



**EPIDEMIOLOGY OF ONCHOCERCIASIS IN GILGEL Ghibe VILLAGE,  
JIMMA ZONE, SOUTHWEST ETHIOPIA**

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JIMMA, ETHIOPIA**

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**DEPARTMENT OF MEDICAL LABORATORY SCIENCE AND PATHOLOGY**

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## **Abstract**

**Background:** - Onchocerciasis is a recognized public health threat caused by the filarial nematode *Onchocerca volvulus*. The disease is endemic in Africa, Latin America, and Yemen. Recent estimates indicate that at least 37 million people remain infected, mostly in Africa. In Ethiopia about 10 million people are at risk of infection and 3 million people are estimated to be affected by the disease. A large and variable spectrum of clinical disease can be seen but skin disease and eye lesions induced by inflammatory reactions to migrating larvae (*microfilaria*) are the major manifestations.

**Objective:**-The aim of the study was to assess Epidemiology of Onchocerciasis in Gilgel Ghibe village, Kersa district, Jimma Zone, Southwest Ethiopia.

**Methods:**-. A Community based cross sectional study design was involving 206 study participants identified by systematic sampling, from March to April, 2014. By using pre-structured questionnaire, parasitological and clinical data were collected. Two Skin snips were taken from individuals and examined microscopically. All sampled individuals were examined for presence/absence of clinical manifestations. Finally the data was analyzed by using statistical packages for descriptive and inferential statistics.

**Result:** - Of the 206 people examined, the prevalence of the disease was 12.1%, being 13.5% in females and 10.5% in males. Having *microfilaria* in skin snip was strongly associated with farming activity (AOR=5.16, P=0.005). Overall intensity of *microfilaria* in total *microfilaria* positive individuals was 55.1 per mg of skin snip. The overall Community Microfilarial Load (CMFL) was 8.94 mf/skin snip. Proportion of OSD in Communities was 11(15.7%), 8(12.2%) and 6(8.6%) in Akko, Carre and Agnyhoo zones respectively. Intensive itching 79(38.3%) followed by skin rashes 54(26.2%) were the most common clinical manifestations in this study area. Intensive itching is strongly associated with that of Exposure to river (AOR=2.14, P=0.01).

**Conclusion:** - Based on these results these communities were regarded as hypoendemic for Onchocerciasis.

**Recommendation:** Treatment coverage should be improved and sustained until the level of *microfilaria* will be reduced drastically to a level that the disease would no longer be a public health problem.

**Key Words:** - Onchocerciasis, Onchocercal Skin Disease, Prevalence, Ethiopia

## Abbreviations or Acronyms

AOR	Adjusted Odds Ratio
APOC	African program for Onchocerciasis Control
APOD	Acute papular Onchodermatitis
ATR	Atrophy
CDTI	Community-Directed Treatment with Ivermectin
CMFL	Community Micro Filarial Load
COR	Crude Odds Ratio
CPOD	Chronic papular Onchodermatitis
LOD	Lichenified Onchodermatitis
Mf	Microfilaria
LYM	Lymphedema
OCP	Onchocerciasis Control program
OEPA	Onchocerciasis Elimination Program of America
OSD	Onchocercal Skin Disease
PCR	Polymerase Chain Reaction
REA	Rapid Epidemiological Assessment
REMO	Rapid Epidemiological Mapping of Onchocerciasis
WHO	World Health Organization

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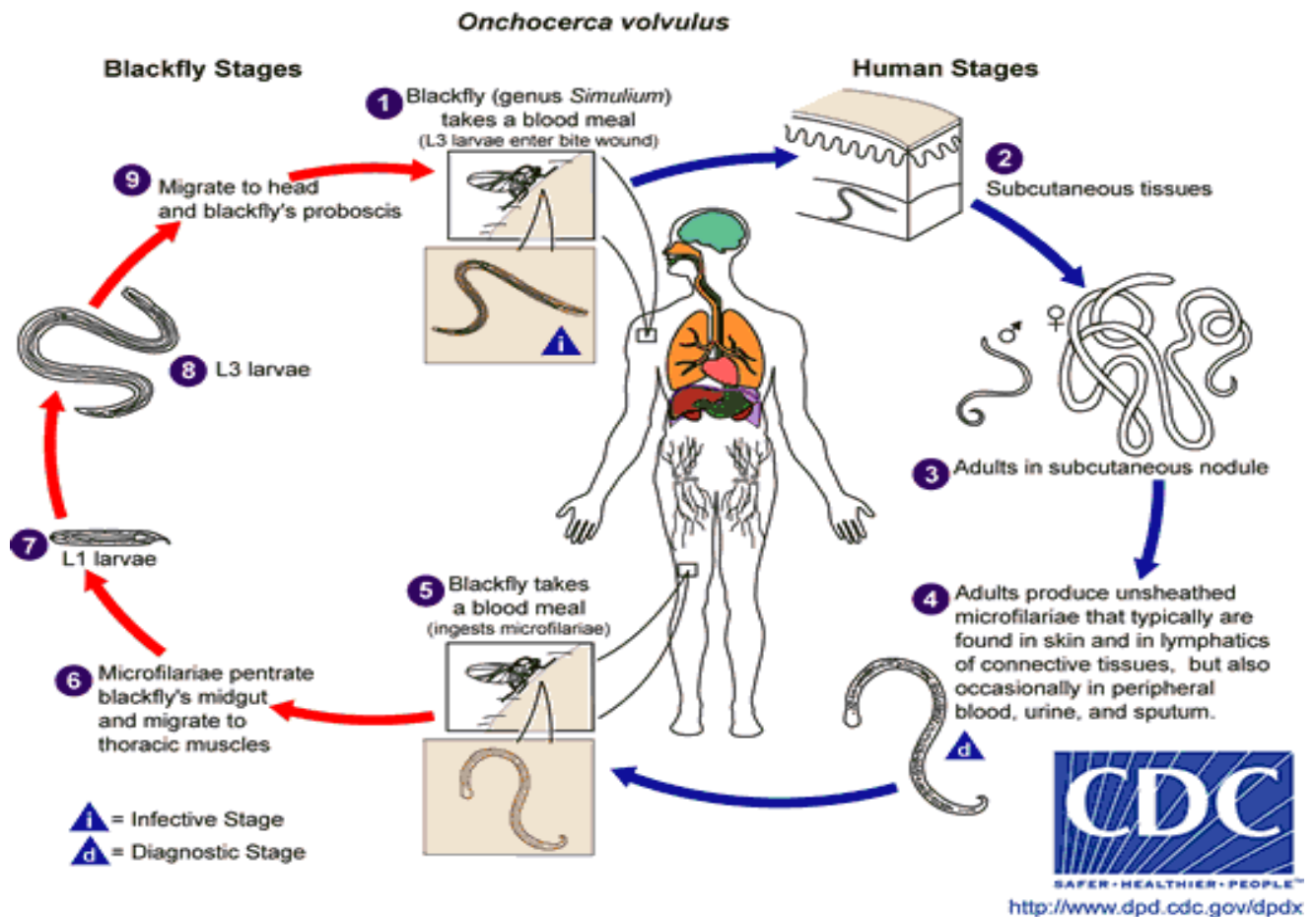
## Chapter One

### 1.1 Back ground

Onchocerciasis is a chronic parasitic infection caused by the filarial nematode, *Onchocerca volvulus*. It is the main species of filarial parasite found in the skin and eye. Microfilaria of *O. volvulus* is unsheathed with broad spatulate head and pointed tail free from nuclei. The disease is transmitted from one individual to another through the bites of the infected black fly, *Simulium damnosum*, of the family Simuliidae(1). Human Onchocerciasis is a major public health problem in many parts of the world and is found in both the Old and New World. About 96% of all cases are in Africa and mostly in Western Africa. Of the 37 countries where the disease is endemic, 31 are in sub-Sahara Africa (plus Yemen) and six are in the Americas(Mexico, Colombia, Guatemala, Brazil, Venezuela and Ecuador) (2). The disease is most severe along the major rivers in 30 countries across the northern, western and central areas of the African continent (3).

In Ethiopia, Onchocerciasis has been known to be endemic in several localities of the Southwestern and Northwestern parts in different magnitudes of endemicity (4, 5). Particularly the disease is widespread in western Ethiopia extending from the Takazi valley in the northwest to the Omo valley in the southwest in varying levels of endemicity (6,7).

The life cycle of *Onchocerca volvulus* occurs in two different hosts: black flies and human. The infective larvae (stage L3) are normally transmitted by the bite of *Simulium* flies. Once in the human body, the larvae undergo molting to the adult stage(8, 9) .Adult females are able to produce millions of microfilaria which they shed typically in the skin of their human host (10).



Figure—1 Life cycle of *Onchocerca volvulus* (source: <http://www.dpd.cdc.gov/dpdx>)

Large spectrums of clinical disease (skin disease and eye lesions) which are induced by migrating larvae (microfilaria) are the major manifestations (11). The symptoms of Onchocerciasis has revealed the clinical manifestations that include Acute or Chronic Onchocercal inflammatory skin damage, visual impairments, onchocercomata, and Lymphadenopathy. based on the type and degree of damage to skin the disease is classified as Acute papular onchodermatitis (APOD), Chronic papular onchodermatitis (CPOD), Lichenified onchodermatitis (LOD), Atrophy (ATR), Depigmentation, Lymphedema (LYM) and Hanging groin (HG) (9)

Although the sensitivity of microscopy is less it is used most commonly as diagnostic procedure. The most definitive diagnostics procedure involves the examination of skin and eyes for microfilaria (10). Although this is a highly specific procedure and is considered the gold standard for diagnosing the infection, it lacks adequate sensitivity in low-intensity infections (12). In such cases; a polymerase chain reaction (PCR) of the skin snip can increase the sensitivity. However, this technology has yet to be commercialized (9,13).

The proportion of palpable nodules is very low in children, increases to about 30% in 10-year olds and plateaus at about 40% in aged people (9,12). In patients with nodules in the skin, Epidemiological surveys, a non-invasive procedure - palpation for nodules - is employed (14).

For the purpose of mass treatment based on prevalence of microfilaria and nodules, Villages were classified into three endemicity levels. hypo endemic:< 40% Mf or <20% nodule carriers; mesoendemic:40-59% mf or 20-40% nodule carriers and hyperendemic:> 60% mf prevalence or >40% nodule carrier (2,15). Mesoendemic and hyper endemic areas targeted for mass treatment by Community Directed Treatment with Ivermectin (CDTI) but Hypo-endemic communities targeted for Clinical-based treatment (16). The treatment of Onchocerciasis was revolutionized with the introduction of Ivermectin in 1987. Ivermectin is now the drug of choice in the treatment of Onchocerciasis. The treatment is suitable for both clinical use and mass distribution in endemic areas (17,18). The removal of nodules may be a valuable adjunct in patients treated with Ivermectin. Recently based on different studies, recommended treatment regimen of Doxycycline for 4 weeks, accompanied by two doses of Ivermectin has been found effective (based on bacterial endosymbionts of *O. volvulus*) (19-21).

The Onchocerciasis Control Programme (OCP) began in 7 West African countries (Burkina Faso, Niger, Benin, Ivory Coast, Ghana, Mali & Togo) in 1974 (3). The major strategy for interrupting transmission of Onchocerciasis was vector control (22). To prevent reinvasion by black flies, parts of 4 other countries (Guinea, Guinea-Bissau, Senegal & Sierra Leone) were also included in 1986. The introduction of Ivermectin in 1987 allowed assistance to be extended to other areas (1, 23). Community-based distribution programs were established in endemic areas to administer the drug 1-2 times per year, even to remote villages (24).

Encouraged by successes with the OCP and Ivermectin, the World Bank launched the African Programme for Onchocerciasis (APOC) in the remaining areas 19 Africa countries in 1995 (25). Unlike the OCP, the APOC uses the community-based distribution of Ivermectin as its primary control strategy (26). The Onchocerciasis Elimination Program for the Americas (OEPA), a similar program, also aims to eliminate Onchocerciasis by 2015 in the Americas (27,28). Up to now there is no successful control of the disease can be accomplished without the use of vector control has yet to be determined (29,30).

## 1.2 Statement of Problem

Onchocerciasis is a severe and devastating parasitic infection of Global concern. It is known to be endemic in many tropical countries with over 37 million people infected worldwide. It occurs in 37 countries worldwide, predominantly in West and sub-Saharan Africa and with other foci of infection occurring in Latin America and the Arabian Peninsula (31).

In Africa about 118 million people are at risk of infection and about 17 millions are infected. In Latin America about 5 million people are at risk of infection and about 1 million were infected .In Middle East, Arabian peninsula (Yemen) about 0.1 million people are at risk and about 30,000 people were infected (25).

In Ethiopia about 10 million people are at risk of infection and 3 million people are estimated to be affected by the disease .The prevalence in Ethiopia ranges from 85.3% in Teppi province, southwestern Ethiopia to 6.9% in the Kuwara province of Northwest Ethiopia (32) . The main endemic focal areas in Ethiopia are Kefa-Sheka and Bench Maji zone in south west and Pawi – Metema in North West (5).

Rapid Epidemiological mapping of onchocerciasis (REMO) carried out in Ethiopia involving six regions of the country indicated, all the six regions were endemic for Onchocerciasis. North Gondar zone (Amhara Region),Tigray region, in Metekel and Assosa zones (Benishangul Region), Agnua and Mezhenger zones (Gambella region), in Illubabor, Jimma, East and West Welega zones (Oromia region), and in North Omo, South Omo, Kaffa Sheka and Bench-Maji zones (SNNPR). Four out of the six had areas that were meso- or hyper endemic to Onchocerciasis. The disease is thus widespread in western Ethiopia extending from the Takazi valley in the northwest to the Omo valley in the southwest in varying levels of endemicity (4,33). The morbidity from Onchocerciasis is more prevalent in areas of West Africa where the *Simulium* vectors profusely breed. In Africa, the *Simulium damnosum sensu lato* species complex is responsible for more than 95% of Onchocerciasis. The species breeds in fast flowing rivers and streams and hence transmission is most intense and the disease is more severe in communities located in river valleys. Since 1995,APOC has treated 90 million people annually in 19 countries, resulting in a 73% case reduction (34).

Onchocercal skin lesions can affect more than one-third of the adult population in hyper endemic communities, ranging from unsightly and itchy popular onchodermatitis to gross depigmentation of the shins. In such communities more than half the adult population suffers from severe itching due to Onchocerciasis. Itching is the most severe complication of Onchocerciasis. It seriously affects the well being of patients who perceive it as an important health problem (35)

Onchocerciasis is chronic and a slowly progressive disease and infected individuals remain asymptomatic for long periods. WHO OCP has successfully reduced the prevalence of Onchocerciasis by interfering with the transmission of the parasite and by mass population treatment in the regions at risk. Despite these laudable efforts, the socioeconomic burden resulting from the disabilities caused by Onchocerciasis, however, remains enormous (36).

Onchocerciasis is widespread filarial disease that produces grave socio-economic consequences. The disease affects the productivity, social and sexual lives of sufferers due to blindness and other debilitating effects. It often led to depopulation of the fertile river valleys and also constituted an important impediment to economic development (28).

Blindness in onchocerciasis, however, is only one feature of the medical, social, and economic tragedy the disease represents. As many reports have shown in Ethiopia, Nigeria and Sudan, onchocerciasis is responsible for poor school performance, higher dropout rate among children due to itching, lack of sleep and other associated consequences. Also, low productivity, low income and higher health related costs are found among adults with onchocerciasis (37,38).

In Ethiopia, the main symptoms of the disease is dermal manifestations that is characterized by intense itching and thickening of the skin, hanging groin and depigmentation of the skin (39).

Reactive skin lesions have severe social repercussions while Onchocercal Skin Disease (OSD) diminishes income-generating capacity as it is mainly accompanied with itching, thereby reducing work/farming hour. The consequences of onchocercal skin lesions, the stigmatization and psychological effect associated with the disease have been a major source of social stigma, whether they are infectious or not. Incessant itching and severe onchocerciasis lesions could be important predictors of failure of women to breast feed for longer period in rain-forest areas. Premature or accelerated aging of the skin, hanging groin and the development of scrotal and clitoral enlargement and its consequent stigma had led some young men and ladies not being able to get life partners (40).

Wide range of physical, emotional, psychological and social ill effects affect the victims of onchocerciasis namely :pain, itching, irritation limited social and leisure time, skin appearance, lack of confidence, embarrassment, self consciousness, insensitivity of the public limitation in employment, sports opportunities, family frictions, depression and lack of understanding among the public concerning the extent of suffering. Onchocercal Skin Disease (OSD) is associated with significant levels of stigma which cut across the entire aspects of the lives of individuals including their personal, social, psychological and economic status. The success gained by Onchocerciasis control program is totally pleasing, however for materialization of the ambitious goal to eliminate the disease, accurate data on the disease before the commencement of CDTI is mandatory (16,41).

Therefore, this study was conducted to determine current epidemiology of onchocerciasis in the study area. Particularly it aimed to determine the prevalence of onchocerciasis, intensity of infection sex and age related distribution of the infection and its association with clinical manifestations were determined simultaneously to shed light on the magnitude of OSD in the area.



## Chapter Two

### 2.1 Literature Review

Onchocerciasis affects people living in poor rural areas; the highest prevalence is in Africa and has high burden in isolated foci in East and South-Central Africa and in one country of the Middle East (Yemen) and six areas of Latin America (28).

In Latin America on 732 people age  $\geq 15$  years, the overall observed prevalence of microfilaria were 32.8% (240/732), although the variation between communities was large, ranging from 0% to 100%. In this focus communities situated along the rivers were hyperendemic (prevalence of microfilaria  $\geq 60\%$ ) (42).

In Tanzania on total of 438 persons (age=16-99 years) showed absence of microfilaria (mf). overall Onchocerca skin symptoms were found on one-hundred seventy (38.8%), of which thirty (6.9%) had nodules, forty eight (11%) had chronic onchodermatitis and ninety had (21%) itching (43).

Finding from study conducted in Sierra Leone showed, about seventy four patients (64%) had at least two types of onchocercal skin lesion. pruritis dominating all other features in eighty six patients (74%). Pigmentary changes in the form of acute or chronic papular onchodermatitis were present in fifty patients (43%), skin nodules in fifteen patients (13%), depigmentation (leopard skin) in 3 patients (2.6%) and atrophy (lizard skin) in eight patients (6.9%). Scrotal and lymph node enlargement were least frequent and occurred in two (1.7%) cases only (44).

Report from study carried in Equatorial Guinea during 1989 and 1998 showed an overall prevalence of 74.5% (1284/1723) and 38.4% (415/1082) respectively. The Community Microfilarial Load (CMFL) in 1989 and 1998 after Ivermectin intervention was 28.29 and 2.32 microfilaria/snip respectively. The reduction in prevalence and CMFL after eight annual rounds of Ivermectin treatment corroborates the drug microfilaricidal activity and good tolerability (45).

In Nigeria (in between 2008 and 2009) about 83% of subjects tested positive for microfilaria in skin snips. The prevalence of clinical manifestations of onchocerciasis was high, with leopard skin having the highest prevalence (87.5%), followed by itching (84.16%), and nodules (75.42%). Nodules had a significantly lower prevalence compared with other clinical manifestations. Prevalence of infection in female vs males was 93.1% vs. 74.5%, respectively. Generally, 10–19 years age group being the least that affected with Onchocerciasis, while individuals of more than 50 years old experienced the highest prevalence (46).

During 2008 involving 700 participants in Nigeria, the overall mf Prevalence by the examination of skin snips was Three-hundred-forty six (48.26%), and about eighty one (11.57 %) of the total persons have one of the following clinical manifestations. Palpable nodules were the most prevalent clinical manifestations found in fifty three (7.57 %) persons. Prevalence of nodules in females, males, farmers, singles and married peoples were 113(29.97%), 63(18.53%), 36(9.68%), 40(10.30%) and 13 (4.14%) respectively. Other clinical manifestations were blindness in six (0.86 %), leopard skin in eighteen (6.61 %) and hanging groin in 4 (0.57%) (47).

Studies in Nigeria during 1994, of the 916 subjects examined about 641(70%) were positive for *O. volvulus* microfilaria in their skin snips. In 2001, microfilaria could only be detected in 927 (44.9 %) of the 2065 subjects examined, representing a 35.9% reduction. The overall CMFL for the study area was 8.01 microfilaria/skin snip in 1994, and this reduced to 3.20 microfilaria/skin snip in 2001, representing a 60.1% reduction (48).

Another Study conducted in Nigeria during 2008 involving 200 participants showed that, the overall prevalence of microfilaria, was 47.5%. The symptomatic effects of the disease recorded in descending order were: Leopard skin (40.5%), itching or pruritis (18.5%); ocular lesion, (14%), nodules (10.5%) and lizard skin (7.5%). Although the males had a higher prevalence of onchocerciasis (27.5%) than the females (20%), the difference was not statistically significant (35).

Overall Nodule and microfilaria (mf) prevalence was 12.20% and 2.91% among adults and 9.2% and 0.48% among children, in Cameroon respectively. Due to effective treatment microfilaria was decreased but nodules carrier rate was still high because adults in nodules were not kill directly by Ivermectin. Blindness because of onchocerciasis was insignificant, although low rates of chronic *Onchocerca* ocular disease (<2%) were observed (49).

Other Study conducted in Cameron in 2011 showed that among the total of 404 participants, 14 (3.5%) had mf in skin snips and 15(3.7%) had nodules. There was no significant difference in the prevalence of microfilaridermia with respect to age of participants. There was however a statistically significant difference in the prevalence of nodule and impaired vision/eye itching (IVIE) with respect to age. The greatest rate of infection was found among farmers (2.5%) followed by students (0.7%) and businessmen (0.25%) (50)

In Tigray Region, northwestern Ethiopia near River Takeze during 2009 involving 678 adults and 134 children (3–10 years of age), the overall prevalence of microfilaria and nodules were 0% and 1% respectively. In children, no nodules were observed, and microfilaria prevalence was 0% (51).

Study conducted on Onchocerciasis among Ethiopian immigrants in Israel, from the Kuwara province in north west Ethiopia, showed that overall living microfilaria prevalence in their skin snips were 40 (48%). the most common skin finding was chronic popular onchodermatitis, found in more than 46 patients (55%); depigmentation and atrophy were found in 13 (15%) and 12 (14%) patients respectively. Of the 65 patients who underwent a through eye examination, 45 pa (66%) had ocular complaints. Corneal abnormalities were found in 55 of the 130 eyes (42%), active anterior segment intraocular inflammation and live microfilaria were found in 4 eyes (3%) and lens changes in 16 eyes (1 %). Eleven eyes (9%) showed retinal or choroid changes (52).

The prevalence of Onchocerciasis in West wollega during 2012 was 74.8%.In this study all of the study participants had undergone clinical examination to check for the common symptoms of Onchocerciasis. Pruritus was the most frequently encountered (64.3%). Among the commonly encountered symptoms of Onchocerciasis, hanging groin is the least prevalent (5.2%). The overall prevalence of Onchocerca nodule, the symptom usually opted for determining the community-wide prevalence of Onchocerciasis was 12.1%.The incidence of onchocercomata was more frequent in male subjects than their female counterparts. Leopard skin, the sign of the longstanding infection in the community was also relatively common among the study participants (19.1%) (33).

In a study conducted in Teppi, Southwestern Ethiopia after four years of annual community-directed treatment with Ivermectin (CDTI) a total of 390 study participants (202 females and 188 males) in the age range of 5-85 years (mean 21.7) volunteered to provide skin snips. Out of 390 subjects examined, eighty-seven (22.3%) were found positive for microfilaria. The overall microfilaria load of the positive individuals ranged from 0.08 – 8mf (mean 1.2) per mg of skin snip. Significant differences in the prevalence of the disease were not found between males and females or among different age groups (6).

Overall prevalence from 228 people examined in Gilgel Ghibe village between April 1994 and March 1995 was (17%), (19%) in males, (14%) in females. The Community Microfilarial Load was 11.1. Males & females had a mean microfilaria load of 13.8 & 7.9 respectively. Microfilaria count ranged from 1 to 132 per mg of skin snip. Itching followed by pigmentary changes were the most common clinical signs and symptoms. Of the 39 individuals with positive skin snips, only twenty two (56.4%) had typical signs and symptoms suggestive of onchocerciasis. Itching and skin changes were the most common signs and symptoms observed in this area. No nodules and visual impairments were detected in all the subjects examined. The remaining seventeen (43.6%) individuals of the positive cases had no signs and symptoms of the disease (53).

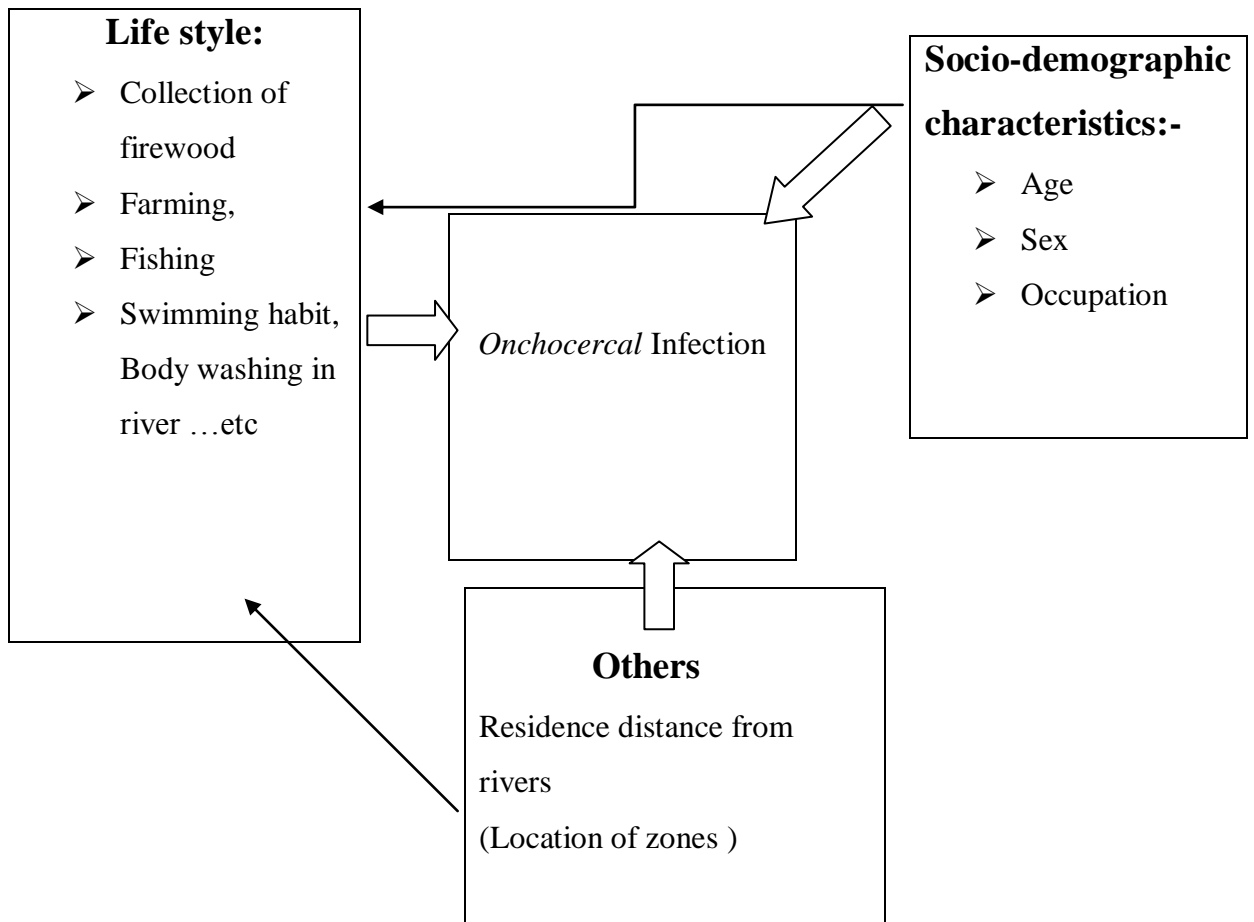


Figure-2 Conceptual framework

## **2.2. Significance of the Study**

A majority of studies conducted elsewhere identified onchocerciasis as a major public health problem and risk factor for blindness, severe visual impairment, an enormous economic and social impact, preventing people from working. In addition to this, living near to fast flowing rivers especially in rural and poor communities by itself can exacerbate the problem (26, 33&34).

A study conducted in Jimma Zone, Gilgel Ghibe village about 11 years ago show that the prevalence of onchocerciasis was low (hypoendemic) in the area (53). Because of hypoendemicity, community-directed treatments with Ivermectin or mass drug administration were not started in this area except treating only infected individuals with Ivermectin.

The current study was aimed at determining the prevalence of Onchocerciasis, intensity of infection, sex and age related distribution of the infection and its association with clinical data determined simultaneously.

This study provide essential recent information on the extent of onchocerciasis which can be utilized for the control measures .Moreover, the findings can help in the evidence- based decision to strengthen the control of diseases and intervention programmes. The findings were indicated in groups who are at risk of infection, and this may help in targeting interventions to prevent, treat, or mitigate the impact of onchocerciasis.

## **Chapter 3:- Objectives of the study**

### **3.1 General Objective**

To determine the Epidemiology of Onchocerciasis in Gilgel Ghibe village, Jimma Zone, South West Ethiopia

### **3.2 Specific Objectives**

1. To determine prevalence of Onchocerciasis in Gilgel Ghibe village
2. To determine intensity of Onchocerca infection among microfilaria positive cases in Gilgel Ghibe village
3. To determine Community Microfilarial Load (CMFL) in a community
4. To describe the clinical manifestation of onchocercal skin disease (OSD) among the study individuals in Gilgel Ghibe village

## **Chapter Four: Methods and Materials**

### **4.1 Study Area and Period**

Gilgel Ghibe is a small 'village' located 320 km south-west of Addis Ababa and 20km from Jimma Town. This area is located in kersa woreda. It lies just along the bridge on the Gilgel Ghibe River. According to the 2007 G.C national census, it comprises of about 1090 households and the total population 5415. From the total population 2986 were people with age  $\geq 15$  years and the rest were  $< 15$  years. The Kebele is divided into three zones based on administrative purpose. These are Akko, Carre and Agnyhoo. The total population with age  $\geq 15$  years in Akko, Carre and Agnyhoo were 1017, 956 & 1013 respectively. In the Kebele there are two rivers. One is Ghibe River (major) and the other is Hareerii river (minor). The Ghibe River is located near the Akko zone where as Hareerii River is found near Carre zone. Agnyhoo zone is far from these two rivers.

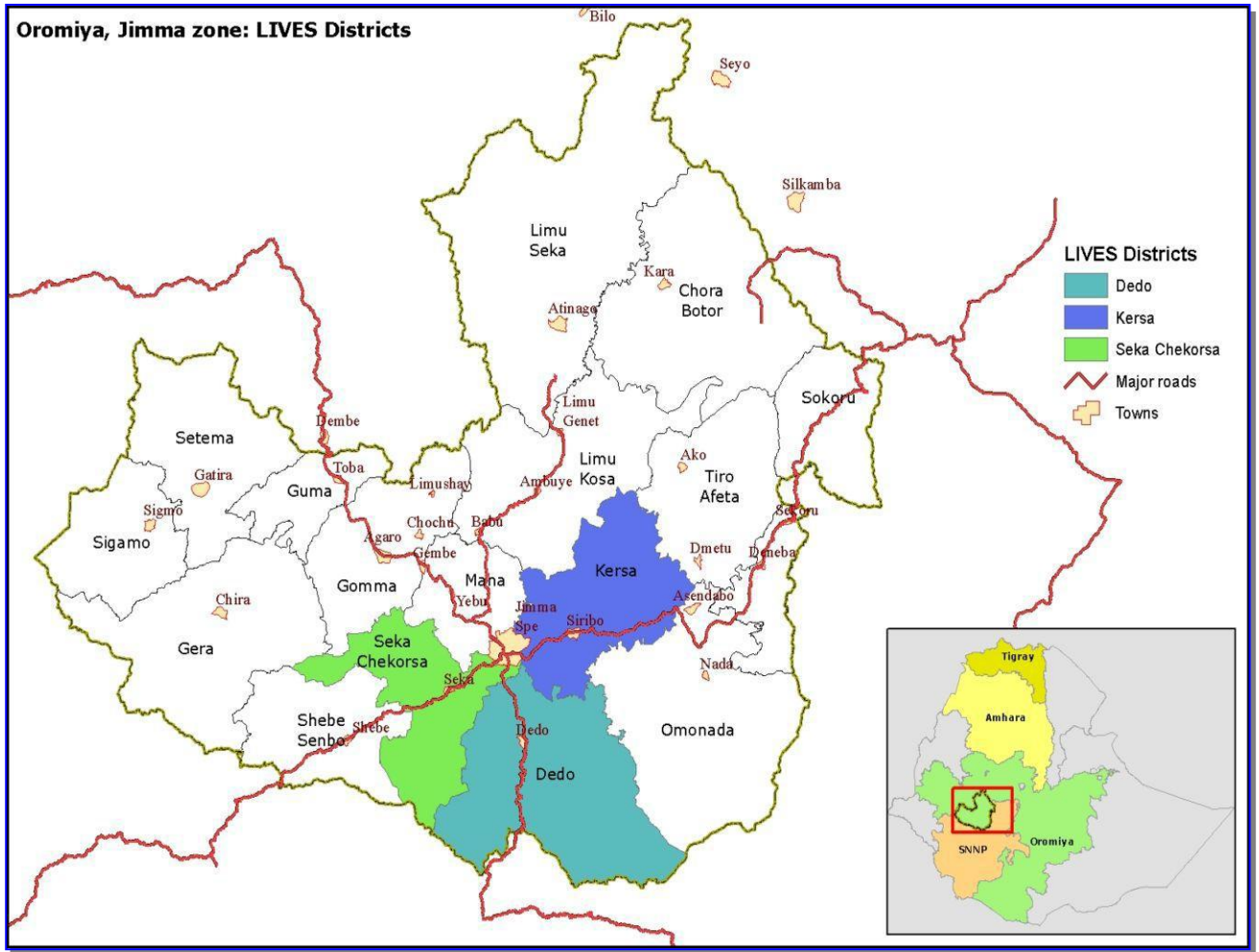
The study area is located between latitudes  $7^{\circ}42'50''\text{N}$  -  $07^{\circ}53'50''\text{N}$  and longitudes  $37^{\circ}11'22''\text{E}$  -  $37^{\circ}20'36''\text{E}$ , at an altitude between 1,672-1,864 m above sea level. The inhabitants of this village work in a sawmill factory located by the river bank and about 85% are dependent on agriculture, mainly growing coffee, chat, maize and fruits.

The study was conducted from March to April, 2014



Figure 3:- Map of Jimma zone with specific study area

The study area (Gilgel Ghibe) is located in Kersa Woreda near to Asendabo around Ghibe River



## 4.2 Study Design

Community based prospective cross sectional study design was used.

## 4.3 Population

### 4.3.1 Source Population

All individuals who were living in the Gilgel Ghibe village during the study period were the source population for this study.

### 4.3.2 Study population

All systematically selected individuals with age  $\geq 15$  years who meet the inclusion criteria

## 4.4 Eligibility Criteria

### 4.4.1 Inclusion Criteria

- All volunteers with age greater or equal to 15 years who gave a written informed consent by themselves or by their parents or guardians.

### 4.4.2 Exclusion Criteria

- Individuals who visit the community temporarily (less than one year).
- If any who on Ivermectin treatment
- Any bloody skin snip

## 4.5 Sample Size Determination & Sampling Technique

### 4.5.1 Sample Size Determination

The sample size was calculated based on the prevalence rate of 17% of onchocercal infection in Gilgel Ghibe village during the previous study (53). The required sample size is computed using single population proportion formula,

$$n = \frac{(Z_{\alpha/2})^2 p(1-p)}{d^2} = \frac{(1.96)^2 * 0.17 * (1-0.17)}{(0.05)^2} = 217$$

Where, P= pre-existing proportion of onchocercal infection in Gilgel Ghibe village (17%)

$Z_{\alpha/2}$  = Critical value at 95% level of confidence (Z = 1.96)

d = Margin of error (5%), the calculated sample size = 217

Since sampling is from a finite population of size, N, the total numbers of people with age  $\geq 15$  years who were living in the study area were 2986 which is less than 10,000, then the final sample size, n, was calculated by applying finite population correction formula

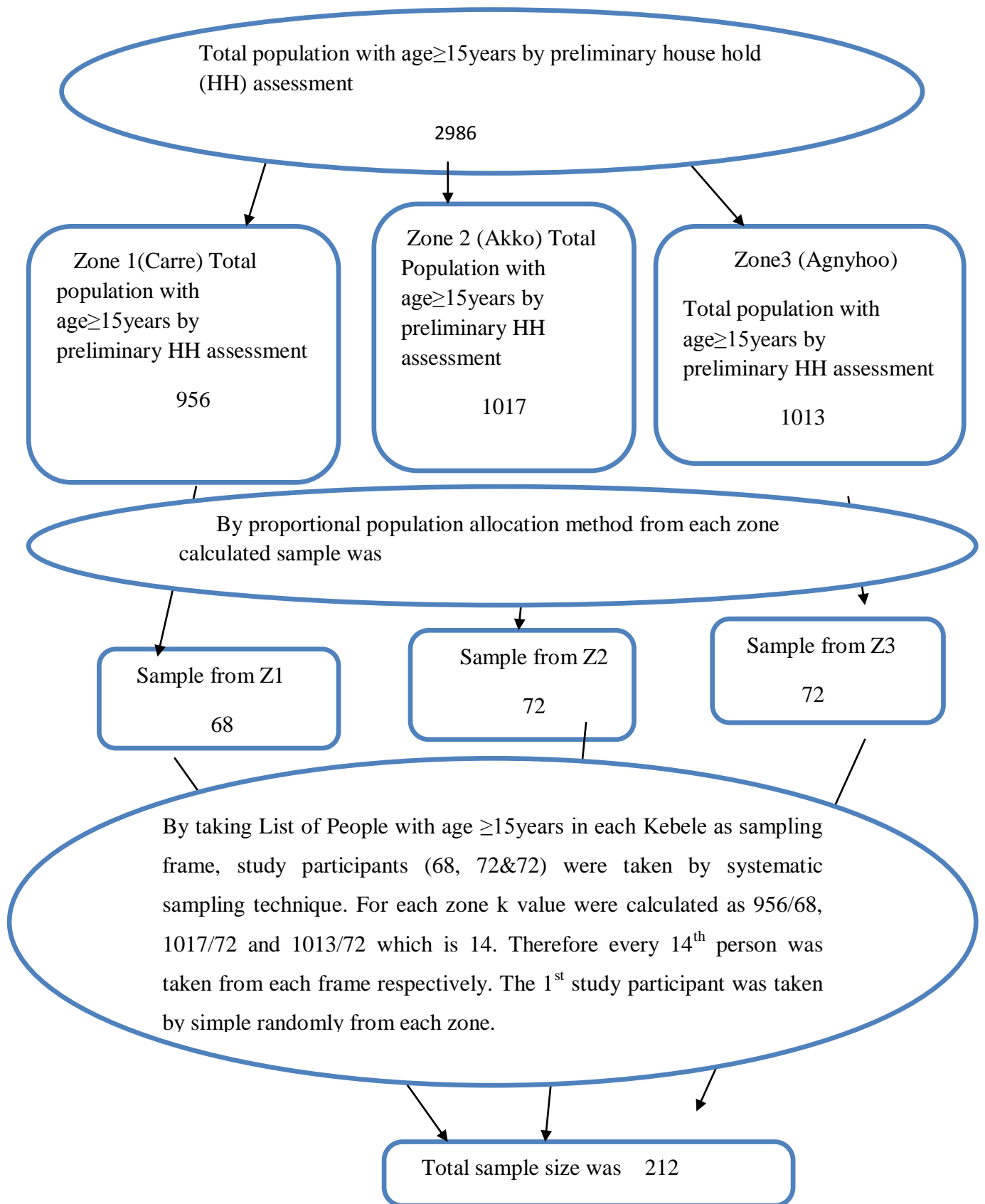
$$n = \frac{n_0}{\left(1 + \frac{n_0}{N}\right)}$$

Where, n=202 but by adding 5% non- response rate the final sample size were =212

#### 4.5.2 Sampling Technique

The Sampling technique used was systematic sampling technique. This study area was divided into three zones for administrative purpose. In this Kebele there are two rivers. One is Ghibe River (major) and the other is Hareerii River (minor). First zone located near the Major River (Ghibe River), second zone near the minor river (Hareerii River), the third zone far away from the two rivers. Akko zone is located near the Gibe River where as Carre zone is located near the Hareerii River. Agnyhoo zone is far away from the two rivers.

During preliminary assessment of each household people with age greater than or equal to 15yrs were listed from each zone. By proportional population allocation method people with respective ages were allocated. For this purpose, the ‘Kebele’ office was approached to ensure that every individual age greater or equal to 15 years were included in the survey. The people with age greater or equal to 15years were taken from each zone by systematic sampling techniques. The 1<sup>st</sup> study participant was taken by simple randomly from each zone.



**Figure 3:** Sampling technique profile

## **4.6 Pre-Test**

Before the actual data collection, all data collection tools were tested and evaluated. The questionnaire was checked in 5% of sample from nearby inhabitants in Asendabo.

## **4.7 Study Variables**

### **4.7.1 Dependent variables (DV)**

- *Onchocerca* Infection

### **4.7.2 Independent Variables (IV)**

- Socio- demographic characteristics (Age, gender, marital status, occupation, place of residence)
- Life styles(, Farming, Fishing ,Swimming habit, washing in river ...etc)

## **4.8. Data Collection Instruments & Procedures**

Data on socio-demographic characteristics like, age, gender, marital status & type of occupation were collected using a semi-structured questionnaire prepared for this purpose. The questionnaire was initially prepared in English and then translated to Amharic and to Afan Oromo by a fluent translator of both languages to ensure its consistency (Annexes II&III).

### **4.8.1. Microscopic Examination**

Two skin snips, one from the left and the other from the right buttock were taken from each study participants under aseptic condition using disposable sterile blood lancets and razor blade. Skin snips were placed in eppendorf tubes containing 100µl of physiological saline. Leaving the snip in physiological saline enables the complete emergence of microfilaria from the snip. Upon completion of every day sample collection, all samples were transported to the Medical parasitology laboratory of Jimma University and each sample were examined microscopically for mf and the positive ones were counted microscopically with low power objective(4x or 10x) of the compound microscope for the microfilaria of onchocerciasis and recorded on the format(Annex IV).

After 24 h, 100 $\mu$ l of 4% formaldehyde were added to preserve the morphological features of microfilaria and conserve skin snips for further quality control checkup by Giemsa staining (Annex V).

The two skin snips from each subject were weighed using analytical balance with sensitivity of 0.01mg after avoiding excess water by tapping on whatmann filter paper. The microfilaria load of each positive subject were calculated as the arithmetic mean of two skin snips per mg of skin snip. The mean microfilaria load was calculated for all skin-snip positive participants.

Community microfilaria load (CMFL) is the geometric mean number of microfilaria per skin snip among adults aged 20 years or above, was calculated using a  $\log(x + 1)$  transformation. A CMFL of <5 microfilaria per skin snip, is recognized by WHO as threshold value in certifying the communities to be free of Onchocerciasis as public health problem, thus:- signifying the possibility of Onchocerciasis elimination in a study area (26).

The percentage microfilaria prevalence (mf %) was calculated as the proportion of skin snips slides found positive for microfilaria.

Prevalence (mf %) =  $\frac{\text{Number of individuals whose slides are positive for microfilaria} \times 100}{\text{Total number of individuals examined for microfilaria}}$

On completion of microscopic examination and count of mf, each skin snip was allowed to dry on a whatmann filter paper and was weighed on analytical balance with a sensitivity of 0.01mg at analytic Chemistry Lab of the Natural Science Faculty and the weight of each sample recorded.

#### **4.8.2. Clinical Examination**

Information on clinical signs and symptoms of the disease in the area were obtained from each subject. Each study participant was examined clinically.

The clinical examinations were conducted by well oriented nurses in a separate room to maintain the privacy of study participants. All study participants were examined clinically for skin signs and symptoms of Onchocerciasis Clinical onchocerciasis is the presence of the clinical spectrum of onchocerciasis which includes: Onchocerca nodule, intensive itching, skin rashes, leopard skin, pruritis and hanging groin (54) (Annex VI).

#### **4.9 Data processing & Analyses**

Socio- demographic, clinical and parasitological data were categorized, coded, entered using Epidata3.1 and exported to SPSS version 16 for statistical analysis. Frequencies and proportions were calculated for initial analysis.

Bivariate analysis was performed to see the existence of association between dependent and independent variables. Finally, multivariate logistic regressions were carried out for variables whose  $p < 0.25$  in simple logistic regressions to determine individual effect of the main predictors.

Differences and associations were deemed significant when P value less than 0.05 was found. Microfilaria were counted with a tally counter and expressed as the average of the two skin snips per person (intensity) in mg of skin snip. The microfilaria load of each subject was estimated as the mean number of microfilaria per mg of skin snip. The mean microfilaria load was calculated for all skin-snip positive participants. The Community Microfilarial Load was obtained as the mean microfilaria load for participants aged 20 yrs and above. The geometric mean intensity (GMI) of microfilaridemia was calculated as  $\text{antilog} (\Sigma \log (x+1)/n)$ , with x being the number of mf per mg of skin snip in microfilaridemic individuals and n the number of individuals examined

#### **4.10 Data Quality Assurance**

Orientation was given to data collectors about the objective and procedure of data collection. Also for laboratory technicians orientation on how to stick on standard operating procedures was given. Standard Operating Procedure (SOP) was used for every laboratory procedures. Closer supervision was undertaken during data collection and problems faced were discussed with data collectors and the supervisors. To ensure accuracy 5% random selected positive and negative slides were re- examined by separate microscopists, who is blind to results of the first sample.

Structured questionnaire was prepared in English and translated into “Afan oromia” and “Amharic” version and retranslated back to English by language experts.

At the time of data collection filled questionnaires were checked for completeness and consistency of information by the supervisor on daily basis and typographic errors were edited manually. Any ambiguity and other problems of data collectors were addressed.

Since both microfilaria of *Onchocerca volvulus* and *mansonella Streptocercia* are detected in skin snip, every 10<sup>th</sup> skin snip sample among positives were stained with Giemsa staining solution to distinguish the microfilaria of one from other.

#### **4.11 Ethical Consideration**

Ethical clearance was obtained from Ethical Review committee of Jimma University, College of public Health and Medical Sciences. Permission letter was sought from Jimma zone Health bureau. Similarly after discussion about the actual study and explaining the purpose of the study, written informed consent was obtained from each study participant .The study participants rights to refusal of participation was respected. Identification of study participants by name were avoided to ensure the confidentiality of the information obtained. Skin snip samples were taken after informed written consent was obtained .All microfilaria positive individuals were treated with Ivermctin according to their age, weight and height as recommended by WHO treatment guideline.



## 4.12 Operational definition

**Acute papular onchodermatitis (APOD):** are small, widely scattered pruritic papules which progress to vesicles and pustules in more severe cases

**Atrophy (ATR):** loss of elasticity and contours, and the skin appears excessively wrinkled, Hairs may be lost and sweating in affected areas is reduced.

**Chronic papular onchodermatitis (CPOD):** The skin lesions that are scattered flat-topped papules which vary greatly in size and height above the skin surface.

**Depigmentation (DPM):** is often described as "leopard skin". Patches of complete pigment loss are seen, with islands or "spots" of normally pigmented skin centered on hair follicles

**Foci:** is the area suspected to be endemic for onchocerciasis

**Hanging groin (HG):** Hanging groin(s) are unilateral or bilateral folds of skin present in the inguinal region. These are inelastic and may contain enlarged lymph nodes.

**Hyperendemic:** Greater than 60% Microfilaria in skin snip or greater than 40% palpable nodule carriers

**Hypoendemic:** Less than 40% Microfilaria in skin snip or less than 20% palpable nodule carriers

**Intensity:** number of worms in an individual/Average number of mf on slide

**Lichenified onchodermatitis (LOD)** is characterized by raised, discrete, pruritic, and hyperpigmented papulonodular plaques associated with lymphadenopathy.

**Mesoendemic:** 40-59% Microfilaria in skin snip or 20-39% palpable nodule carriers

**Village:** used as kebele interchangeable in area

**Zone:** at level of kebele it show "Gote"

## **Chapter Five: - Results**

### **5.1 Socio-demographic characteristics**

The demographic characteristics of the population considered in this study include: age, sex, marital status, Occupation, and educational background.

Of total 212 individuals selected for study; four individuals refused to participate in the study and another two were not available at home during the survey, yielding a response rate of 206 (97.2%) and non-response rate of six (2.8%). The age of the study participants ranged from 15 to 86 years with a mean  $\pm$ SD (37 $\pm$ 15.1) and median ages of 35 years. Age ranges of participants was as follow : 69 (33.4%) in 15-29 years, 95 (44.8%) in 30-49 years and 42 (19.8%) were in  $\geq$ 50 years age groups .Of 206 study participants 96(46.6%) were females and 110(53.4%) were males. From total examined individuals, 170 (82.5%) were married, 27 (13.1%) were single, about 101 (49.0%) were farmers, 80(38.8%) were housewife, 14(6.8%) were students, about 142 (68.9%) were illiterate, 50 (24.35) were at elementary level (Table 1).

**Table 1:**Socio-demographic characteristics of study participants in, Gilgel Ghibe village, Kersa District , Jimma zone ,Southwest Ethiopia,2014( Numbers in parenthesis show percent from respective subtotal in the subgroup )

<b><u>Socio-demographic characteristics</u></b>	<b><u>Total number n (%)</u></b>
<b>Sex</b>	
Male	110(53.4)
Female	96(46.7)
<b>Age</b>	
15-29 years	69(33.5)
30-49 years	95(46.1)
≥50 years	42(20.4)
<b>Marital status</b>	
Single	27(13.1)
Married	170(82.5)
Divorced	2(1.0)
Widowed	5(2.4)
Others	2(1.0)
<b>Occupation</b>	
House wife	80(38.8)
Student	14(6.8)
Employed	3(1.5)
Merchant	3(1.5)
Farmer	101(49.0)
Daily laborer	5(2.4)
<b>Educational level</b>	
Illiterate	142(68.9)
Only read &write	7(3.4)
Elementary	50(24.3)
Secondary	4(1.9)
Above 12	3(1.5)

## 5.2 Parasitological Result

Of the total study participants examined for microfilaria by skin snip, 25 (12.1%) were positive for microfilaria and 181(87.9%) were negative. The prevalence of infections was 13 (13.5%) in females and 12 (10.9%) were in males. In both sexes, maximum infection rate was observed in the age group 30-49 years and the least in the age groups of 15-29 years and  $\geq 50$  years. Of the total positives 13(52%) were females and 12(48%) were males (Table 2).

by stepwise selection only occupation, i.e. being farmer have positive effect on acquiring Onchocerciasis, controlling the value of all the other predictors (AOR=5.16, 95%CI=1.623-16.408, P=0.005 Microfilaria count range was 0 to 74 per mg of skin snip. Mean microfilaria count were 3.85 per mg of skin snip. Average mean weights of skin snip were 3.2mg.

Overall intensity of microfilaria among microfilaria positive cases was 55.1 per mg of skin snip. Microfilaria load in females and males were 27.2 and 27.9 per mg of skin snip respectively (Table 3).

The overall Community Microfilarial Load (CMFL) among adults' age  $\geq 20$  years was 8.94 per mg of skin snip. CMFL in males and females were 4.18 and 4.76 per mg of skin snip respectively (Table 4).

The prevalence, intensity and Community Microfilarial Load were high in age groups of 30-49 years and least in age range of 15-29 years. Overall Prevalence of onchocerciasis in Akko, Carre, Agnyhoo zones were 11(15.7%), 8(12.1%) and 6(8.6%) respectively (Table 1).

**Table 2:** prevalence of Onchocerciasis with respect to age , sex ,three zones and type of occupation among study participants in, Gilgel Ghibe village Jimma zone, southwest Ethiopia, 2014 (Numbers in parenthesis show percent from respective subtotal in the subgroup)

<b>Variables</b>		<b><u>Skin Snip result</u></b>		
		positive n (%)	negative n (%)	Total n(%)
<b>sex</b>	Male	12(10.9)	98(89.1)	110(53.4)
	Female	13(13.5)	83(86.5)	96(46.6)
<b>Age in years</b>	15-29 years	6(8.7)	63(91.3)	69(33.5)
	30-49 years	13(13.7)	82(86.3)	95(46.1)
	≥50 years	6(14.3)	36(85.7)	42(20.4)
<b>Location of zones</b>	Akko	11(15.7)	59(84.3)	70(34.0)
	Carre	8(12.1)	58(87.9)	66(32.0)
	Agnyhoo	6(8.6)	64(91.4)	70(34.0)
<b>Occupation type</b>	farmer	21(20.8)	80(79.2)	101(49.0)
	housewife	4(5.0)	76(95.0)	80(38.8)
	student	0(0)	14(100)	14(6.8)
	merchant	0(0)	3(100)	3(1.5)
	Employed	0(0)	3(100)	3(1.5)
	Daily laborer	0(0)	5(100)	5(2.4)

**Table 3:** Intensity of Microfilaria among study participants by age and sex in, Gilgel Ghibe village, Jimma zone, southwest Ethiopia, 2014

Age groups in years	<u>Total number of positives in skin</u>			<u>Mf/mg of skin Snip(intensity)</u>		
	<u>snip</u>					
	Male	Female	Total	Male	Female	Total
15-29	4	2	6	7.8	2.9	10.7
30-49	6	7	13	12.9	12.9	25.8
≥50	2	4	6	7.2	11.4	18.6
Total	12	13	25	27.9	27.2	55.1

**Table 4:** The community microfilaria loads (CMFL) of Onchocerciasis in the communities with respect to age and sex along Gilgel Ghibe Village, Jimma zone, southwest Ethiopia, 2014

Age Groups (in Years)	<u>Total number examined</u>		<u>Sum of skin snip Weight</u>		<u>Geometric Mean</u>		
	<u>Within given age &amp; sex</u>		<u>in mg</u>		<u>(CMFL)</u>		
	Male	Female	Male	Female	Male	Female	Total
20-29	22	27	66	83.5	1.33	1.12	2.45
30-49	54	41	168.5	129	1.45	1.84	3.29
≥50	20	22	67	68.5	1.40	1.80	3.20
Total	96	90	301.5	281	4.18	4.76	8.94

### 5.3 Results of Clinical Examinations

All the study participants undergone clinical examined to check for the common skin signs and symptoms of Onchocercal infection. Of the total study participants screened 79(38.3%) had intensive itching, 54(26.2%) had skin rashes and 1(0.5%) had palpable nodules. Study participants who had been positive for microfilaria by skin snip and who had intensive itching, skin rashes and palpable nodules were 17(21.5%), 9(16.7%) and 0(0%) respectively. Itching and skin rashes were the most common clinical manifestations of the disease (Table 5).

Overall, the commonly diagnosed symptoms of Onchocerciasis were more prevalent in males than females except for palpable nodules (Table 4).

The highest prevalence of OSD was observed among study participants in the age groups 30-49 years (Table 5).

**Table 5:** Frequency of Onchocerca dermal manifestations and skin snip for mf by age and sex among study participants in Gilgel Ghibe village, Jimma zone, southwest Ethiopia, 2014(Numbers in parenthesis show percent from respective subtotal in the subgroup)

<b>Variables</b>	<b>Clinical signs &amp; symptoms</b>					
	Intensive itching		Skin rash		Palpable nodules	
	present	Absent	present	Absent	present	Absent
<b>Age in years</b>						
15-29	27(39.1)	42(60.9)	20(29.0)	49(71.0)	0(0)	69(100)
30-49	32(33.7)	63(66.3)	19(20.0)	76(80.0)	0(0)	95(100)
≥50	20(47.6)	22(52.4)	15(35.7)	27(64.3)	1(2.4)	41(97.6)
Total	79(38.3)	127(61.7)	54(26.2)	152(73.8)	1(0.5)	205(99.5)
<b>Sex</b>						
Male	42(38.2)	68(61.8)	29(26.4)	81(73.6)	0(0)	110(100)
Female	37(38.5)	59(61.5)	25(26)	71(74)	1(1.0)	95(99)
Total	79(38.3)	127(61.7)	54(26.2)	152(73.8)	1(0.5)	205(99.5)
<b>Skin snip result</b>						
positive	17(21.5)	8(6.3)	9(16.7)	16(10.5)	0(0)	25(12.2)
negative	62(78.5)	119(93.7)	45(83.3)	136(89.5)	1(100)	180(87.8)
Total	79(38.3)	127(61.7)	54(26.2)	152(73.8)	1(0.5)	205(99.5)

All independent variables with p-value less than 25% in binary logistic regression were fitted to multiple logistic regressions in order to see the effect of individual variables on outcome variable and to check multi-co linearity between predictor variables. Being a farmer, exposure to fast running Ghibe River and living in Akko zone have p-value less than 25% (Table 6). In multiple logistic regressions). Therefore farmers are 5.16 times risky of acquiring onchocerciasis than other occupations. There was no significant association between exposure to water bodies and living in Akko zone with that of onchocercal infection (AOR=2.10, 95%CI =0.708-6.211, P=0.181) and (AOR=3.06, 95%CI=0.998-9.391, P=0.06) respectively (Table 7).

**Table 6:** Bivariate logistic regression analysis showing the Skin Snip result and associated factors in Gilgel Ghibe Village, Jimma zone, southwest Ethiopia, 2014

<u>Variables</u>	<u>Total n(%)</u>	<u>Skin Snip result</u>				
		Positives	Negatives	COR	95%CI	p-value
<b>Sex</b>						
Male	110(53.4)	12(10.9)	98(89.1)	1		
Female	96(46.6)	13(13.5)	83(86.5)	1.28	0.554-2.955	0.564
<b>Age</b>						
15-29 years	69(33.5)	6(8.7)	63(91.3)	1		
30-49 years	95(46.1)	13(13.7)	82(86.3)	1.67	0.599-4.624	0.328
≥50 years	42(20.4)	6(14.3)	36(85.7)	1.75	0.525-5.830	0.362
<b>Occupation</b>						
Farmers	102(49.5)	21(20.6)	81(79.4)	6.63	2.19-20.09	0.001
others	104(50.5)	4(3.8)	100(96.2)	1		
<b>Exposure to river</b>						
Yes	115(55.8)	20(17.4)	95(82.6)	3.62	1.30-10.07	0.014
No	91(44.2)	5(5.5)	86(94.5)	1		
<b>Location of zones</b>						
Akko Zone	70(34.0)	11(15.7)	59(84.3)	1.99	0.692-5.716	0.202
Carre Zone	66(32.0)	8(12.1)	58(87.9)	1.471	0.482-4.494	0.498
Aghenoo Zone	70(34.0)	6(8.6)	64(91.4)	1		

Variables with p value less than 0.25 were carried to multivariate logistic regression to see individual main effect on outcome variable



**Table 7:** Multivariate logistic regression analysis showing the Skin Snip result and associated factors in Gilgel Ghibe Village, Jimma zone, southwest Ethiopia, 2014

Variables	Total n(%)	Skin Snip result				
		Positives	Negatives	AOR	95%CI	p-value
<b>Occupation</b>						
Farmers	102(49.5)	21(20.6)	81(79.4)	5.160	1.623-16.408	0.005
others	104(50.5)	4(3.8)	100(96.2)	1		
<b>Exposure to river</b>						
Yes	115(55.8)	20(17.4)	95(82.6)	2.10	0.708-6.211	0.181
No	91(44.2)	5(5.5)	86(94.5)	1		
<b>Location of zones</b>						
Akko Zone	70(34.0)	11(15.7)	59(84.3)	3.062	0.998-9.391	0.06
Carre Zone	66(32.0)	8(12.1)	58(87.9)	1.471	0.482-4.494	0.498
Aghenoo Zone	70(34.0)	6(8.6)	64(91.4)	1		

When Study participants who develop Intensive itching and skin rashes were analyzed in binary logistic regression to see presence or absence of association with age, sex, type of occupation and exposure to water bodies, only age group of 30-49 years and exposure to fast running Ghibe River have p-value less than 25 % ( Table 8a & 8b). Therefore, these predictors were carried to multiple logistic regressions to see individual effect on outcome variable.

In multiple logistic regression by stepwise selection only intensive itching had significant association with exposure to river, controlling all the other predictors (AOR=2.14, 95%CI=1.192-3.833, P=0.01).Therefore, study participants exposed to rivers were 2.14 times more risky to develop itching than non-exposed once. Other variables had no significant association with above observed skin signs and clinical symptoms (Table 9).

**Table 8:** Bivariate logistic regression analysis showing the Onchocercal skin diseases and associated factors in Gilgel Ghibe Village, Jimma zone, southwest Ethiopia, 2014

Table 8a

<b><u>Variables</u></b>	<b><u>Onchocercal skin diseases(OSD)</u></b>							
	<b>Skin rashes</b>				<b>Intensive itching</b>			
	Yes	No	COR	P-V	Yes	No	COR	P-V
<b>Sex</b>								
Male	29(26.4)	81(73.6)	1.02	0.958	42(38.2)	68(61.8)	0.99	0.958
Female	25(26.0)	71(46.7)	1		37(38.5)	59(61.5)	1	
<b>Age</b>								
15-29 yrs	20(29.0)	49(71.0)	0.74	0.460	27(39.1)	42(60.9)	0.71	0.381
30-49 yrs	19(20.0)	76(80.0)	0.45	0.052	32(33.7)	63(66.3)	0.56	0.123
≥50 yrs	15(35.7)	27(64.3)	1		20(47.6)	22(17.3)	1	
<b>Occupation</b>								
Farmers	27(26.7)	74(73.3)	1.05	0.868	42(41.6)	59(58.4)	1.31	0.349
Others	27(25.7)	78(74.3)	1		37(82.2)	8(17.8)	1	
<b>Exposure to rivers</b>								
Yes	34(29.6)	81(70.4)	1.49	0.220	53(46.1)	62(53.9)	2.14	0.01
no	26(26.8)	71(73.2)	1		26(28.6)	65(71.4)	1	

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Variables with p value less than 0.25 were carried to multivariate logistic regression to see individual main effect on outcome variable

**Table 8b**

<b>Variables</b>	<b><u>Onchocercal skin diseases(OSD)</u></b>			
	Palpable nodules n(%)		COR	P-Value
	Yes	No		
<b>Sex</b>				
Male	0(0)	110(100)	0.00	0.997
Female	1(1.0)	95(99.0)	1	
<b>Age</b>				
15-29 yrs	0(0)	69(100)	0.00	0.997
30-49 yrs	0(0)	95(100)	0.00	0.99
≥50 yrs	1(1.0)	41(99.0)	1	
<b>Occupation</b>				
Farmers	0(0)	101(100)	0.00	0.997
Others	1(1.0)	104(99.0)	1	
Exposure to rivers				
yes	1(0.9)	114(99.1)	1.42	0.997
no	0(0)	91(100.0)	1	

**Table 9:** Multivariate logistic regression analysis showing the Onchocercal skin diseases and associated factors in Gilgel Ghibe Village, Jimma zone, southwest Ethiopia, 2014

<u>Variables</u>	<u>Onchocercal skin diseases(OSD)</u>							
	<u>Skin rashes</u>				<u>Intensive itching</u>			
	Yes	No	AOR	P-V	Yes	No	AOR	P-V
<b>Age</b>								
30-49 yrs	19(20)	76(80)	0.45	0.054	32(33.7)	65(66.3)	0.56	0.126
<b>Exposure to rivers</b>								
Yes	34(29.6)	81(70.4)	1.46	0.220	53(46.1)	62(53.9)	2.14	0.01*
no	26(26.8)	71(73.2)	1		26(28.6)	65(71.4)	1	

\*Significant at  $p < 0.05$

## Chapter six: - Discussion

In the present study, 25(12.1%) study participants had microfilaria in the skin with a mean of 3.85mf/mg of skin snip. Adopting the endemic rates classification as defined by World Health Organization, these communities could be regarded as hypoendemic for Onchocerciasis which is consistent with that of study conducted 11 years ago in the same area (53).

When this finding is compared with reports of other studies in different countries, it is much higher than 2.91% mf prevalence in Cameroon in 2010(49), 0% mf prevalence in Tanzania from total of 438 participants (43) and 0% mf prevalence in Tigray Region during 2009(51). Whereas, the present mf prevalence is lower than the 32.7% mf prevalence in Latin America from total of 732 participants (42) ,415 (38.4%) mf prevalence in Equatorial Guinea during 1998(45), 346(48.26%) mf prevalence in Nigeria 2008 (52) , 83% mf prevalence in Nigeria in 2010(46) ,47.5% mf prevalence in Nigeria in 2008 (38) , 14 (3.5%) mf prevalence in Cameroon from 404 participants in 2011(50), 40(48%) mf prevalence on Ethiopian immigrants in Israel(52) ,74.8% mf prevalence in West Wollega during 2012(33),87(22.3%) mf prevalence in Teppi from 390 participants(5) and 39(17%) mf prevalence in Gilgel Ghibe village 11 years ago(53). The prevalence of Onchocerciasis in Gilgel Ghibe during our survey was 12.1%. The distribution is not uniform because different disease patterns are associated with different variants or strains of the parasite, differences in the vector competence and feeding characteristics of local blackfly populations, the abundance of the vector, and the difference in the human host response to the parasite.

The present study found that CMFL decreased from a 11.1 mf/skin snip (53) to 8.94 mf/skin snip. The same is true in Nigeria that overall CMFL was 8.01 microfilaria/skin snips in 1994, and reduced to 3.20 microfilaria/skin snips in 2001(48).This finding is also consistent with that of finding of Equatorial Guinea in which CMFL was 28.29 mf /mg of skin snip in 1989 and reduced to 2.32 mf/mg of skin snip in 1998(45).Whatever the percent prevalence of this disease was in different parts of countries, it is decreasing from previous rates. This reduction might be due to fact that all positive individuals in previous study were treated with Ivermectin.

The prevalence of the disease was found to be slightly higher in females than males (although it is not statistically significant) which is also consistent with study done in Nigeria in 2010 (46) and the study done in Teppi, in 2005 (5). However, this observation is inconsistent with the findings of earlier reports in the same area (53). Suggesting that not only males but also females were actively participating in outdoor activities such as farming which may expose them to the bite of black fly. Furthermore, the females may have more contact with the rivers when fetching water and washing clothes around the river.

In this study, the age group (30-49) was most affected by the onchocercal infection. This finding is consistent with those of Nigeria, in 2005 (36), earlier reports in Gilgel Ghibe, in 1995 (53) and reports of a study from Sierra Leone in 2002 (44). This age related high prevalence in this study might be due to these individuals were mostly engaged in outdoor activities which expose them to bite of blackflies.

In Gilgel Ghibe village, females were more engaged in outdoor activities mainly for farming. People who frequent the breeding sites of blackflies, rivers and streams to bath or fetch water are at increased risk of the infection. While males are more engaged in only outdoor activities of farming and hence in comparison to females, males were less frequently exposed to the biting black flies. Farmers in the Gilgel Ghibe village were usually dressed in short sleeves and shorts during farming activity which expose them to bites of black flies. Similar trend of prevalence rate of onchocerciasis was reported from Nigeria in 2005 and 2008 (36, 47) respectively.

There was a significant relationship between type of occupation and prevalence of onchocerciasis. Farmers were the most affected than other occupations (Table 7). This is in agreement with the result in Cameroon, 2010 (50). The higher prevalence rate of onchocerciasis among farmers has also been reported from Nigeria in 2005 where farming was the major occupation of the study communities (33).

The present study showed that the density of the microfilaria is above threshold value (CMFL < 5 mf /skin snip) in the studied communities. It is inconsistent with that in southwest Nigeria (26). The low CMLF obtained has many implications on the transmission and control of onchocerciasis in the area.

The low density of microfilaria in human hosts usually reduces the vectorial potential of the *Simulium* vectors as the flies need to ingest relatively high number of microfilaria to ensure continuous transmission of infection. Gilgel Ghibe river is only a few kilometers away from the village in our study.

In Akko zone high prevalence and intensity of onchocerciasis had been recorded as it is closer to the rivers than other zones although it is not statistical significant ( $p>0.05$ ). Several studies have implicated that prevalence rate and closeness of population to breeding sites of black fly were related. A study from Nigeria (40) and Latin America (42) also showed that high prevalence rate was reported from areas near to different rivers . Since the disease is common in areas with fast flowing streams and along riverne areas across the Savanna belt, it is not surprising that most of the affected respondents are those having farms located near to Ghibe river. But other few studies showed that the same trend of infection distribution was found in population who are living near to fast flowing rivers and a few kilometers far away from the rivers.

Overall clinical symptoms Observed are intensive itching 79(38.3%), skin rashes 54(26.2%) and palpable nodules 1(0.5%). itching in males & females is 42(53.2%) and 37(46.8% respectively). The prevalence of itching also increased with age, reached its peak in the 30–49 years age group and then decreased slightly as age increased. Thereafter; there was a slight decrease in itching as the age of patients increased. this is consistent with a report from Nigeria in 2005(36). Only intensive itching and exposure to river have significant association in this study. The nodule carrier rates in females was 0.5% and in males (0%). Similar results were reported in Nigeria in 2010(46). however, the NCR is different from an earlier report in Gilgel Ghibe(53). This type of clinical manifestations might be found not only due to onchocerciasis but also in some other skin diseases like scabies or associated with a wide variety of systemic conditions.

### **Limitation of the Study**

- Onchocercal infection prevalence on age of <15 years were not done due to fear of invasive procedure of skin snip.
- Taking two skin snips from only two sites for examination might sometimes miss very light infections.
- One of the outcomes of onchocercal infection is the involvement of the eyes. In this study ophthalmic examination were not carried out due to unavailability of ophthalmological instruments (ophthalmoscope and slit lamp microscope).



## **Chapter Seven: - Conclusion and Recommendation**

### **7.1 Conclusion**

The results of the present study showed a considerable reduction both in the prevalence and intensity of onchocercal infection in comparison to the study report of 11 years ago in the same study area. Overall prevalence of the microfilaria in this area was 12.1%. From this study, the prevalence of microfilaria in Akko zone, which is located near to Gilgel Ghibe river, was higher than other zones. Microfilaria in skin snip had strong association with farming activities. Overall intensity of microfilaria in positive individual was 55.1 mf/mg of skin snip. Itching and skin rashes were the most common skin signs and symptoms of the disease in this area. Intensive itching has significant association with the exposure to Gilgel Ghibe river. Overall CMFL was 8.94 microfilaria/skin snips. Based on the finding of this study the area is considered hypoendemic for onchocerciasis.

### **7.2 Recommendation**

It is believed that if the treatment coverage is improved and sustained, the level of microfilaria will be reduced drastically to a level that the disease would no longer be a public health problem.

Since onchocerciasis was hypoendemic in this area, it should call for individuals directed treatment with Ivermectin. One round treatment has been given after this diagnosis. Therefore, the treatment should be continued and should not be interrupted until the microfilaria reduced to the level which should be no longer a public health problem.

Ministry of Health should carry out cohort study in the areas to evaluate the success of the treatment of Onchocerciasis with Ivermectin.

Health information about the disease, its transmission, prevention and control should be initiated and sustained.

Routine monitoring of Ivermectin distribution and treatment is recommended. The awareness campaign on multiple benefits of Ivermectin should be intensified and sustained in endemic communities.

There should be further study on unstudied question” Does Onchocerciasis transmission take place in hypoendemic areas”? Hypoendemic areas are presumed to cause low onchocerciasis morbidity-a notion that led to their exclusion from Mass Drug Administration (MDA).

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**Annexes**  
**Jimma University**

**College of Medical and public health sciences,**

**Department of Medical Laboratory Science & Pathology**

Questionnaire for Data Collection on Epidemiology of Onchocerciasis in Gilgel Ghibe village, Jimma,  
Southwest Ethiopia

**Annex I: Information sheet**

**Study Title:** Epidemiology of Onchocerciasis in Gilgel Ghibe Village, Jimma Zone, Southwest Ethiopia

**Principal investigator:-** Adane Eyasu

**Organization:** Department of Medical Laboratory Sciences and Pathology College of Public Health and Medical sciences, Jimma University

**Purpose of the research:** Onchocerciasis is endemic in areas of fast running water bodies were present in different parts of Ethiopia. It is also common here in Jimma zone around Gilgel Ghibe. In this area 11 years ago Onchocerca Epidemiological and Entomological study was done. The aim of this study was to determine Epidemiology of Onchocerciasis in Gilgel Ghibe Village, Jimma Zone, Southwest Ethiopia.

**Procedures:** In order to undertake the above-mentioned study, some questions related with the topic, two skin snips for laboratory investigation and clinical manifestations were taken from each study participants. Permission was obtained from Jimma University, Jimma zone Health Bureau, Kersa woreda health office and Siba (Gilgel Ghibe) kebele administrative. Written consent obtained from each study participants and they are kindly asked to give required samples and information related with the study.

**Safety:** There was no any possible risk or discomfort during skin snip sample collection and clinical assessment.

**Benefits:** Study result will able to create awareness among health professionals and policy makers to strengthen existing programs that take actions on Onchocerca infection. Based on their laboratory result the participants were treated appropriately by Ivermctin.

**Confidentiality:** The information obtained during this study was remained confidential. Disclosure of any of the data to third parties other than those allowed in the informed consent was not permitted. Records were remained confidential. To maintain confidentiality, the investigator was kept records in locked cabinets and the results of the tests were coded to prevent identification of the volunteers. Skin snip samples collected were not used for other research purposes and were be safely disposed of after the completion of the study.

**Right to refuse or withdraw:** We assure them that, they were free to withdraw from the study at any time and that they were not discriminated in any form for education or health services.

**Whom to Contact:** If you have any questions about the study at any time, you can contact Mr. Adane Eyasu (PI of the study) Tel: +251 910594122 (Mobile)

Email: adaneeyasu@gmail.com



**Annex II: Consent form**

**Consent form for participation as a volunteer in the research undertaking**

**Explanation on procedures and conditions of agreement**

We are from Jimma University, college of public health and medical science. We are here to study the problem of the disease called Onchocerciasis. We would like to ask you a few questions about Onchocerciasis and its associated clinical manifestation. The objective of this study is to determine the prevalence and intensity of Onchocerciasis infection and subsequently to help in the initiation of the control programs. The outcomes of the findings can help in the evidence- based decision to develop control intervention strategies to improve the health status of the diseased individuals. We are asking you and others in this community to participate in this study. What we are asking everyone is to be examined for these diseases. Examination will involve physical and laboratory examinations. Laboratory examination will involve a tiny bit of skin snip from expected parts of your body. All samples will be collected using disposable blades and blood lancets. These procedures of sample collection are neither harmful nor experimental procedures. They are routine medical practices. However, if in case any problems arise during sample collection, we shall offer you the necessary medical interventions.

If the diagnosis is confirmed, you will receive the necessary drug(s) from the control program that will commence soon after this study. In the end of the study, we plan to write a report about the results of the study. The reports will not bear any information relating to your personality e.g. your name, personal address or identity.

We assure of the confidentiality of such information. If you have understood the explanation well enough, we are asking you to participate in this study. If you decide to volunteer, we kindly ask you to put your signature as illustrated below.

I, the undersigned, will like to confirm that, as I give consent to participate in this study, it is with a clear understanding and recognition of:

- a. The objectives of the intended study
- b. The procedures of diagnosis and treatment

I confirm that the proposal has been explained to me in the language I am fluent and conversant.

Name of participant/patient: \_\_\_\_\_Signature:\_\_\_\_\_

Name of researcher: \_\_\_\_\_Signature\_\_\_\_\_

Date\_\_\_\_\_



108. Family size \_\_\_\_\_

109. Average Monthly Family Income \_\_\_\_\_ (birr)

110. Where is your usual place of residence? 1. Urban 2. Rural

111. Length of the stay in the village-----

**Part II: Clinical Examination (OSD)**

201. Intense itching 1/No 2/ Yes, if yes site-----

202 Swollen leg 1/No 2/ Yes

203. Skin rashes (pruritic) 1/No 2/ Yes, if yes site-----

204. Leopard skin (depigmentation of skin ) 1/No 2/ Yes, if yes site-----

205.onchocercomata( palpable nodules) 1/No 2/ Yes, if yes site-----

206. Hanging groin 1/No 2/Yes

**Part III: Risk factors for Onchocerciasis**

301. Availability of rivers or other water bodies in the vicinity 1. Yes 2. No

302. If yes proximity to home in meters estimated-----

303. Exposure to lake or rivers through swimming or bathing 1. Yes 2. No

**Part IV: Laboratory Request Format**

Code of study participant -----

Age -----sex -----

Keble-----zone/Gote-----

Name and signature of laboratory Tech. ....

Date -----

Anatomical Sites from which skin snip was taken	Positive for microfilaria	Negative for microfilaria	Weight of skin snip/mg	Number of microfilaria Per mg of skin snip
Right side of buttock				
Left side of buttock				

#### **Annex IV: - Laboratory procedures for wet mount of skin snip**

1. The left and the right buttock were selected for each study participants
2. Cleanse the skin using a spirit swab.
3. Allow the area to dry.
4. Insert a sterile fine needle almost horizontally into the skin.
5. Raise the point of the needle, lifting with it a small piece of skin
6. Cut off about 3-5mg of skin to a depth of 0.5µm with a sterile razor blade (or scalpel).
7. The two Skin snips were placed in separate eppendorf tubes or microplate each containing 100µl of normal saline
8. Leave the sample at room temperature for 24 hours (overnight).
9. Using forceps, remove the skin snip, place it on a slide, and cover with a cover glass.
10. Examine both the skin snip microscopically for microfilaria using the 10x objective with the condenser iris closed sufficiently to give good contrast
11. After 24 h, 100µl of 4% formaldehyde were added to preserve the morphological features of microfilaria and conserve skin snips for further quality control checkup by Giemsa staining
12. The two skin snips from each subject were weighed using analytical balance after avoiding excess water by tapping on absorbent filter paper
13. The number of mf from each snip expressed as mf per milligram (mf/mg) of the skin snip.
14. The microfilaria load of each positive subject were calculated as the arithmetic mean of two skin snips per mg of skin snip
15. The geometric mean of the mf from the two skin biopsies from each patient were calculated and used as a measure of Community Microfilarial Load (CMFL)

## **Annex V: - Laboratory procedures for Giemsa stain of skin snip**

1. If microfilaria is present to confirm, follow the following steps:
2. Remove the cover glass and allow the preparation to dry completely
3. Fix the dried preparation with absolute methanol or ethanol for 2–3 minutes.
4. Stain with Giemsa at pH 6.8.
5. Cover the preparation with a drop of immersion oil and
6. Examine it microscopically using the 40x and 100x objectives to identify the microfilaria
7. If the following morphology were seen. Small & thin microfilaria, Mf without a sheath, Nuclei extends to end of tail, Tail is hooked& its tip is rounded or forked. It is *Mansonella Streptocercia*
8. If the following morphology were seen, Large & thick mf, Broad spatulate head, No sheath, pointed tail & Tail free from nuclei .it is *Onchocerca volvulus*

## **Annex VI: - procedures for Clinical Manifestations of Onchocercal Skin Disease (OSD)**

### **i. Palpable Onchocerca nodules**

Nodules were palpated from head to the ankles and Individuals were also asked if they had any palpable nodules on their bodies. location of nodules in following anatomical sites: head, neck, right arm, left arm, upper trunk (above umbilicus), right axilla, left axilla, lower trunk (below umbilicus), right iliac crest, left iliac crest, right trochanter, left trochanter, right groin, left groin, right buttock, left buttock, sacrum, right knee, left knee, right ankle, left ankle, right foot and left foot

- Nodules absence /presence recorded on Questionnaire

### **ii. skin rash(pruritis)**

Skin rash on the body of sampled individuals assessed visually and Individuals were also asked if they had any rashes on their bodies

- Skin rashes absence /presence recorded on Questionnaire

### **iii. intensive skin itching**

Sampled individuals asked about body itching at any time

- Skin itching absence /presence recorded on Questionnaire

### **iv. Leopard skin (depigmentation of skin )**

Patches of complete pigment loss are seen, with islands or "spots" of normally pigmented skin centered on hair follicles (**Depigmentation**)

- skin is observed and Absence/presence of Depigmentation recorded on Questionnaire

### **V. Hanging groin**

Hanging groin(s) are unilateral or bilateral folds of skin present in the inguinal region. These are inelastic and may contain enlarged lymph nodes

- Hanging groin Absence/presence recorded on Questionnaire

**ANNEEXII: II Guca wadda waligaluu warra qorraannoo kessaatti hiramchuuf fedhii qaban ibsa adeemsa fi haala waligalte.**

Nutti Kan dhufne Jimma uniiverisitti koollejji fayyaa hawaasa fi saayinsii meedikaala irraatti. Nutti Kan asii dhufneef rakkina wa'ee dhukkuba Onkoosarkiyaas qorraachuudhaaf. Kaayyoon qorraannoo kana babal'ina fi walitti dhufeenya onkoosarkiyaas uummata kan kessaatti qabu baruudhaaf akkasumaas kaka'umsa sagaanta ittisaf godhamu gargaarudhaf. Nutti siif kanneen birra Kan gaffanu akka isinii qorrana Kan keessaatti hirmaatan. Kan nutti nama hunda gaffanu akka isini dhukkuba kanaf qorramtaniidha. Qorraannoon isakan ofii keessaatti qabatuu ilaalcha qamaa fi laabratoriin yaalamuudha. Yaaliin laabratorii kan geggefamuu goga baay'isee xiqqoo ta'e naannoo nafa keenya inni itti shakamuu irra kutuun fudhaachuun ta'a. Sampiliin hundii kan ittin fudhaamuu milaaccii steeriyilii fi lanseetii dhiigaa ergaa nama tokkoo fayyadamne bodaa gatamuun. Sampiliin nuttu fudhaanuu kun kan nama miidhuu ykn kan yaalii irraatti geggefamuu oso hin ta'ane kan dhukkuba onko qabachu fi dhisuu keessaan itti adda basanu qofadha. Haata'u iyyuu malee yoo rakkini isinii mudate yeroo sampilii funnanuu oggeesaa fayyattiin akka isinii ilaalmtani isini gargaara. Yoo dhukkuba kana qabachuun keessaan mirkana'e qorraanno kan booda qorricha(dawwaa) akka isiniin argataan tasifama dhabata saganta to'anoo fi ittisaa onkoottin. Dhumma qorraannoo kana irratti kaayyoon keenyaa waa'ee bu'a qorraanicha gabaasudha. Gabaasini bu'a qorraannoo kan odeeffannoo wa'ee enyumaa keetti kan ibsuu hin qabu. Fakkeenyaaf maqaa kee, nannoo kee kan ibsuu ykn eenyumaa kee kkf akka inni hin qabnee jala mure ofitti ammanmuumadhaan isin beeksisuu barbaadna. yoo atti barbaachisumaa fi ibsa isaa sirriiti hubaate akka atti qorraanna kan keessaatti hirmatu isini/sii gafaana. Yoo atti fedhii keen keessaatti hirmachuuf muteessite ta'e kan sii gaffanu akka atti mallattoo kee mallatesituu sii gafana akka kan gadii jirutti.

Anni Kan armaan gaditti mallateesse, Kan sii mirkaanessu barbaadu fedhii kootiin qorraanicha kessaatti hirmaachuu gutumma gutuutti hubadhee bu'a isaa wajj in innis:-

- a. Kaayyoon qorraanichaa fi b. adeemsa qorraana fi yaalamuu isaa

Kan mirkaneeffachuu barbaadu proposaaliin Kun afaan anni sirritti beekuun sirriitti jijjirame naf ibsamerra.

Maqaa hirmaata/dhukkubsata \_\_\_\_\_

Mallattoo \_\_\_\_\_

Guyyaa \_\_\_\_\_ -

Maqaa abba qorraannoo geggeessu \_\_\_\_\_

Mallattoo \_\_\_\_\_ Guyyaa \_\_\_\_\_

**ANNEEXII III:- Gaaffii sigafechu**

Guyya..... Lakkafisa manna .....Gerra .....

**Kuta Toko: Haalaa jiruuf Jirenyaa**

101. Issin mannakanffii malitati A/abbworra B/haldha worra C/ijolle D/kanbirra
102. Ummurri.....
103. Saala A/dhirra B/dhala
104. Akkata gai'la A/kanhinfne/kanhinherumne B/kanfudhe/kanheerumte C/kanwaliniikan D/kanabbanwarra du'e/kanhatiwarra duute
105. Hojii A/haldha manna B/barataa C/hojataa mootummaa D/daldalaa E/qotebulaa F/hujataa guyaa G/Kan biraa (adda baasi) -----
106. Manna amma keessaa jirtan A/keessanii B/kan kireeffatani
107. Sadarkaa barnoota A/kanhin baranne B/bareessuufidubbisu qofakan danda'u C/sadarkaa tokkoffa Kan xumure D/ sadarkaa lamoffa Kan xumure E/kudha-lama olii
108. Baayina maatii -----
109. Galii ji'aa.....
110. Bakka jirre nyaa dhaabbataa A/magaalaa B/badiyyaa
111. Hammamiif achii jiraattan.....

**Kutaa lama: mallattoo dhukkubichaa**

201. Dhaqnaa hokisaa A/hinjiru B/jirra
202. Dhita'u milaa A/hinjiru B/jirra
203. Qaamarratti shifii A/hinjiru B/jirra
205. Rakkoo arguu A/hinjiru B/jirra
207. Dhiita'uu naanno qaama hormaataa A/hinjiru B/jirra

**Kutaa sadaffaa: dhukkuba onkoosarkariyaatif Kan sababa ta'an**

301. Nanno keeesan laging jira A/hinjiru B/jirra
302. Laggeen jiratan nannoo manna.jireenyaarraa fageenya isaan qaban-----
303. Laga sanatti dhiqattuu A/hinjiru B/jirra



**የስምምነት ማረጋገጫ ቅጽ ፣ በጥናቱ በፈቃደኝነት ስለመስተፍ**

**ስለጥናቱ ዝርዝር አሰራሮችና ቅድመ ሁኔታዎች መግለጫ**

እኛ የመጠናዊ ከጅም ዩንቨርሲቲ ህክምና ፋኩልቲ ነዉ። የመጠነዉም Onchocerciasis የተበለዉን በሽታ ለማጥናት ነዉ። የጥናቱ ዓለማ ይህ በሽታ በማህበረሰቡ ዉስጥ እየስከተለ የለዉን የጤና ችግር ለመገምገምና ተገቢዉን ቁጥጥር መርሃ ግብር እንድጅመር ለማገዝ ነዉ። ለዚህ ዓላማ መሰከት እርስዎና ሌሎች የ ማህበረሰቡ አባላት በጥናቱ ተከፋዮች እንድትሆኑ እንጠይቀለን። የምንጠይቀዉም ለዚህ በሽታ ሁለችሁም እንድትመረመሩ ነዉ። ምርመራዉ የሰዉነትና የላቦራቶሪ ሥራዎችን ያካትታል። የላቦራቶሪ ምርመራዉ ከቆዳ ጫፍ የሚቆነጠር ናሙና ይፈልገል። ናሙናዉ ለብቻዎ በተዘገጁ መገልገያ ማሣርያዎች አመክሮት ይወሰዳል። ይህ የናሙና አወሰሰድ የተለመደ የህክምና አሠራር እንጂ በሙከራ የሚገኝ አይደለም፤ ህመም አየመጠም። ነገር ግን ዓገጠሚ በናሙና አወሰሰድ ሰቢያ ችግሮች ቢከሰቱ ተገቢዉን ህክምና ያገኛሉ።

በምርመራዉ በበሽታ መጠቃትዎን ከራጋገጥን ተገቢዉን ህክምና እንድያደርጉ ይደረገል። ይሁን እንጂ አንድንዴ ይህንን በሽታ ማከም አስቸጋር ነዉ። በተለይ የመዳሃኒቶች አለመስማማትና በሽታዉ በአስከፍ ሁኔታ የተከሰተ ከሆነ ይህም ሊያጋጥም ይችላል። በአሁኑ ጊዜ ይህንን በሽታ አይቮርሜክትን ከአልባንደዛል ጋር በጠምራ በመወሰድ ማከም ይቻላል ፡ ፡

ይህ ያለክፍያ የሚታከሙበት መርህ ግብር በስራ ላይ ዉሎአል።

ጥንቱ ስጠናቀቅ ዉጤቱን አስመልክቶ ሪፖርት እናዘጋጃለን። ይህ ሪፖርት የእርሶን ማንናት የሚገልጽ መረጃዎረችን ለምሳሌ ስም፣ የግል አድራሻ ሁሉ አያጠቃልልም። እነዚህ መረጃዎች በሚስጥር እንዳምጠበቁ እናረጋግጥሎዎታለን።

ከላይ የተጠቀሰትን መግለጫዎች በሚገባ የተረዱ ከሆነ በዚሁ ጥናት ተካፋይ እንድሆኑ እንጋብዝዎታለን። ለማሳታፊ ፈቃደኛ ከሆኑ ይህንኑ ለማረጋገጥ ከታች ፊርማዎን እንድያኖሩ እንጠይቅታለን።

እኔ ሙሉ ስሜ ከዚህ ከታች የተገለጸዉ፤ በዚህ ጥናት ተሳታፊ ለመሆን ስወስን ሁለት መሠረታዊ ጉዳዮችን በሚገባ በማጤን ነዉ፤

ሀ/የጥናቱን ዓላማ ለ/በጥናቱ የተካተቱ የምርመራ ሥራዎችና ህክምናዎች በተጨማሪ የጥናቱ ዝርዝር ዓላማዎችና አሰራሮች ሁሉ በሚገባ በምረዳዉ ቋንቋ የተገለጹልኝ መሆኑን በፊርማዬ አረጋግጣለሁ።

የተሳታፊ ሙሉ ስም.....ፊርማ.....

የተመራማሪዉ ሙሉ ስም.....ፊርማ.....

ቀን.....

**ቃለ-መጠይቅ**

1/ የቃለ-መጠይቁ ቀን-----2/ የቤት ቁጥር-----3/ ጎጥ-----

**ክፍል አንድ ፡ ማህበረዊ የኑሮ ሁኔታ**

101. እርሶ የቤቱ ምንድ ናት? 1 ባል 2 ሚስት 3 ልጅ 4 ሌላ-----

102. ዕድሜ ስንት ነው? -----

103. የታ 1/ ወንድ 2 /ሴት

104. የትዳር ሁኔታ 1/ ያላገባ/ች 2/ ያገባ/ች 3 /የተፋቱ 4/ ባል የሞተባት/ሚስት የሞተችበት 5/ሌላ-----

105. ሥራ ምንድ ነው? 1/ የቤት እማቤት 2/ ተማሪ 3/ ተቀጣሪ 4 /ነጋዴ 5/ አርሶ አደር 6/ የቀን ሠራተኛ 7/ ሌላ-----

106. አሁን ያሉበት ቤት 1/ የራሶ 2/ የተከረየበት 3/ ሌላ-----

107. የትምህርት ደረጃ 1/ የልተማራ 2/ ማንበብና መጻፍ ብቻ የሚችሉ 3 /አንደኛ ደረጃ (1-8) ያጠነቀቀ/ች 4/ ሁለተኛ ደረጃ (9-12) ያጠነቀቀ/ች 5/ ከ12 በላይ

108. የቤተሰብ ብዛት-----

109 ወራሃዊ ገቢ-----

110. መደበኛ መኖርያ ቦታ 1 /ከተማ 2/ ገጠር

111. በአማካይ በዚህ ቦታ የቆዩበት ጊዜ-----

**ክፍል ሁለት፡ የምልክት ምርመራ**

201. ሰውነትን ማሳከክ 1/ የለም 2/ አለ ካለ ያለበት የሰውነት ክፍል-----

202. በእግር ላይ እብጠት 1/ የለም 2/ አለ

203. በሰውነት ላይ ሽፍታ 1/ የለም 2/ አለ ካለ ያለበት የሰውነት ክፍል-----

204. ከማሳከክ የተነሳ ሽግግር ጉር ቆዳ በሰውነት ላይ 1/ የለም 2/ አለ ካለ ያለበት የሰውነት ክፍል-----

205 በእጅ ሲነክ የሚያሞልጭ አይነት ዕብጠት (palpable nodules) 1/ የለም 2 /አለ ካለ ያለበት የሰውነት ክፍል----

206. ብልት አካባቢ እብጠት 1 /የለም 2 /አለ

**ክፍል ሶስት፡ ለአንኮሳርከርያ መከሰት ስጋት የ ማሠኑ ነገሮች**

301 በ አ ካ ባ ቢ ወ ወን ዞ ች 1/ የ ሉ ም 2/ አ ሉ

302 ወን ዞ ቹ ካ ሉ ከ መኖርያ ቤት ያለ ወር ቀት-----

303 በ ወን ዝ ወስ ጥ የ መዋኛትና የ መታጠብ ልምድ 1/ የ ለ ም 2/ አ ለ