

**ORIGINAL ARTICLE****PATTERN AND TRENDS OF MALARIA MORBIDITY OVER FIVE YEARS IN JIMMA ZONE, SOUTHWEST ETHIOPIA**

Lelisa Sena<sup>1</sup>, BSc, MPH, Wondimu Tesgera<sup>2</sup>, BSc, MPH

**ABSTRACT**

**BACKGROUND:** Malaria has been a major cause of morbidity and mortality in developing countries, including Ethiopia. Health facility records are major sources of data for planning, intervention and evaluation of health services and programs. The objective of this study was to assess trend and pattern of malaria based on health care facility records.

**METHODS:** retrospective record review was conducted from April to May 2007 on routinely collected data on malaria cases seen at out patient department of Jimma zone health care facilities from July 2001 to June 2006. Proportion and distribution of malaria cases by time and person were analysed using Microsoft Office Excel 2003.

**RESULTS:** Out of 11,689,789 cases seen in Outpatient Departments of the facilities, 288,643 (17%) of them were malaria. The number of malaria cases varied both seasonally and by year where the peak was seen to be in the month of September and lowest number of cases were seen from January to March, sharp increment number of malaria cases was seen from 2002/3 to 2003/4; 27,263 cases to 75,149 cases, respectively. The numbers of cases were lower in the years 2001/2 and 2002/3. A significant proportion, 87,539 (61.0%) of microscopically confirmed malaria cases were not documented by malaria species. Among the documented ones, 34203 (62.0%) were *Plasmodium Falciparum* and 21313 (38.0%) were *Plasmodium Vivax*.

**CONCLUSION:** Malaria constitutes large proportion of all cases with seasonal and yearly variations. Large proportion of malaria cases, were not documented by species. Thus, it is recommended that health care institutions should improve malaria cases by species for appropriate intervention. Awareness creation among community and health professionals regarding seasonal variation and secular trend of malaria is recommended as well.

**KEY WORDS:** Malaria, Trends, Jimma, Southwest Ethiopia.

**INTRODUCTION**

Malaria remains to be a major challenge to public health and socio-economic development worldwide and in sub-Saharan Africa in particular. Annually, 300-500 million malaria cases lead to over a million deaths, of which 90% occur in Sub-Saharan Africa (1, 2). In Ethiopia, 75 % of the country's land surface is malarious and 68% of the populations are at risk of malaria infection (3, 4). Thus, malaria is a public health concern and all age groups of the population are vulnerable, even if children under five years of age and pregnant women are generally considered to be at a higher risk (5). Malaria is a leading cause of outpatient consultations and deaths

in the country. Malaria stands first among the top causes of morbidity and mortality in all age groups contributing for 15.5% out-patient consultations in 2003/4 (6). In Oromia Region, about 65% of the population lives in malaria endemic areas (7). Malaria has been a major cause of morbidity and mortality in Oromia Region in general and in Jimma zone in particular occurring as epidemic during the months of September to December with peaks in October and November (8). Temperature is the most important factor in transmitting malaria in highland while rainfall and humidity determines the transmission of malaria in midland and lowland area (1, 9).

<sup>1</sup>Department of Epidemiology, Jimma University, Tel: 09862161(mobile); 0471123208 (Office)  
Email: lelisase@yahoo.com, P. O. Box: 816, Jimma, Ethiopia

<sup>2</sup>The Carter Center- Ethiopia, Tel.0471117623, Mobil: 09117868, E-mail: wonjimma@yahoo.com  
P.o.Box 1881, Jimma - Ethiopia

Despite the need for reliable information on the burden of the disease to evaluate the current interventions there exists a major information gap. To fill this gap, use of health facility records are important alternative sources of data to be considered (10). Thus, analysis of existing health service data on malaria can be used for planning prevention programs, evaluating the impact of interventions and for surveillances (trends and patterns) (5).

Therefore, this study was conducted to assess the pattern of malaria before the application of large scale insecticide treated bed net (ITNs) so that it lays a base for subsequent evaluation of the effectiveness of the intervention. The study also tried to quantify the burden of malaria by analyzing its trends by person, time and place.

## MATERIALS AND ETHODS

Record review based on the routinely collected data on malaria cases over five years (July, 2001 to June, 2006) was used to assess the pattern and trends of malaria at all health care facilities of Jimma zone, Oromia Regional State. Based on the Ethiopian central statistics Authority, the projected total population of Jimma zone for the study period was estimated to be 2.7 million persons with a equal ratio of male to female (11, 12). About 85% of the population reside in rural areas that had limited access to health care services.

From a total of 535 Kebeles in 18 woredas of Jimma zone, 319 (60 %) kebeles in 16 (88.9%) woredas were found to be partially or completely malarious, with about 61 % of the total population residing in these areas of which 179 (56 %) were recognized as areas under one round indoor residual spray operation (13). Almost all households in the 319 malarious Kebeles had received Long Lasting Impregnated Nets.

There were a district hospital, 20 health centers, 57 health stations, 117 health posts, 65 Rural drug venders and 7 governmental and 38 non governmental clinics in the zone, out of these one Hospital, 11 Health Centers, 50 Health Stations, 42 Health Posts and 4 other governmental clinics were included into the study; except the hospital the rest were randomly selected. The potential health service coverage of the zone was 85% for the year 2006/7 (13). Malaria was diagnosed either microscopically/Rapid Diagnostic Test (RDT) or by clinical signs and symptoms of the cases (6). All health care facilities especially hospitals and health centers record case using the coded of international classification of diseases (10).

Data were collected by malaria prevention and control experts who have a certificate/ diploma educational levels of training who were given four day training on health care facility malaria data collection methods. Data on sex, age and malaria species were abstracted from all outpatient consultation records in the health facilities of Jimma Zone during the five years period using a prepared format from May to April, 2007.

The completeness and consistence of the data were checked and the data were finally entered into Microsoft Offices excel and Proportion of cases relative to others cases seen at out patient departments of the health facilities as well proportion of plasmodium species among microscopically confirmed malaria cases to and distribution of malaria cases by time and person were analysed using Microsoft office excel 2003.

### Operational definitions:

- **Clinical malaria case:** it is any patient with fever or history of fever in the previous 24 hours who lives in malarious area or traveling history to malarious area during the last two weeks.
- **Microscopically confirmed malaria case:** it is any case positive for plasmodium species by light microscope or Rapid Diagnostic Test (RDT) of drop of blood taken from the patient.

## RESULTS

In the five year period considered by this study, a total of 1,689,789 cases were seen in Outpatient Departments (OPD) of the facilities, of these 288,643 (17%) were malaria cases (table 1).

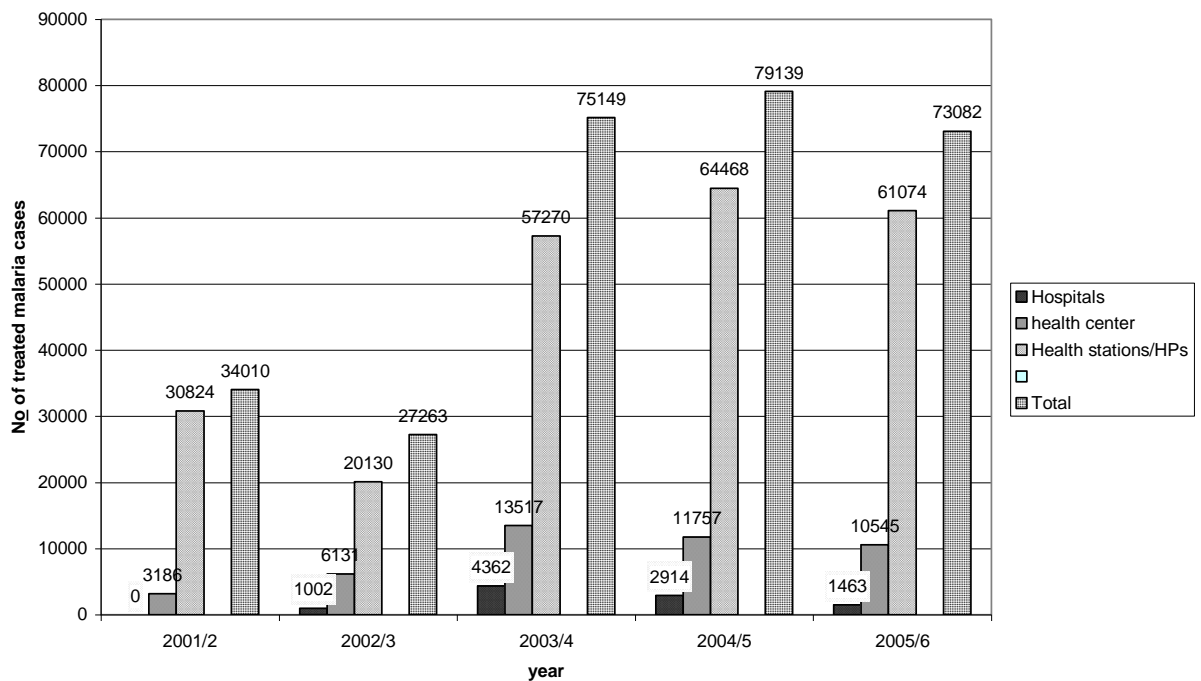
**Table 1.** All cases and Malaria specific outpatient cases treated at different health facilities in Jimma zone, Southwest Ethiopia, July, 2001- June, 2007.

year	Cases of malaria among all causes	Hospitals	health center	Health stations/HPs	Total
2001/2	% malaria	NA	4.6	15.6	12.8
	total malaria	NA	3186	30824	34010
	All causes	NA	68676	197072	265748
2002/3	% malaria	13.8	7	10	9.1
	total malaria	1002	6131	20130	27263
	All causes	7284	87743	202901	297928
2003/4	% malaria	13.3	11.5	25.9	20.2
	total malaria	4362	13517	57270	75149
	All causes	32615	117151	221100	370866
2004/5	% malaria	11	11.7	25.3	20.7
	total malaria	2914	11757	64468	79139
	All causes	26694	100792	254709	382195
2005/6	% malaria	7	9.5	25.3	19.6
	total malaria	1463	10545	61074	73082
	All causes	20773	110748	241531	373052
Total	% malaria	11.1	9.3	21	17
	total malaria	9741	45136	233766	288643
	All cases	87366	485110	1117313	1689789

NA\*Limmu hospital have started public service since January 2004.

From the total 288,643 cases of malaria diagnosed and treated at outpatient departments of different health facilities during the five years period,

233,766 (81 %) were seen at health stations and health posts (Fig1).

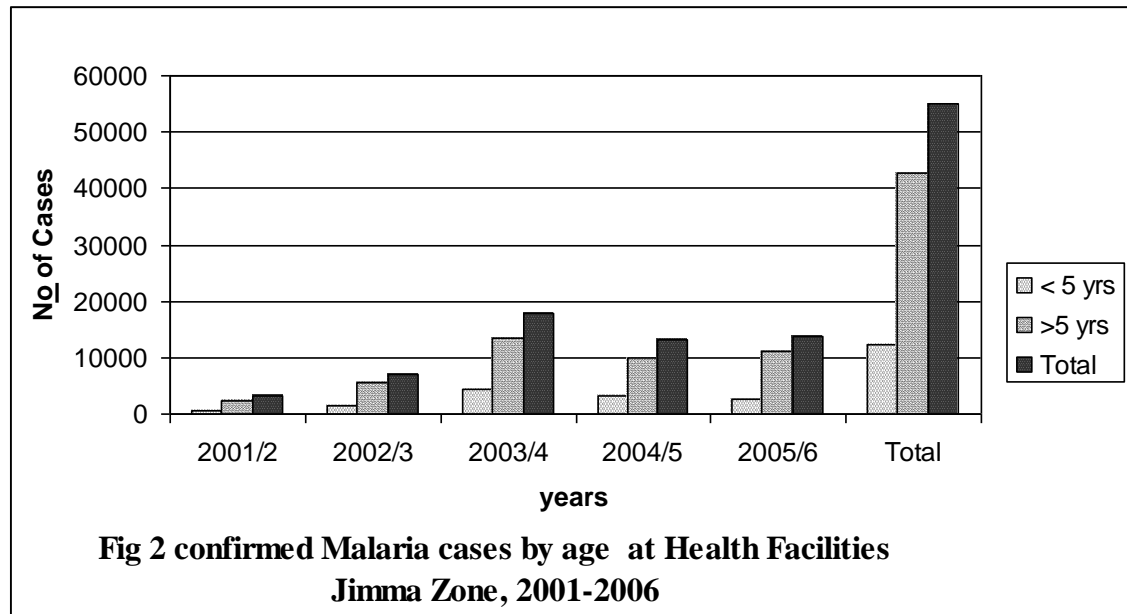


**Fig,1,Treated malaria cases at heat facilities,Jimma zone,2001-2006**

There was a sharp rise of malaria cases from 27,263 to 75,149 during the years 2002/3 to 2003/4 and still increment of cases 79,139 was continued in 2004/5 as well (Fig2). The increment proportion of malaria cases during the period was from 9.1% in 2002/3 to about 20.7 % in 2004/5 and then decreased to 19.6 % in 2005/6. The increment was for health centers and health stations / health posts, but decrement of number of malaria cases was

observed for hospital, from 13.8 % the year in 2003/4 to about 7 % in 2005/6.

Almost, children of less than five years and those above five years age groups were affected equally by malaria in the zone during the study period considered (Fig 2). Children under the age 5 years contributed 12349 (22.4 %) of the total confirmed malaria cases reported in the hospitals and health centers during the study period.



Regarding to the identified plasmodia species, Plasmodium falciparum and Plasmodium Vivax accounted for 62% and 38% of malaria morbidity, respectively. A significant proportion of malaria microscopically/TDR confirmed cases, 68,882

(60.5%) for health centers and 18, 657(65.7%) for hospitals, were not identified by species (Fig 3). **The number of confirmed malaria cases were increased from 2001/2 and showed a high increase in 2003/4 at health centers.**

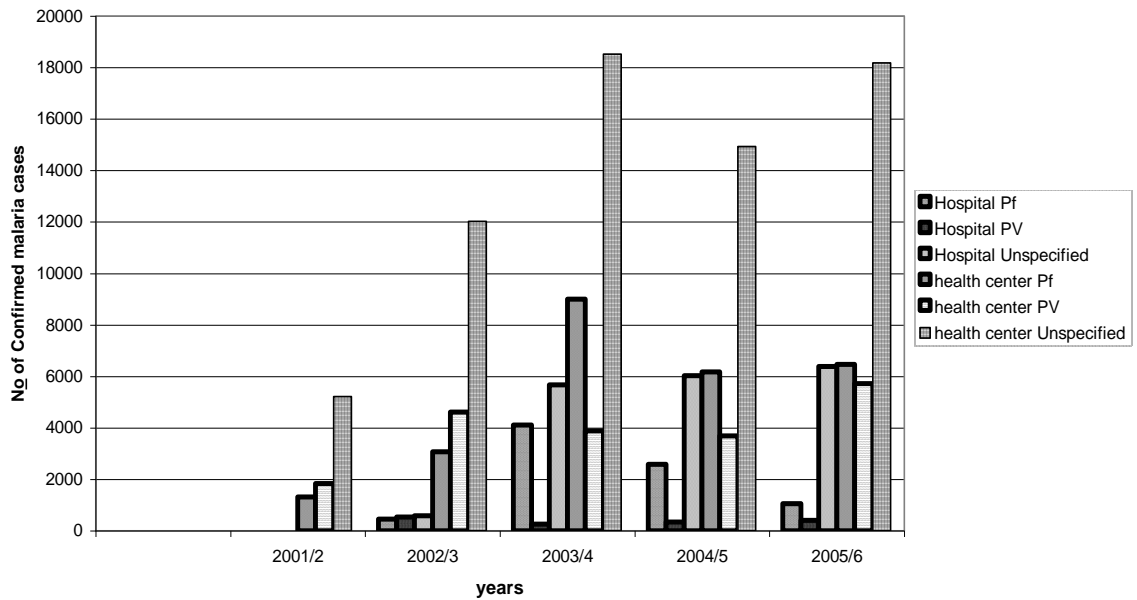


Fig.3. Confirmed malaria cases at Health center and Hospital, Jimma zone, 2001-2006

There has been an increase in the trend of clinical malaria cases over the five years (July, 2001-June, 2006) period. Substantial increment was observed

in September and October 2003 with a decline in March to August 2004 and a rise in August to October 2004 (Fig 4).

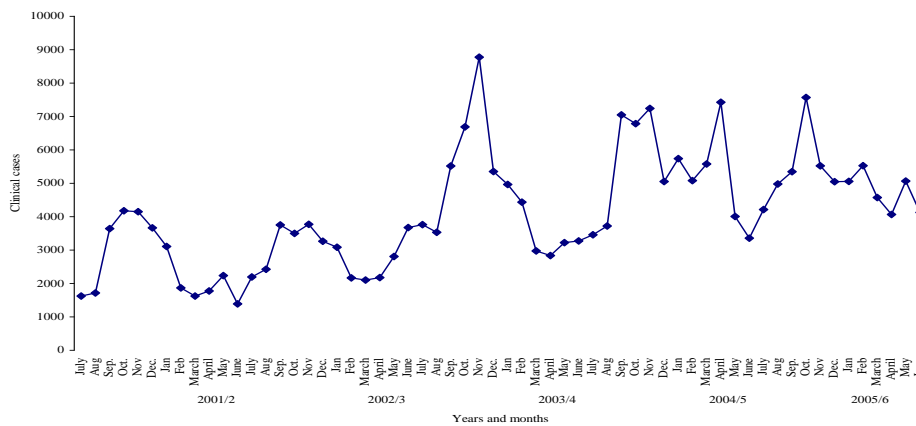
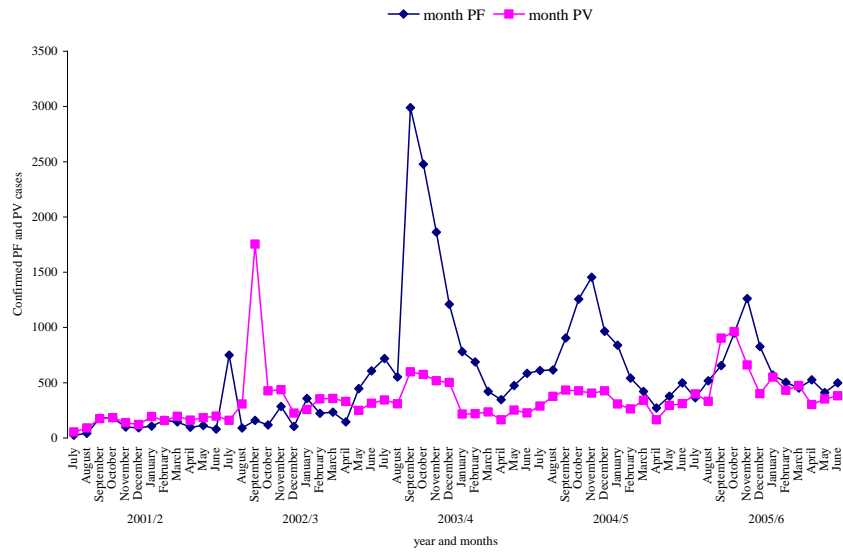


Fig 4. Trend of outpatients clinical malaria cases at health facility, Jimma zone, July, 2001-July, 2006

Overall seasonal variation was observed from year 2001-2006 with increasing cases during September to November. Highest number of *P. falciparum* cases was seen in July 2002 and during September

- November, 2003. Overall, 4 peaks of *P. falciparum* cases were seen during the studied five years while *P. vivax* peaked only twice (Fig. 5).



**Fig 5.** Trend of confirmed malaria species at health centers and hospitals , Jimma zone,2001-2006

## DISCUSSION

Malaria is the major public health problem in terms of morbidity and burden on health care facilities, accounting for the increasing percentage of outpatients' consultations in most health facilities in Oromia region (7). Increment in climatic changes in different parts of the world and population dynamics both globally and within a region have played major role to the precipitous upward trend in malaria cases observed in the recent years (2, 14). The present study revealed that burden of malaria was high in Jimma zone where the most deadly species, *Plasmodium Falciparum*, accounted for 62%. This is lower than reported in other study (15), still much lower the proportion reported from Eritrean survey on 177 sample villages in which the *plasmodium falciparum* proportion was 90% (16). But it is higher compared to a retrospective study done in Malaysia (17)

In highly endemic areas where there is a stable malaria transmission the disease mainly affects young children and pregnant women (18, 19). On the contrary, in malaria unstable areas with low to moderate endemicity, the disease affects all age groups of the population. Although broadly categorized, the result of this study is in line with other study elsewhere (7) showing that all age groups were equally affected with the disease during the study period. In such areas, severe epidemics occur with high incidence of morbidity and mortality in the non-immune populations (1, 6, 7, 20).

According to the National Malaria diagnosis and treatment guideline a significant number of malaria patients in the peripheral areas of Ethiopia are mainly diagnosed and treated based on the clinical finding /RDT but patients at hospitals and health centers should be diagnosed and treated based on microscopic finding (18, 21). However, the present study has indicated that the causes of malaria for most patients diagnosed and treated at hospitals (65%) and health centers (61%) were not specified by *plasmodium* species. This could be due to overburden of the laboratory technicians, carelessness or negative attitudes of the technicians, lack experience or even physician/other health workers reluctance in recording and reporting the specific type of *plasmodium* species. This might be lack of in-service training for laboratory workers at health facilities. Lack of accurate laboratory diagnosis of malaria can overestimated the disease (5) which can result at least in irrational treatment. Moreover; majority of the cases might have been treated at lower health facilities which are more accessible to the community before demanding

health center/hospital care where clinical diagnosis is used such in areas as there is no laboratory facility (1, 5, 17). This calls for the prompt treatment of malaria to terminate the progression of the disease from mild situation to severe complicated malaria and in rational drug utilization.

During the five years considered, there were 4 peaks of malaria for *plasmodium falciparum*, a peak every year from the month of September to November, yet the highest peak was in the year 2003 just following the decentralization of health system restructure; possibly due weak prevention and control efforts, as the malaria control team at zonal level was decentralized and the district health offices were not yet well strengthened. The *plasmodium vivax* showed only a peak in the year 2002 in the months of August to October, for unclear reason, and slight increment during September to October of 2005 was also seen.

In conclusion, this retrospective has indicated that the heavy burden caused by preventable and treatable malaria in the zone. The occurrence of malaria in the study was unstable as there was at least a peak of malaria per year seasonally. Majority of the laboratory/RDT results were not specific enough to guide case treatment with rational drugs. In this context, timely collecting, recording, reporting and analysis at local situation would play an essential role in improving the quality service and treatment of malaria in health care facilities. The use of the existing data is also important for monitoring and analysis the malaria trend at health care facility level and would prevent the occurrence of malaria epidemic. It is therefore, recommended that health centers and hospitals should improve the way of malaria species identification to ensure the prompt treatment of malaria with the right anti-malarial drugs. In addition, monitoring the health service practices is demanding for better patient outcome and for generating reliable and quality data that would help reflecting the magnitude of specific disease burdening of an area to rely on for health planning and programming.

The fact that we used secondary data and the exclusion of data from private health institutions could affect the quality and representativeness the study.

## ACKNOWLEDGEMENTS

We are very grateful to the Jimma Zonal and Woreda Health Office and Malaria Experts for their support in data collection. Our special thanks go to Oromia Regional Health Bureau, Malaria

Department for their support during training of data collectors.

## REFERENCES

1. World Health Organization. WHO expert committee on malaria 20<sup>th</sup> report. Technical report series No 892.
2. Deressa W, Ali A, Berhane Y. Review of the interplay between population dynamics and malaria transmission in Ethiopia. *Ethiop J Health Dev*, 2006; 20 (3):177-144.
3. World Health Organization. Guidelines for the Treatment of Malaria: 2006, Geneva.
4. Federal Democratic Republic Of Ethiopia Ministry Of Health Ethiopia National Malaria Indicator Survey, Addis Ababa, 2008.
5. Ministry of Health, 2nd edition, Malaria diagnosis and treatment guidelines for health workers in Ethiopia. Addis Ababa, 2004.
6. Dressa W, Chibsa S, Olana D. The distribution and magnitude of malaria in Oromia .*Ethiop. J .Health Dev*, 2004; 18(3): 164-170.
7. Dressa W, Olana D, Chibsa S. Treatment seeking of malaria patients in east Shewa of Oromia. *Ethiop J Health Dev*, 2003; 17(3): 9-15.
8. Gebreyesus TA, Deressa W, Witten KH, Getachew A, Soboxa T. Malaria. In: Berhane Y, Haile Mariam D, Kloos H (eds).*The ecology and epidemiology of health and disease in Ethiopia*. Third edition, 2004:556-576.
9. Tulu AN. Malaria. In:Kloos, H. and Zein ZA eds. *The ecology of health and disease in Ethiopia*. Second edition. Boulder. West view press, 1993: 341-352.
10. Ministry of Health. Health and health related indicators, planning and programming Department. Addis Ababa, Ethiopia, 2005/6.
11. Central Statistical Authority. The 1994 population and housing census results of Oromia, Ethiopia. Addis Ababa.
12. Central Statistical Authority. Ethiopia Demographic and health survey 2005, Addis Ababa, September, 2006.
13. Jimma Zonal health Department. Annual Report of Health activities for the year 2006/7, unpublished report, 2007.
14. World Health organization .A global strategy for malaria control Geneva, Switzerland ,2000
15. Yeshiwondim A, Gopal S, Hailemariam A, et al. Spatial analysis of malaria incidence at the village level in areas with unstable transmission in Ethiopia; 2009. licensee BioMed Central Ltd source: <http://www.ij-healthgeographics.com/content/8/1/5>: (viewed 5 May, 09).
16. Sintasath D. Activity report 134: National malaria survey (2000-2001) The state of Ministry of Health of Eritrea, 2004.
17. Jamaiah I, Rohela M, Nissapatorn V, et al. Malaria: A 10-Year (1994-2003) Retrospective Study at University Malaya Medical Center (UMMC), Kuala Lumpur, Malaysia. *Southeastern Asia J Trop Med Public health* 2005; 36 (suppl. 4): pp.
18. Federal Ministry of Health. Ethiopian National Malaria Indicator Survey, 2007, Addis Ababa.
19. Ministry of Health. National Five year strategic plan for Malaria prevention and control in Ethiopia 2006-2010 .Addis Ababa, April 2006.
20. Lidsay SW, Martens WJM. Malaria in the Africans highlands: Past, present and future. *Bull WHO*, 1998; 90:573-588.
21. Ministry of Health. Guidelines for the prevention and control of selected epidemic diseases in Ethiopia, Addis Ababa, August, 2002.