

**PREVALENCE OF MALARIA AMONG OUTPATIENTS
VISITING JIMMA SHENEN GIBE HOSPITAL, JIMMA
SOUTHWEST ETHIOPIA**



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Jimma University, Ethiopia

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SCIENCES, DEPARTMENT MEDICAL LABORATORY SCIENCES AND
PATHOLOGY**

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ABSTRACT

Background: Malaria is one of the major parasitic diseases with high morbidity and mortality. The disease is curable if the patient is early diagnosed and promptly treated.

Objective:-The aim of this study was to determine the prevalence of malaria among out patients visiting Jimma Shenen Gibe Hospital Laboratory during the study period.

Methods:-A cross- sectional study was carried out on the prevalence of malaria among patients at Shenen Gibe Hospital, Jimma, Ethiopia from April 17 to May 02, 2015 G.C. The sampling population was interviewed using questioner prepared for this purpose. Finger pricked blood sample was collected from each subject, thick and thin smears were prepared and stained with Giemsa and were examined microscopically for the presence of malaria parasites.

Results:- Out of 324 participants whose blood film was examined, 196 and 128 were male and females respectively. The prevalence of malaria was 37 (11.4%) and from this 21(6.5%) and 16(4.9%) were male and female, respectively.

Conclusion and Recommendation:-The overall prevalence of malaria infection obtained in this study was 11.4%. *P.vivax* was the most dominant (8.6%). The study showed that the residents of Jimma town had slightly more malaria infection than residents outside Jimma town. Community education on proper bed net utilization must be forwarded.

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ACRONOMY

EJHD	-Ethiopian Journal of Health Development
MOH	- Ministry of Health
SNNP	- Southern Nations, Nationalities & People's Region
WHO	- World Health Organization
ART	-Anti retroviral Treatment
FP	-Family planning
BF	Blood Film

Chapter One

1. Introduction

1.1 Back ground

The word malaria comes from Italian word 'mal'-'aria' which means "bad air" is serious public health problem. Today in more than 90 countries, total of 2400 million people's i.e 40%of the world population is at risk of malaria. Worldwide there are 300-500 million cases each year, more than 90%of this malaria cases are sub-Saharan Africa (1).

Malaria is a blood and tissue protozoan caused by four species of parasite of the genus plasmodium. Namely:- *P. falciparum*, *P.vivax*, *P. malaria* and *P. ovale*. Out of the total cause of malaras globally, it is estimated that about 40% are caused by *P. falciparum*, about 50% caused by *P.vivax* and 7-8 % caused by *P. malaria* and the rest by *P. ovale*. The parasite is transmitted from the blood of infected persons to female anopheles mosquito and then to susceptible new person. Occasionally transmission is through the placenta to the fetus or by transfusion of blood which contain malaria site in it (1, 2).

Malaria is a serious problem for the majority of human being. Recent estimated shows that more than 2000 million people almost 50% of the world population are exposed to varying degree of malaria risk in about 100 countries. Close to 90% are in sub- Saharan African where the transmission reaches higher level than anywhere else in the world and 200 million are chronically infected. Most of the disease and deaths in highly endemic areas occur in children and pregnant women. It remains one of the most difficult epidemiological pharmacological and immunological challenges in the world particularly in African and its impact on economic development is very high .Recent epidemics of malaria in Africa, the changing pattern of disease due to climate changes, human migrations and drug resistance are the key factors that affect the rapid spread of the disease all over the continent (3, 4).

The incidence of malaria parasite is one the increasing there is growing resistance to current anti malaria drugs in many areas, including multi drug resistance in several countries of south East Asia and Africa. Increasingly insect side resistance is also a

major threat as are changing agricultural practice especially irrigation programs in many endemic countries. Malaria is the most important and wide spread of parasite disease in tropical developing countries with more death than other disease (4, 5).

The symptom of this disease include: fever, shivering, joint pain, headache, repeated vomiting, generalized convulsion, severe anemia that often lead to death in the areas where intensive malaria transmission occur (7).

1.2 Statement of the problem

Malaria is an acute infection of the blood caused by the genus plasmodium: *P. falciparum*, *P. vivax*, *P. ovale* and *P. malaria*. Malaria remains a major threat and hinders the economic development of local countries and nations. Almost half of the world populations are at risk from the disease, which cause an estimated 300-500 million clinical cases and 1.5-3 million deaths each year. The global distribution of per-capital gross domestic product shows a striking co-relation between malaria and poverty. Countries in which malaria is endemic have lower rate of economic growth as consequence of numerous factors including effect of disease on fertility, population growths, work productivity, premature mortality and medical cost (8). It has a major impact in sub-Saharan Africa over 90% of disease were reported. In this region, malaria is responsible for over 1 million deaths in children (9, 10).

Malaria is one of the major health problems in sub Sahara Africa, affecting 46 endemic countries. In these countries 92% of the total burden of disease in the continent and responsible every year for about one million deaths in children under 5 yrs (11). Malaria also the most common disease as cause of among school children absenteeism and young adult in Africa where it tends to strike at the harvest time affecting productivity. The disease cause anemia in children and pregnant women and increase their vulnerability to other disease. The economic significance of malaria in 1987 the estimated annual direct and individual cost of malaria in Africa was, us \$800 and this figure was expected to rise to more than 1800 by 1998, the world cost associated with malaria is undoubtedly higher however possibly reaching us # 200 million in 1999 assuming that 90% of the world wide malaria case in Africa (12, 11).

The current population of Ethiopia is approximately 81 million of which 68% of the population at risk of malaria the annual clinical is estimated to be 4-5 million which constitute about 10-40% of outpatient consultations and it accounts 13-26% of all in patient admission (4, 13).

In Oromia Region 95% of the area is prone to malaria with over 2 million at risk of acquiring the infection every year Jimma zone is among the 18 zones of Oromia region. Its temperature, rainfall and topographic conditions favor for most of vector transmission diseases. Among these vector born diseases malaria is the one which causes serious health problems in the zonal communities. The prevalence of malaria is not decreased as expected (5, 14).

Jimma town, one of special administrative town in Jimma zone which is found in Jimma woreda is one of malarious town in the zone. There is much stagnant water in the town and around the town because of its topographic condition. According to the report obtained at Jimma Shenen Gibe Hospital in 2004 E.C, a total of 2657 diagnosed as malaria with a confirmed at the laboratory on blood film 1213 with *P.falciparuem* and 1444 with *P. vivax* revealed that malaria was among the ten top diseases (15). Therefore, this prevalence study of malaria can serve as base line information to develop effective community based prevention and control programs and to those who are interested for further study in the same area.

1.3 Significance of the study

This study is beneficial in many aspects. It can provide information on the prevalence of malaria infection in the community of the study area. It can be used a base line information to those who are interested for further study in the same area and also it can be used for those concerned personals and to take an action on the diseases.

CHAPTER TWO

2. Literature review

Malaria is endemic in 91 countries with about 40% the world population at risk. Each year there are 300-500 million clinical cases of malaria of which 90% of them from Africa resulting in 1.5-2.9 million deaths, mostly children under 5 years (1).

Among the four species of plasmodium; *P. falciparum*, *P. vivax*, *P. ovale* and *P. Malariae*; *P. falciparum* accounts the majority of infection. *P. ovale* is found mostly in Africa (especially western Africa) and the Islands of Western pacific. It is biologically and morphologically similar to *P.vivax*. However, different from *P. vivax* in that it can infect individuals who are negative for Duffy blood group, which is case for many residents of sub-Saharan Africa. *P. malariae* is found worldwide and is the only human malaria parasite that has a quarter cycles (three day cycle), While the three other species have a tertian time. In some patients, *P. malariae* causes long lasting chronic infection that in some cases can last little time (16).

As world wide *P. falciparum* is the dominant species followed by *P. vivax*. These two species accounts for 60% and 40% of all malaria cases respectively (4). *P. vivax* which is found mostly in Asia, Latin America and some parts of Africa, because of population densities especially in Asia it is probably the most prevalent human parasite. It has dormant liver stage (hypnozoite) as like *P. ovale* that can activate and invade the blood (relapse) several months or years later after infecting on mosquito bite (17).

P. malariae accounts only less than 1 % of cases and *P. ovale* is rarely reported. However, the relative frequency of this species varies place to place and from season to season. *P. falciparum* is responsible for most epidemics of malaria in Ethiopia (18).

Early detection and promote of treatment is the corner stone of primary health care (PHC) service to reduce the morbidity and mortality due to malaria.

Clinical diagnosis is widely used to identify and treat malaria in rural or remote areas lacking laboratory support and represents the only practical approach to patient care in many regions (18).

Malaria is the major public health problem and cause of suffer and premature death in tropical sub-Sahara countries. in many endemic area it is becoming increasingly difficult to control b/c of the resistance of the parasite to anti malaria drug and the Assessment of the clinical symptoms, particularly diagnosis of the presence of fever forms the basis of malaria diagnosis at the village level and also at the first referral level in many areas. However, it is very imprecise means of diagnosis and investigation conducted in tropical Africa. The reliable diagnosis of malaria whether in hospital or clinic patients become at the peripheral is prerequisite for selecting the correct treatment and consequently for reducing malaria morbidity and mortality (2).

The epidemiological profile and clinical patterns of severe malaria have been shown to vary according to the intensity of exposure in children living in rural areas of east Africa with different levels of transmission. This is demonstrated between rural and urban environment in Burkina faso. This study shows that in rural zones by at least 20 fold mean increase in the level of malaria transmission.

This discretion of prevalence and the prognosis significance of various sign and symptoms of sever malaria in different epidemiological setting of Burkina Faso should also contribute to the management of malaria (3, 11).

Malaria in Ethiopia ranks among the most important causes of mortality and morbidity. The disease is distributed in most parts of the country with varying degree of intensity from place to place depending on local epidemiological factors. It is the 2nd most important causes of outpatient morbidity, the first leading causes of hospitalization and most important causes of hospital death. it is endemic in many parts of Ethiopia and 75% of the total areas is estimated to be malarias and about 2/3 of the population of the county are at risk of infection. it is highly endemic in the low lands below 1500m above sea level and in temperate 1500-3000 its usually the local endemic and very

unstable with frequent out break resulting in high morbidity and mortality . The country has experienced the worst malarial epidemic in 1958 E.C with 3 million malaria cases and 150,000 deaths. The disease was still continued to be the major problem in the country (6).

The study done in Addis Ababa, the microscopic results showed that 10.9% of people examined were Plasmodium positive in the household surveys. Of those, 83.9% were caused by *P. vivax*, 15.0% were due to *P. falciparum*, and the rest 1.1% were mixed infections due to both *vivax* and *falciparum* malaria. Similarly, 24.5% of people were malaria infected among febrile cases visited health centers. Among them, 78.6% (n = 308) were *P. vivax*, 20.4% were *P. falciparum*, and the rest 1.0% were mixed infections due to both *vivax* and *falciparum malaria* , (19).

The study of malaria epidemiology in Humera a one year round blood film collection was carried out in 1996 on 22,000 febrile patient visiting Humera hospitals. The result showed the annual prevalence to be 42% the highest rate greater than 50% was in the months of August to November and the lowest rate less than 5% in the months of March and April (12).

There was a research which was done in relation to malaria outbreak in north central up lands in Autumn 1991 in Zeway the slide positivity rate for malaria varied from 42% to 46% of all febrile cases with a conservative 40% prevalence rate. the major vector control measures that is being 1997/98 supplied to affected community on cost recovery bases in four regions like Amhara, Oromia, Tigray and SNNP . All the human malaria parasites species are found in Ethiopia. However, *P. falciparum* and *P.vivax* are the dominant which accounts 60% and 40% respectively. *P. malaria* and *P. ovale* are rare accounting less than 1% of the case (4, 20).

Diagnostic and treatment services are delivered through the general health services and for malaria control laboratory currently an average of 4-5x 10⁵ cases are positive for malaria is treated annually. These are seen mainly in health institutions with microscopic diagnostic facilities. It is estimated that the actual number of cases seen at facilities with no microscopic diagnostic services and by

community health workers to be 3-4 times the number of case indicated above. In addition to it a significant number of people didn't have access to health services and among these who have access majority don't normally seek medical care. There for the actual number of malaria cases that occurs annually throughout the country is estimated to be 4-5 million. Thus the magnitude of the problem is high and it requires an enormous amount of resources (3, 11)

Jimma zone is one of the 18 zones of Oromia. Jimma Zone is divided into 17 districts and Town administration hosting a total population of over 2.5 million according to the 2007 census. The Zone has 1 district (Limu) Hospital, 20 Health Centers, 62 Clinics and 202 Health posts.

A study conducted in Agaro Health Center for one year in 1992 revealed that total 3.65% malaria cases from clinically suspected patients (20). A similar study conducted in butajira south weast Ethiopia a total of 19,207 persons were examined in the six surveys. From those tested, 178 slides were positive for malaria, of which 154 (86.5%) were positive for *Plasmodium vivax* and 22 (12.4%) for *P. falciparum*; the remaining two (1.1%) showed mixed infections of *P. falciparum* and *P. vivax* (21).

A total of 55,833 malaria suspected patients gave blood films for malaria diagnosis in Metema Hospital. Of these, 9486 (17%) study subjects were positive for malaria. The predominant Plasmodium species was *P. falciparum* 8602 (90.7%), followed by *P. vivax* 852 (9%), and mixed infections of *P. falciparum* and *P. vivax* 32 (0.3%).The age groups of 5–14 years old were highly affected by malaria infection 1375 (20.1%), followed by 15–29 years old with the slide positive rate of 3986 (18.5%)(22).

CHAPTER THREE

3. OBJECTIVES OF THE STUDY

3.1 General objective

- To determine the prevalence of malaria among outpatients visiting Jimma Shenen gibe hospital.

3.2 Specific Objectives

- To determine the prevalence of overall malaria parasite infection
- To determine the prevalence of *Plasmodium* species
- To determine the distribution of malaria parasite among different sex and age groups.

CHAPTER FOUR

4. MATERIALS AND METHODS

4.1 Study Period

The study was conducted from April 17 to May 02/2015 GC.

4.2 Study design

A cross-sectional study was conducted to determine the prevalence rate of malaria parasite among patients visited Jimma Shenen Gibe Hospital during the study period.

4.3 Study area

The study was conducted in Jimma Shenen Gibe Hospital. Jimma is one of the administrative towns in the Jimma zone, Oromia Region of Ethiopia. It is 352 Km far from Addis Ababa in south west part of Ethiopia. Based on figures published by the central statistical Agency in 2007, obtained at Jimma town health bureau; the town has an estimated total population of 144, 369 (15).

Based on the data obtained from Jimma administrative town health office, the town has 13 kebeles and 20,924 households, One specialized hospital, 3 health centers, 2 health posts, 2 NGO clinics and private clinics in the woreda. Jimma Shenen gibe hospital is 6km away from Jimma University and was established in 2004 EC (14). Jimma town have a temperature ranges 11.5-27.1° c & its annual rain fall is 1200-2000ml. Its altitude is about 1760m above the sea level.

4.4 Population

4.4.1 Source of population

All patients who visited Jimma Shenen gibe hospital during the study period

4.4.2 Study population

All malaria suspected patients who visited Jimma Shane gibe hospital laboratory department for blood film examination during data collection time.

4.5 Sample size and sampling technique

Sample size was determined by the following formula but a convenient sampling frame was used.

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

Where n=the total sample size

p=0.438(43.8%) -prevalence

z= Za/2=95%=1.96 confidence interval / the confidence limits of the survey result.

d= 5%=0.05 - the desired precision of the estimate /margin of error

N=144,369 N=total population

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

$$= \frac{(1.96)^2 \cdot 0.438(1-0.438)}{(0.05)^2} = 378$$

n= 378 the sample size.

4.6 Study variables

4.6.1 Dependent variables

- Prevalence of *Plasmodium* species

4.6.2 Independent variables

- Age
- sex
- Education status
- Occupation
- Religion
- Ethnicity

4.7 Data collection and examination technique

Before the data collection, all required questionnaires format were prepared, then socio-demographic data were collected using redesigned questionnaire by face to face interview.

Capillary blood sample from finger prick was taken after verbal communication. A drop of capillary blood was evenly spread on pre-labeled slides. Thin and thick blood films were air dried and stained for 10 minutes with Giemsa stain using standard procedure (17).

4.8 Materials

- **Microscope**
- **cotton**
- **Pencil**
- **Absolute ethanol**
- **Giemsa stain**
- **Glove**
- **Microscopic slide**
- **Lancet**

4.9 Data analysis and interpretation

Data analysis and interpretation of the results were done on collected data from each questionnaire and blood film examinations were tallied and grouped manually into dependent and independent variables. Percentage and rates were calculated using scientific calculator and the result was displayed by means of tables and figures.

4.10 Ethical consideration

Ethical issues were considered in all steps of research process. Permission letter to do the research was written from Jimma University, Department of Laboratory Sciences and Pathology. Then the purpose of the study was briefly explained to the patient. Patient result was given to the respective health personal for treatment.

CHAPTER FIVE

5. RESULTS

Out of the 324 blood film tested individuals, 37 (11.4%) harbored malaria parasites among them 9(2.8%) were positive for *P. falciparum* , 28 (8.6%) were positive for *P. vivax*, (Table 1) The age distribution shows adults 15-49 years seems more infected than other age group. The age adjusted parasites rate was 8.1%, 32.4%, 54.1% and 5.4% with respect to the age group (years) ≤4, 5-14, 15-49 and ≥50 respectively (Table2). The prevalence of malaria with respect to occupation showed students are more affected groups with positive rate of 14(4.3%) followed by farmers with 10(3.1) positive rate(table 5).

Malaria infection by *P. falciparum* was in 9(24.4%) malaria infected individuals and 28(75.6%) by *P. vivax*. The prevalence of malaria on study population, who used bed net is low which accounted (2.5%) from the total prevalence rate (11.4%).This may be due to the fact that the bed net can protect mosquito bite. There is no statically significantly association between usage of bed net and malaria (p>0.05).

In this study the majority (60.5%) of the study subjects were males and 6.5% of the males were positive and from the total 128 females and 16(4.9%) were positive (table1).

Table: 1 Distribution of malaria with respect to sex among study population at Jimma Shenen Gibe Hospital from April 17 to May 02, 2015 GC

Sex	Malaria		
	Positive No (%)	Negative No (%)	Total No (%)
Male	21(6.5%)	175(54%)	196(60.5%)
Female	16(4.9%)	112(34.6%)	128(39.5%)
Total	37(11.4%)	287(88.6%)	324(100%)

As shown in the table below the highest prevalence 6.2%was seen among 15-49 age group followed by the age group of 5-14 years and the least prevalence was seen among age group of children and elders which was 0.9% and 0.6% respectively.

The prevalence of *P. falciparum* and *P.vivax* were 24.3% and 75.7% respectively.

Table 2:-Age and sex distribution of malaria among study population at Jimma Shenen gibe Hospital from April 17 to May 02, 2015 GC

Age group in year	Total Examined		Positive cases in number			Total Positive %
	M	F	<i>P. falciparum</i>	<i>P.vivax</i>	Total	
≤4	49	31	1	2	3	8.1
5-14	56	58	3	9	12	32.4
15-49	84	36	5	15	20	54.1
≥50	7	3	0	2	2	5.4
Total	196	128	9	28	37	100

As indicated in the Table 3, among 215 urban residents, 23(7.1% were positive for malaria infection and among 109 rural, 14(4.3%) were positive for malaria infection.

Table 3:- Distribution of malaria parasite by place of residence among study population at Jimma Shenen Gibe Hospital from April 17 to May 02, 2015 GC

Sr. No	Residence of patients	Total number examined	percent of positive			Total positive %
			<i>P. falciparum</i>	<i>P. vivax</i>	Total	
1	Jimma town	215	4	19	23	7.1%
2	Outside the town	109	5	9	14	4.3%
3	Total	324	9	28	37	11.4%

From a total of 324 patients 114(35.2%) uses bed net from which 8(2.5%)were positive from malaria infection and from 210(64.8%)who don't use bed net 29(8.9%)were positive for malaria infection (Table 4).There was no statically significant association between the habit of using bed net and malaria infection ($p>0.05$).

Table 4: Distribution of malaria among ITN users and non-users among study population at Jimma Shenen Gibe Hospital from April 17 to May 02, 2015 GC

Sr. No	Habit of bed net usage	Positive number (%)				Malaria negative	Total examined	%	Chi-square
		P. f	P. v	Total	%	N ₀	N ₀	%	
1	ITN users	2	6	8	2.5	106	114	35.2	X ² =3.37 Df=1 P=0.066
2	Non-ITN users	7	22	29	8.9	181	210	64.8	
Total		9	28	37	11.4	287	324	100	

As it is shown on Table 5, among occupation of the study subjects, the prevalence of malaria was higher in students (4.32%) followed by framers (3.08%) and the least was in the others (0.3%)

Table 5: Distribution of malaria parasite by occupation at Jimma Shenen Gibe Hospital from April 17 to May 02, 2015 GC

Sr. No	Occupation	Total malaria positive				Total examined in number	Total examined in percent
		P. f	P. v	Total	%	N ₀	%
1	Student	3	11	14	4.3	110	33.9
2	Employer	2	5	7	2.2	61	18.8
3	House wife	1	3	4	1.2	39	12
4	Laborer	0	1	1	0.3	12	3.7
5	Farmer	2	8	10	3.1	96	29.6
6	Others	0	1	1	0.3	6	1.8
Total		8	29	37	11.4	324	100

CHAPTER SIX

6. DISCUSSTION

In this study the prevalence of malaria infection among the out patients was 11.4% which is slightly higher result with the study done in Addis Ababa, shows that 10.9% were found to be positive for malaria parasite (19).

It is higher when compared with the findings of a study done at Agaro Health Center for one year in 1992 revealed that total of 3.6% malaria cases from c clinically suspected patients (20). Furthermore the findings of the study done in Butajira southwest Ethiopia with prevalence of malaria infection was 0.93% among clinically suspected individuals (21). This shows lower prevalence than this study, this may be due to seasonal and geographical variation.

The prevalence obtained in this study was 37(11.4%) from which the most dominant species of *P.vivax* which was 28 (8.6%) followed by *P. falciparum* which was 9(2.8%). This variation may be due to the study conducted in dry season (non malarious season) and cases may be due to the relapsing of malaria which is characteristics of *P. vivax*.

Out of the 324 total study subjects 196 (60.5%) and 128(39.5%) were male and female respectively. Malaria is common on females due to lower immunity during pregnancy. The age of study population range from 1 years to 71years with the peak number between 15_49, which was 20 (6.2%), a lower prevalence compared to a study done in Butajira, south west Ethiopia with the prevalence rate of (17%) with the age group 4-15 were high in prevalence which accounts (20.1%). But this study showed that the young people (15_49) are at high risk of malaria (22).

Among population of the study subjects 215(66.4%) were residents of Jimma town from which 23(7.1%) were positive for malaria infection and 109 (33.6%) were out of Jimma town from which 14(4.3%) were positive for malaria infection .The study showed that the residents of Jimma town were more affected by malaria infection.

CHAPTER SEVEN

7. CONCLUTION AND RECOMMENDATION

7.1 CONCLUTION

In this study the prevalence of malaria was 11.4%. Prevalence of malaria was high among people who are not using bed net. This study showed that in this area *P.vivax* was the dominant *Plasmodium* species. The study also indicated that the age group 15-49 years were the most affected cases.

7.2 RECOMMENDATION

Developing of seasonality map for malaria transmission is required because in areas affected by epidemics correlated to abnormalities in seasonal rainfall and temperature, it will be great tool to control or minimize the disaster caused due to epidemics. In order to overcome misdiagnosis of malaria species, regular training of technicians should be given, and also quality of diagnostic service must be assured. Proper bed net utilization education must be promoted. Public health awareness on malaria prevention have to be given by health extension workers and other health professionals for the community.

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ANNEXES

Annex I

Test Procedures

Staining Procedure for Giemsa Stain:

1. Both thin and thick blood smears prepared on one slide
2. Allow both blood smears to dry
3. Place the smear on staining rack film side up
4. First fix thin blood smear with 2-3 drops of methanol and wait for 1-3 minutes
5. Cover the thick and thin blood smear with Giemsa staining solution
6. Wait for 10-15 minutes
7. Wash the stain with distilled water
8. Stand the glass slide on the thick blood smear
9. Examine the slide with oil immersion objectives

Annex II
Questionnaires

Jimma University

Department of medical laboratory Science and pathology

Questioner format prepared to study the prevalence of malaria in Jimma town Jimma Shenen gibe hospital outpatient laboratory examination.

Code No _____

Date _____

1. Name of the patient _____ Age ____ Sex _____

2. Address; Jimma town _____ outside town _____

3. Occupation:

- Student

- Employer

- House wife

- Laborer

-Others

4. Do you know way to malaria transmission? Yes no

5. If yes to Question No 4 can you tell me how it is transmitted?

1, _____

2, _____

3, _____

4, _____

6. Do you know way of malaria prevention method?

Yes No

7. If yes can you tell those methods of prevention?

1, _____

2, _____

3, _____

8. Do you have bed net? Yes No

9. Usage of anti malaria drug before giving samples

Yes No

10. If yes question No 10 which of the following drug?

Chloroquine

Coartum

Laboratory investigation

A. Blood film examination

Thick blood film_____

Thin blood film_____

Hemoparasite detected _____