo and Gog districts, where GWD cases were seen in 2008 and 2011, respectively. Participants from Larie district had observed a worm coming out of a patient's abdomen. All the focus group participants except those from Gog district confirmed that they had not seen or heard about GWD cases in the last three years.

The participants explained that most people in their respective districts (including the participants) had travelled to South Sudan. The participants are aware of the presence of GWD in South Sudan. They also believed that the cross-border disease surveillance on the Ethiopian side of the border was weak and that increased the possibility of cross-border infection from South Sudan.

The participants from Larie district believed that there was no indigenous GWD in Larie district and that all cases reported were from South Sudan. In Gog, people are now assigned to guard all ponds. Most of the participants from the formerly endemic District repeatedly expressed their fear of imported cases of not only across the border but also of cross-district imported cases, mainly from Gog district.

The participants explained as, “There is a vast area covered by forest. If GWD was imported to the forest area and contaminated the pond, no one would be aware of it. As Gog district is on the border of South Sudan, there is cross-border movement of people deeper into South Sudan, up to Juba. Between Pochalla and Juba are the nomadic Murulie tribe. They cross the border to Gog, and even up to Gambella town to raid cattle. If any of these people have GWD, they will contaminate ponds, which will result in contamination of other people”.

During the discussion with the programme coordinators, all confirmed that they had conducted GWD surveillance in their respective areas, but coordinators in Gambella, Zuria, and Abobo districts were not satisfied with guinea worm disease surveillance. Inadequate funding for motorcycle fuel at district level has affected the surveillance activity. All the district coordinators except Gog complained of lack of financial support from any of the partners or regional government. In addition, lack of incentives for the field supervisors also had a negative impact on GWD surveillance.

As some of the programme coordinators explained, until two years ago, district programme coordinators and field supervisors earned birr 450 per diem per month while village-based volunteers earned birr 75 per month to cover the cost for transportation. The payment was believed to enhance GWD surveillance. However, financial support had stopped since 2010 in all districts except Gog. This contributes to failure to carry out active surveillance to villages.

All the district coordinators except Gog district also mentioned transportation problems as another factor that hindered effective implementation of GWD surveillance in the region. All the coordinators confirmed that they had received one motorcycle each from the WHO to support the GWD eradication programme early in 2010, but because of mismanagement, most of the motorcycles were now non-functional.

As one of the district coordinators mentioned, “The mismanagement was a result of lack of ownership of the programme. He explained that everyone in the district office used the motorcycles without riding skill and as a result, the motorcycles were damaged within a short time. In addition, there was no budget to maintain the motorcycles”.

All the programme coordinators indicated that health extension workers mostly carried out GWD surveillance. The health extension workers were expected to submit weekly disease surveillance reports of 20 diseases to the district regularly on Mondays. GWD is included in the 20 weekly reportable diseases. All programme coordinators agreed and accepted the system but because of a shortage of funds and transportation, they were not able to verify if the activity was carried out as expected or not.

During the researcher's observation, all the districts except Gog had incomplete weekly disease surveillance reports. Most of the district health offices received only half of the weekly disease surveillance report from health facilities and some of the reports received were submitted after the expected date. In general, weekly disease surveillance reports in all districts lack completeness and timeliness. In addition, lack of weekly disease surveillance report forms was mentioned as a major problem for failure to submit the reports on due date.

The distance and transportation problem from health posts to district health office was also stated as impeding the submission of the weekly disease surveillance report in time. None of the programme coordinators gave feedback to health facilities regarding the observed weakness of weekly disease surveillance reports. The experience of health workers on disease surveillance activity was also questionable. No GWD rumour was recorded in all districts except Gog district. In Gog district, average of 35 rumours were reported monthly.

The researcher observation and document reviews confirm that weekly disease surveillance report from districts is incomplete and checklist not used during supportive supervision. Missed GWD cases could result due to poor surveillance and this should be improved on recording and reporting of weekly disease surveillance and districts need to provide supportive supervision in short intervals to enhance active surveillance

4.3.4.2 Cash reward

Most of the participants had heard about the cash reward a long time ago and listed the previous amount such as 100 birr while others mentioned 200 birr. In addition, most of them said that only the patient would receive the reward while others said only the person making the report would receive the cash reward. Most of the participants from

Gog and Abobo districts were able to mention the exact amount of birr 1000 cash reward and this reward was offered to both the patient and the one who informed the health worker. In response to the question “what action would you take if you came across a patient with GWD”, more than half of the participants said that they would support or advise the patient to go to a health facility. However, they were not aware of the benefit of cash reward.

All the programme coordinators confirmed that health extension workers provided education to community members regarding the cash reward. The programme coordinator of Gog district confirmed that regular health education on the cash reward was provided to the community using videos and stated that each village was supplied with a television and deck to use to raise community awareness on GWD including the cash reward. Moreover, all GWD cases reported in 2011 received Birr 1000 reward (USD 1.00 is equivalent to Birr 17.40). The reward was offered to the patient and to the one who reported, if any.

If the GWD suspected cases reported themselves to health workers and the disease was confirmed, the person would receive 1000 Birr. If another person reported about the guinea worm case, the reporter would receive 1000 Birr while the case would get 500 Birr. GWD case is eligible of the cash reward if reported early before rupture of the blister and release of the worm. This helps to bring the patient early before contamination of any water source and helps prevention of further infection.

Self-infection for the sake of getting the reward is not possible, directly from rupture without involvement of the vector, which is a complicated and unpredictable phenomenon. Abuse by reporting individuals is unlikely because the reward will be offered only for GWD cases that came early before rupture of the blister, which is before any chance of contaminating water sources.

Observed methods used to advertise the cash reward include posters and brochures with messages on the cash reward (figure 4.4). No message (poster) on GW cash reward is observed in visited villages. Data on Cash reward available in Gog and Abobo districts only and no old document on number of cases received cash reward in other districts. Low awareness on amount of cash reward probably results in low involvement on quick reporting and therefore water source contamination by cases.

The cash rewards increased the sensitivity of case detection and facilitated the early detection and reporting of all guinea worm cases occurring in a country within 24 hours thereby preventing contamination of drinking water source. There is a guideline stating the amount of money and the illegible to get the reward for indigenous or imported case of guinea worm disease (FMoH Ethiopia 2008:4). Countries such as Uganda, Nigeria, Mali, and Ghana have success in using cash reward (Miri et al 2010:215-225; CDC 2011c).

According to the Ethiopian national report, cash reward was established in 2002 (FMoH 2010). The main objective of the cash reward was to attract patients to come to the attention of health workers as early as possible before rapture of the blister.



Figure 4.5 Poster with GWD cash reward message posted in one of the Health centres, Itang (left) and on the side of a major road in Gambella town (right)

Even though the GWEP coordinators perceive that there is community awareness, this is not the case in the community as evidenced from the low community involvement in the intervention undertakings. Publicising the cash reward system for effective outcome is also dependant on health education intervention. However, during the FGD most participants were not able to mention the amount of the cash reward they never heard of a person received the reward.

4.3.4.3 Case containment

Case containment is one of the key methods used to prevent the spread of GWD. GWE centres provide treatment and support to people with GWD and prevent them from contaminating water sources. The researcher observed GWD cases admitted in Pugnido health centre of Gog district (figure 4.5). Community members are the key partners to report any suspected case to the nearby health workers. Low awareness of the community how the GWD is transmitted, and methods of prevention was evident from FGDs. As a result, there will be failure to identify suspected cases and reporting immediately to health workers for action and may lead to possible contamination of ponds by guinea worm missed cases and contribute for continuous transmission of the disease in the region.



Figure 4.6 GWD patients at a containment site in Gog (Pugnido health centre) district health centre

Data on list of GW cases admitted was available only in Gog and Abobo. Efforts should be made to have documents on list of GW cases in all districts, as it is required for certification of disease eradication, which the responsible persons should be aware.

4.4 CONCLUSION

In endemic countries like Nigeria, Ghana and South Sudan as many as nineteen international partners were involved to support the GWD eradication programme whereas in Ethiopia the Carter Centre was the only non-government organisation (NGO) that supported surveillance and awareness creation. Health and Development International (HDI) contributed limited financial support to the cash reward and case containment activities. In addition, in countries such as Nigeria and Ghana, there were enough full-time staff dedicated only to GWD eradication whereas in Ethiopia, the GWD programme coordinators spent not more than a quarter of their work time for eradication activities. This had a negative impact on active GWD surveillance activities as well as report compiling and documentation.

Officials, celebrities, and the like may help for fund raising but not useful in raising awareness and mobilisation in poor communities. Therefore, a locally tailored educational framework and modalities need to be developed. The results of this study indicated the necessity of and need for community education on safe drinking water, and priority setting in the application of interventions, mainly filtering drinking water in areas where only pond water is available as this is the choice of the community and feasible than other interventions.

This chapter discussed the data analysis and interpretation. Chapter 5 concludes the study, describes its limitations, and makes recommendations.

CHAPTER 5

Findings and recommendations

5.1 INTRODUCTION

The GWD eradication programme has been in operation for about 20 years in Ethiopia. Uganda, Nigeria, and Ghana have succeeded in completely eradicating the disease. The goal of eradicating *dracunculiasis* (GWD) completely in Ethiopia has been delayed by several years. At the same time, however, it should be noted that GWD transmission currently occurs only in a few villages in Gambella region.

5.2 FINDINGS

This study tried to explore and assess the perception and understanding of the community and GWEP implementers and the gaps in knowledge and experience of the GWD interventions in the Gambella region of Ethiopia. The findings are described in the following sub headings with respect to the role of implementers and the community (table 5.1) as expected for GWDE.

Table 5.1 Role of implementers and beneficiaries in GWEP

Intervention	Role of GWEP	Community/outcome
1 Education	Conduct continuously: optimise <ul style="list-style-type: none">• Message• Educators• Media• Methodology• Place and time	Awareness, behavioural change, participation in activities
2 Surveillance: Containment, cash reward, management/treat	Train staff, teach community, search new cases Investigate suspected cases, manage and treat, popularise, reward	Report and contain cases, avoid water contamination
3 Interventions for safe water	Study sources, prioritise intervention, Provide tap water, wells construction and maintain, and teach Identify naturally safe water sources Treat ponds with chemical, Provide filter, teach how to use	Proper use Identify and use Participate, use Use properly

5.2.1 Low community awareness of GWD

Having appropriate awareness of how GWD is transmitted is the key not only for interrupting indigenous transmission from the region but also for preventing recurrence of the disease due to cross-border importation from neighbouring countries. One-third of the FGD participants did not have adequate knowledge of how the disease is acquired, while only a few were able to explain the disease transmission. More than half of the participants confirmed that they had attended health education sessions. Of the participants, most did not know the incubation period of the disease and indicated that only posters and brochures were used as health education materials in four of the former endemic districts and health education sessions were not conducted regularly in three districts.

Of the FGD participants, the greater majority did not know the incentive scheme provided for prompt reporting of GWD. Moreover, they generally exhibited little awareness of GWD, even though the GWD eradication programme had been implemented in the region for almost two decades. Programme coordinators have confirmed that assessment of the level of awareness of GWD was not carried out by any of them in four former endemic districts. In the last three years awareness-raising activities, such as video films, dramas and community criers, had only been used in Gog district.

Compared with other countries' programmes, Ethiopia's eradication programme was run by only one full-time staff member recruited by TCC. Nigeria employed ten full-time staff, Uganda had eight, and South Sudan had more than 20 full-time staffs. Prominent people and political leaders, such as President Museveni in Uganda, General Yakubu Gowon in Nigeria, and a retired bishop in South Sudan were involved in community awareness-raising activities but no one was involved in Ethiopia (Rwakimari, Hopkins, & Ruiz-Tiben 2006:3-8; Njebuome et al 2009:691-698)..

Health education and community mobilisation are at the heart of GWD eradication. Health education is very important intervention component for GWE as most of the intervention strategies rely on community behavioural change and participation. Health education must be conducted as a continuous process and with appropriate consideration of target communities.

Like other tropical diseases interventions, GWDE has biomedical behavioural continuum, having biomedical interventions such as vector control and behavioural intervention such as boiling of water. The biomedical - behavioural continuum of interventions for GWDE relies on active community participation, which depends on the extent of health education intervention effort in increasing understanding of the disease, the acceptance for prevention and control methods and behavioural change.

The selection, appropriate training, motivation, and support of Health Extension workers, their commitment, and educational messages tailored to the locality using well-designed methods and media are crucial for the success of GWEP in the region (Hopkins & Ruiz-Tiben 1991:533-540).

5.2.2 Inadequate coverage of safe water supply

There is plenty of evidence for the impact of water supplies on dracunculiasis. However, there are some important limitations to the effectiveness of water supply, as a preventive intervention. First, water supplies cannot be expected to function without maintenance. Many water systems in Africa have fallen into disuse for this reason within a few years of construction, and in some cases the resulting reversion to unprotected water sources has allowed the disease to persist. The second limitation is that provision of water supply to every village and hamlet is not always feasible. The third limitation, a functioning water supply will still be ineffective if it is not used. The most common cause of non-use is that the supply is not close enough to the people's homes. Fourth, much of the population in the rural migrate. In addition to the movement of the nomadic pastoral population, it is common practice for a village to disperse during the growing season to a number of small and seasonal occupied hamlets, some of which may be in other districts, or even to sow their crops in several different areas (villagers movement is very common in Gambella region). When a borehole can cost as much as \$10,000, it is not a cost effective option to provide one for every such hamlet. Fifth, water supplies alone cannot eliminate dracunculiasis if they are not used exclusively (Cairncross et al 2002).

On the other hand, according to Uganda Country Report, safe water coverage in the endemic villages had reached full coverage by 2001. That contributed to interruption of

indigenous GWD transmission and eradication of the disease in the country in 2003 (Country Report on Dracunculiasis Eradication in Uganda 2008:20-31).

Safe water provision coverage in Gambella region has improved in the past five years. However, the construction of safe water schemes especially in few areas of Abobo and Larie districts that border Gog was inadequate. The construction of borehole in the known endemic Abawiri village of Gog failed due to hydro-geological formation and as a result the community still using pond water as a source of drinking water. This could have been one of the factors for the continuous transmission of the disease in the district.

5.2.3 Limited distribution and use of water filters

Since an adult cyclopid is over 1mm 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 remote and frequently inaccessible communities and speaking hundreds of different languages, to change their behaviour in this way is by any standard a major challenge to health education planning (Cairncross et al 2002). However, In Uganda, where eradication of GWD was successful, filters were part of the logistics supplied to the districts for combating dracunculiasis. The distribution of filters was introduced in 1992 during the initial stages of the programme and continues to 2003. The filters were supplied by The Carter Centre, and distributed to all households in the endemic villages. The programme replaced the filters every six monthly (Uganda Country Report 2008).

During this study, there was no documented data on the distribution of filters in three of the five districts. Cloth and straw filters are now distributed in Gog district only, despite the equally urgent need in other villages bordering Gog. Failure to distribute filters to areas that still use pond water as a source of drinking water and border on Gog are at risk for acquiring the infection. (It should be noted that the policy has been to distribute filters only in villages where GWD has been reported).

5.2.4 Low coverage of treatment of ponds with Abate chemical

The control of copepods populations using Abate® (temephos) is less expensive, relative to the promotion of health education or use of filters and rural water supplies. It should be used only in selected endemic villages as backup to health education and/or water supply intervention. It should be considered for use in “epidemic control” in very highly affected villages with limited drinking water sources, to reduce the incidence in situations where compliance with health education is poor or where providing a safe source is not feasible, or to provide a second or third barrier to transmission for additional security in areas where dracunculiasis elimination is imminent or was recently achieved (Hopkins & Ruiz-Tiben 1991). On the other hand, chemical treatment of African ponds, even by highly qualified research teams, has been found on a number of occasions to be of questionable effectiveness. When the treatment is not fully effective, there is an increased risk of Cyclops, developing resistance to the cyclopicide. Even treatment which successfully removes the cyclops from the pond does not always eliminate GWD as other contaminated water sources are often in use. Transmission is most intense in ponds which are in the final stages of drying up (Cyclops tend to sink) and which therefore may be missed by the treatment team (Cairncross et al 2002).

The treatment of ponds with Abate chemical® in Gambella is limited to few at risk villages of Gog district. All the participants expressed their fear of importation of cases within the districts and across the border. There is a need to extend treatment of ponds with chemicals beyond Gog. Ponds that are potentially sources for contamination should be identified and treated mainly in villages located in Larie and Abobo districts bordering the endemic Gog district.

5.2.5 Inconsistent and weak surveillance and case containment system

Dracunculiasis is officially a notifiable disease in Ethiopia. The epidemiological surveillance reporting forms have been designed to capture this information in all the health facilities in the country. This is done through the quarterly HMIS and the weekly IDSR designed for diseases targeted for elimination and / or disease with epidemic potential. Due to the unique nature of Dracunculiasis surveillance which relies on the VBV's to detect and notify cases, the Case Containment Form (CCF) for guinea worm surveillance has been the main source of information on Dracunculiasis. However;

Gambella region has failed to distribute the forms to districts and health facilities and as a result, reports were not submitted to next level on regular base. Some of the reports submitted were also incomplete and not on time. In addition; active surveillance was not carried out by health workers as well as VBVs.

Nigeria begun to recording lists of suspected cases that were investigated (rumour registers) in 2005 and the number of investigated rumours of GWD increased year by year, from 27 in 2005 to 526 in 2008 (Miri et al 2010:216). In Gambella region, there was no GWD rumour register in all the districts except Gog. Inadequate funding contributed for poor supportive supervision by district coordinators, lack of transport (unable to maintain motorcycles), and lack of fuel for the motorcycles.

The main findings of the study are as follows:

- Health Education and community mobilisation component are not effectively executed as reflected by the low community awareness of GWD transmission and prevention methods.
- Community behavioural change in using safe water sources is not achieved as evidenced on the neglect to use safe water sources and unwillingness to use ponds with Abate chemical.
- The use of filters was accepted and it was the choice of the people. However, there is a limitation on provision of filters by GWEP.
- Active surveillance and case containment intervention assisted by cash reward system is with limited application and impact.

The intervention, which has the greatest impact on the success of all other interventions, is health education. Initially to educate about the disease, cause, impact, transmission routes, prevention methods, and safe water sources. Then, promoting the use of safe water sources or to use filters and lately also to prevent the contamination of ponds by patients.

If health education succeeds in changing people's behaviour, they will be less likely to revert to unhealthy habits when technology fails, such as when the pump breaks down or when there is no other source of water except pond. People use all alternatives to safe drinking water. They will also actively participate in chemical treatment of ponds

and the detection and containment of GWD case, figure 5.1 shows the role of health education in GWEP.

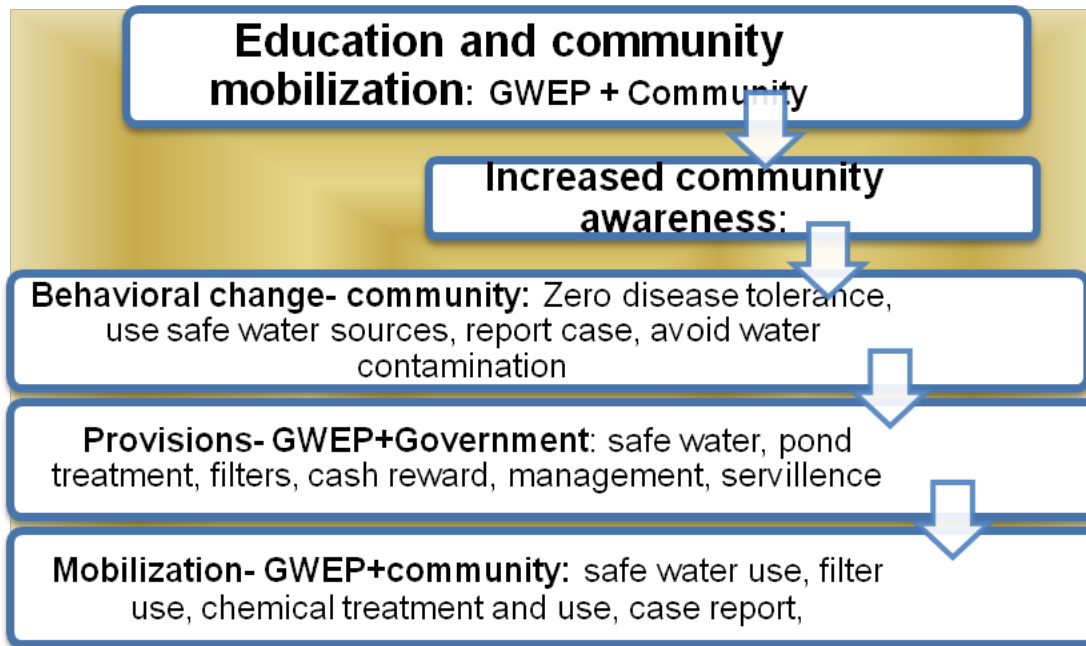


Figure 5.1 Education as the basic and all-inclusive intervention in GWEP

The principal concern of the GWEP in Gambella region is lack of sustainable and committed community participation due to low achievement of the health education intervention.

Other problems include the low commitment by the programme staff and local administrators, the cross-border imported cases from notably Southern Sudan and programmatic disruptions resulting from unsustainable provision of preventive measures to the community and sporadic insecurity in the area.

5.3 LIMITATIONS OF THE STUDY

The limitations of the study includes inability to revisit districts to verify some claims of participants due to transportation constraints and difficulty of testing the participants' behaviour due to time and logistical constraints and language barrier.

5.4 CONCLUSION

Understanding the perceptions and experiences of communities and GWEP providers is vital to devise acceptable educational messages and provides the basis to bridge conceptual and attitudinal differences and gap between the community and GWEP implementers. This study was conducted to assess and explore the perception of the community and the frontline GWEP implementers and to understand reason why the GWEP interventions are not successful in the area from the perspective of the two stakeholders.

The findings and recommendations of the study should contribute significantly to the eradication of GWD in Ethiopia and elsewhere where similar circumstances prevail. GWD is eradicated in several countries by applying the global GWEP intervention strategies. Ethiopia endorsed the GWEP and applied the recommended interventions. However, the disease remains endemic in one focus of the country, the Gambella regional state in three villages.

5.5 RECOMMENDATIONS

Based on the findings, the researcher makes the following recommendations:

The GWEP of Gambella region should:

- Identify and develop appropriate strategies that will help increase community awareness on GWD interventions.
- Conduct intensive training to frontline health workers on disease surveillance focusing the collection, analysis, interpretation and dissemination of data
- Work with other sectors such as the Water Bureau and UNICEF to achieve 100% safe water coverage in endemic and at risk villages.
- Allocate the budget/logistic received from partners to districts for a smooth and uninterrupted programme operation.
- Strengthen collaboration with other health programmes such as national immunisation days, mass drug administration days for onchocerciasis control programme to enhance GWD surveillance.
- Improve cross-border collaboration with South Sudan GWEP on GWD surveillance.

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ANNEXURE 1

TIME FRAME

ANNEXURE 2

BUDGET BREAKDOWN

BUDGET BREAKDOWN FOR THE STUDY “PERCEPTIONS AND EXPERIENCES OF PEOPLE IN GAMBELLA REGION OF ETHIOPIA ON GUINEA WORM DISEASE ERADICATION INTERVENTIONS”

June 2011

No	Activities	Unit	Number	Unit price/birr	Days	Total Cost
1	Per diem					
1.1	Per diem for data collectors	No	2	350	15	10,500.00
1.2	Per diem for translator	No	5	80	1	400.00
1.3	Per diem for driver	No	1	350	15	5250.00
1.4	Per diem for data entry clerk	No	2	60	10	1,200.00
3	Stationery					
3.1	Note book	No	3	25		75.00
3.2	Pen	No	25	3		75.00
3.3	Printer toner	No	1	1500		1,500.00
4	Other items					
4.1	Battery power tape recorder	No	1	720		720.00
4.1	Battery		20	15		300.00
Total						20,020.00

ANNEXURE 3

LETTER OF CONSENT

LETTER OF CONSENT

I _____the under signed agree to participate in the research project entitled “ **Perceptions and Experience of People in Gambella Region of Ethiopia on Guinea Worm Disease Eradication Interventions** ” conducted by a student _____ . The following points are explained to me. The purpose of the study, confidentiality of results, the procedure of the study, the provision of free treatment for project related sicknesses. I am assured the right to withdraw at any time when I wish. I have decided to participate in the study and append my signature hereunder.

Name and address of the participants:

Name _____ District/Woreda _____

Kebele _____ Village _____

Name of Supervisor _____ Signature _____

ANNEXURE 4

DISCUSSION POINTS: FOCUS GROUP

FOCUS GROUP: Introduction

Introduction and informed consent statement to participants conducted individually
Participants were selected as per criteria and identified. Each was contacted to get consent. Those who agree to participate were asked for their convenient time and place. The date, time, and place were selected based on participants' suggestions and appointment made to continue the FGD or the interview.

Greetings:

Good morning/afternoon/evening, I want to thank you for taking the time to meet with me today.

Self Introduction:

My name is _____ and I _____.

Introducing purpose and conditions of discussion:

We are conducting a study on GWD. This interview is part of that assessment, and I would like to ask you some questions in relation to this idea. Everything that you say will be confidential. No one will tell anyone what you specifically said. I will be taking notes and the session will be tape-recorded. We will compile a report to help with GWDE intervention. No names will be associated with any of the findings in the report.

Participation in this interview is voluntary and you can choose not to answer any question or all of the questions. However, I sincerely believe and hope that you will participate in this survey since your views are very important to make effective intervention. Expected Duration: 1- 1.30 hour.

1. Identification

1.1. Site identification

a) Region: _____ b) Wereda: _____

c) Village: _____

1.2. Date of the interview: _____

1.3. FGD participants Identification

Name	sex	occupation	Address

DISCUSSION POINTS: FOCUS GROUP

Bulleted and bold: Lead questions

Indented and italics: Prompt, probing guide with flexibility

- **Do you know what guinea worm disease is?**
 - *If yes, could you please explain the signs and symptoms of the disease?*
 - *If no, why did not you know?*
- **Have you seen or heard any one with the disease in your village or anywhere in the region?**
 - *Where did you see a patient?*
 - *When was it?*
 - *How do you observe?*
- **Do you know how one can be infected with guinea worm disease?**
 - *How do you become aware?*
 - *From whom did you get the information?*
 - *Did others in your neighbourhood know about the disease?*
- **If you come across a patient with Guinea worm what would you do?**
 - *Why do you do that?*
 - *Is there any benefit to you?*
- **Have you heard about the cash reward being offered to a person who informs the health staff about the guinea worm case he has come across?**
 - *If yes, do you know how much it is?*
 - *Do you know how a person is illegible for the reward*
 - *Do you know a person who was rewarded?*
 - *If yes, how was his/her feeling?*
- **Are there people in your village or from other areas that can advice you on how you can prevent the disease?**
 - *If yes; how often do they visit your village/house?*
 - *What was the focus of the discussion?*
 - *Do you accept their advice?*
 - *If no, why do not you accept their advice?*
- **What is your source of drinking water?**
 - *What are your sources?*
 - *Which source do you prefer?*

- *How far is your source?*
- **Do you feel drinking pond water can affect the health of an individual?**
 - *Could you describe the health consequences?*
 - *Can you mention some diseases resulting from drinking pond water?*
- **Are the ponds in your village treated with chemicals?**
 - *Do you know the name of the chemicals? What was it?*
 - *Can you tell the periodicity of treatment?*
 - *What is your opinion on participation in treatment process?*
- **Are there any advantages or disadvantages in using chemical treated ponds?**
 - *What are the benefits? If yes, can you explain how?*
 - *Do you feel that drinking treated pond water can harm? If yes, can you explain how?*
- **How do you describe the effort of local health agents, health professionals, and organizations in promoting of the use of filters?**
 - *Who can explain the use of filters?*
 - *Is there any additional or different explanation?*
 - *Who can demonstrate how different types of filters are used?*
 - *Do all of you agree on how filters are used?*
 - *Can you give your opinion on the role of health officials in promoting the use of filters?*
 - *Would you tell us the availability and frequency of supply of filters in your area?*
 - *How do you describe the popularity of use of filters in your community?*
 - *How do you see the usefulness of filters in preventing GWD?*

ANNEXURE 5

DISCUSSION POINTS: IN-DEPTH INTERVIEW GUIDE WITH GWEP COORDINATORS

IN-DEPTH INTERVIEW GUIDE WITH GWDEP COORDINATORS

Greetings:

Good morning/afternoon/evening, I want to thank you for taking the time to meet with me today.

Self-Introduction:

My name is _____ and I _____.

Introducing purpose and conditions of discussion:

- As in FGD

1. Identification

1.1. Site identification

a) Region: _____ b) Wereda: _____

1.2. Date of the interview: _____

1.3. Interview participants Identification

a) Name: _____

b) Occupation: _____

d) Organization: _____

INTERVIEW GUIDE

The interview guide is only a framework because the interviewees are professionals interviewed by the researcher with flexibility.

Bulleted and bold: Lead questions

Indented and italics: Prompt, probing guide with flexibility

- **Extent of guinea worm disease**
- **Interventions used and appropriateness of interventions in the regional context (applicability, feasibility sustainability)**
 - *Studies addressing the above intervention issues*
- **Details of on-going activities pertaining to eradication interventions?**
- **Community understanding and participation in each of the following?**
 - *Safe Water provision*
 - *The use of Filters*
 - *Chemical treatment of ponds*
 - *Case reporting*
 - *Cash reward*
 - *Education*
 - *Training*
 - *Surveillance*
- **Source and methods of distribution of the cloth filters,**
- **Source and methods of distribution of Abate?**
- **Success of intervention?**
- **Management of programme**
 - *Staff conditions*
 - *Presence and Quality of IEC activities*
 - *Presence and adequacy of training to health workers*
 - *Frequency and effectiveness of supportive supervision*
 - *Financial and technical capability of the institutions to support eradication initiatives*

ANNEXURE 6

**DOCUMENT REVIEW AND OBSERVATION
GUIDE CHECKLIST**

Document review checklist

Document type	Where to get		
	Region	Woreda	H. centre
Surveillance			
Chemical and filter			
Constructed water			
Case reported and reward			
Staff training			
Health Education aspects			

Observation checklist

Observation focus	Where to look		
	Woreda	H. centre	Village
Water source and use			
Chemical and filter stock			
Case management			
Health Education materials			

ANNEXURE 7

**PERMISSION FROM GOVERNMENT TO CARRY
OUT THE STUDY**

ቀን 11/23/11
ቁጥር 4599/11

Date: 21 November 2011

To: Mr Getachew Temeche

Gambella

Subject: Approval for your research proposal related with Guinea worm eradication.

I want to inform to you that Gambella region health bureau has reviewed your research proposal entitled "**Understanding the Perceptions and Experiences of people in Gambella region of Ethiopia on Guinea worm Disease Eradication Interventions**" to fulfill the requirements to a master's degree in public health

The bureau has observed that your proposal has met the necessary requirements including ethical issues.

Therefore; I inform to you that you can carry out the proposed research in our region.


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KHOR FUCHE BILIKY
ወይ ገብረ ገብረ
Head of Health Bureau



ANNEXURE 8

ETHICAL CLEARANCE FROM UNISA FOR THE STUDY

ETHICAL CLEARANCE FROM UNISA FOR THE STUDY



**UNIVERSITY OF SOUTH AFRICA
Health Studies Higher Degrees Committee
College of Human Sciences
ETHICAL CLEARANCE CERTIFICATE**

HS HDC 38/2011

Date of meeting: 19 October 2011 Student No: 4396-535-0
Project Title: Perceptions and experiences of people in Gambella Region of Ethiopia on Guinea worm Disease Eradication Interventions.
Researcher: Getachew Temeche Sisay
Degree: Masters in Public Health Code: DIS4986
Supervisor: Mr EO Peprah
Qualification: MPH
Joint Supervisor:

DECISION OF COMMITTEE

Approved

Conditionally Approved

Prof E Potgieter

CHAIRPERSON: HEALTH STUDIES HIGHER DEGREES COMMITTEE

MB
Prof MC Bezuidenhout

ACADEMIC CHAIRPERSON: DEPARTMENT OF HEALTH STUDIES

PLEASE QUOTE THE PROJECT NUMBER IN ALL ENQUIRES