

# Prevalence of Malaria in Different PHCS of Adilabad District, Telangana, India

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**Abstract:** *In India malaria is complex because of vast tracts of forest with tribal settlement. The present study reveals the prevalence of malaria in different PHCs of Adilabad district Telangana from 2009 to 2014. PHCs are Jainoor, Sirpur(U) and Lonvelly. The results were obtained through cross-sectional record based study. The plasmodium falciparum and plasmodium vivax infection was identified individually by ONE STEP Malaria Anti - P.f./P.v. Test and infection was confirmed by examining blood smear microscopically. The malaria cases were recorded for all the Three PHCs, In the year 2009, out of total 159 cases 125 cases were P.F. and 34 were P.V; in the year 2010 out of total 147 cases 121 cases were P.F. and 26 were P.V ; in the year 2011 out of total 231 cases 187 cases were P.F. cases and 44 were P.V; in the year 2012 out of total 118 cases 71 cases were P.F. cases and 47 were P.V; in the year 2013 out of total 234 cases 160 cases were P.F. and 74 were P.V ; in the year 2014 out of total 261 cases 228 cases were P.F. cases and 33 were P.V. Some epidemiological parameters were calculated to support the data. The ABER was observed to be high in Jainoor PHC. Other parameters like API, SFR and SPR were calculated and found that Lonvelly PHC has shown highest values compared to the rest of PHCs. It was observed that API was high during the year 2009 to 2011, but decreased in 2012 and again increased in 2013 and 2014. Finally it is concluded that falciparum cases recorded were three times more than the vivax cases. Thus according to our study, P.falciparum malaria was more prevalent than P.vivax malaria in PHCs of Adilabad district.*

**Keywords:** Epidemiological Investigation, Plasmodium falciparum, plasmodium vivax, Malaria incidence, ABER, API, SFR, SPR, Primary Health Center (PHC).

## 1. Introduction

Malaria is a major public health problem in India and its transmission dynamics differ from place to place. (Pattanayak s, Sharma VP et al 1994) It is one of the biggest killers in the world. It causes about 400-900 million cases of fever and approximately one to three million deaths annually. (Bremar, 2001) It remains a life-threatening disease in India causing significant mortality and morbidity despite concerted efforts to control it. Malaria is transmitted to the people through the bite of infected female *Anopheles* mosquitoes caused by the Plasmodium parasites. According to the World Malaria Report 2014, 22% of India's population live in high transmission (> 1 case per 1000 population) areas, 67% live in low transmission (0-1 cases per 1000 population) areas and 11% live in malaria-free (0 cases) areas.(World Malaria Report, 2014). The biggest burden of malaria in India is borne by the most backward, poor and remote parts of the country, with >90-95% cases reported from rural areas and <5-10% from urban areas. The majority of malaria cases and deaths in India are being reported from Odisha, the seven North Eastern States, Jharkhand, Chhattisgarh, Madhya Pradesh Rajasthan, West Bengal, Karnataka and Telangana.

The risk factors leading to complete reconciliation of cause and effect relationships of malaria were identified in India by GIS based studies (Srivastava et al., 1999 & 2003). Persistent malaria is the characteristic feature in most forest areas and both Plasmodium vivax and Plasmodium falciparum are prevalent in forest areas of Madhya Pradesh (Singh and Khare, 1999). Hema Joshi (2003) reported the existence of genetic diversity among the field isolates of P. falciparum and P. vivax in India. A hospital based study on assessment of knowledge about malaria among patients

indicated that the knowledge about malaria is poor in persons living in urban localities reported with fever (Matta et al., 2004). Control of malaria is also possible by educating the community to take measures for the non-prevalence of disease (Sharma et al., 2000). On a global scale, malaria has been a major public health concern.

Malaria is the most prominent and problematic of all vector borne communicable diseases of Adilabad district Telangana. Incidence of malaria has been observed very high in, Adilabad, and Khammam. Three paradigm of malaria are observed in the state i.e., tribal, rural and urban. Hence, the present study was focused on study of malaria incidence in selected PHCs of Adilabad district, Telangana, India.

## 2. Materials and Methods

### Study Area

In the present study, three PHCs of Adilabad district are selected because these PHCs are occupied by tribal and rural people and to get awareness of some communicable diseases. In the present study Jainoor , Sirpur (U) and Lonvelly were selected and the prevalence of malaria cases was studied for 6 successive years from 2009 to 2014. The data was obtained through cross- sectional record based study. Adilabad district is approximately populated with 2,741,239 people, out of which 760,259(27.73%) were of urban and 1,980,980(72.27) were of rural. This district is occupied with 44.8 forest range. The annual rainfall is 1044.5 mm as per 2011 data.

### Study Period

The data regarding malaria cases from 2009 to 2014 was collected from the Malaria Department of Adilabad district. The no. of cases of *Plasmodium falciparum* and *P. vivax* infection was identified in three PHCs by ONE STEP Malaria Anti - P. f. / P. v. Test and infection was confirmed by examining the blood smear microscopically. To support the data, other epidemiological parameters like Annual Blood Examination Rate (ABER), Annual Parasite Incidence (API), Annual Falciparum Incidence (AFI), Blood slide Positive Rate (SPR) and Slide Falciparum Rate (SFR) were also represented.

### Annual Blood Examination Rate (ABER)

It is the proportion of blood slides examined for malaria in a human population in a year. ABER is calculated using the formula given below:

$$ABER = \frac{\text{No of blood slides examined in year}}{\text{Total population surveyed}} \times 100$$

### Annual Parasites Incidence (API)

It is expressed as the number of malaria positive cases in a particular year for a particular place per thousand population.

$$API = \frac{\text{Total no of malaria positive cases in a year}}{\text{Population of the area}} \times 1000$$

### Slide Positive Rate (SPR)

It is expressed as the proportion of positive slides out of those examined for malaria.

$$SPR = \frac{\text{Total no of positive cases detected}}{\text{Total no of blood smears Examined}} \times 100$$

### Slide Falciparum Rate (SFR)

It is the proportion of slides showing *P. falciparum* infection out of the total slides examined for malaria. No. of *P. f.* slides.

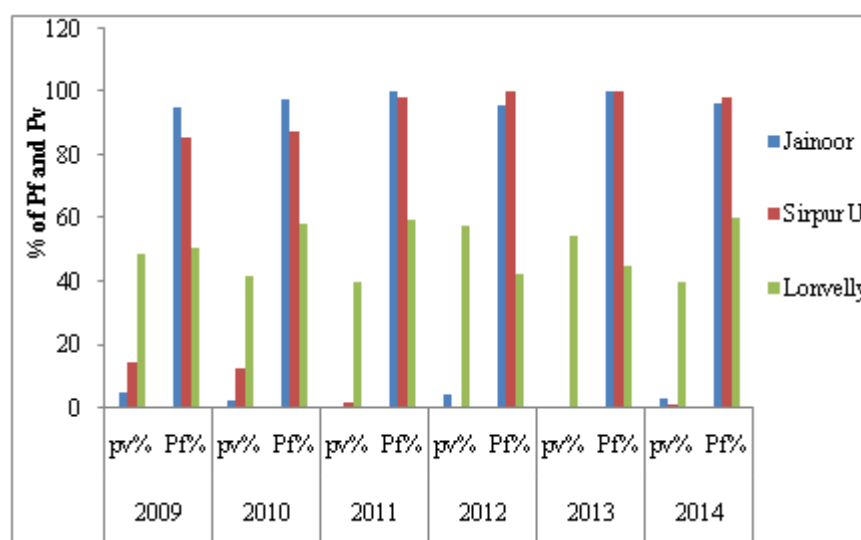
$$SFR = \frac{\text{No. of P.F. Slides}}{\text{Total Slides Examined}} \times 100$$

## 3. Results and Discussion

The malaria cases were recorded in all the three PHCs. In the year 2009, out of 159 cases, 125 were *P. falciparum* and 34 were *P. vivax* cases. In the year 2010, out of total 147 cases, 121 were *P. f.* and 26 were *P. v.* cases. In the year 2011, out of 231 cases, 187 were *P. f.* and 44 were *P. v.* cases. In the year 2012, out of 118 cases 71 were *P. f.* and 47 were *P. v.* In the year 2013, out of 234 cases, 160 were *P. f.* and 74 were *P. v.* cases. In the year 2014, out of 261 cases, 228 were *P. f.* and 31 were *P. v.* cases. The highest percentage with regard to *P. f.* cases is found in Jainoor from 2009-2014.

**Table 1:** Prevalence of Malaria in Adilabad from 2009 to 2014

Name of the PHC	JAINOOR						SIRPUR (U)						LONVELLY					
	No. Positive Cases			Percentage (%)			No. Positive Cases			Percentage (%)			No. Positive Cases			Percentage (%)		
	<i>P. v.</i>	<i>P. f.</i>	Total	<i>P. v.</i>	<i>P. f.</i>		<i>P. v.</i>	<i>P. f.</i>	Total	<i>P. v.</i>	<i>P. f.</i>		<i>P. v.</i>	<i>P. f.</i>	Total	<i>P. v.</i>	<i>P. f.</i>	
2009	4	79	83	5	95		3	18	21	14	86		27	28	55	49	51	
2010	2	82	84	2	98		1	7	8	12	88		23	32	55	42	58	
2011	0	69	69	0	100		1	54	55	2	98		43	64	107	40	60	
2012	1	24	24	4	96		0	14	14	0	100		46	34	80	57	43	
2013	0	31	31	0	100		0	68	68	0	100		74	61	135	55	45	
2014	4	111	115	3	97		1	75	76	1	99		28	42	70	40	60	



**Figure 1:** Malaria situation in three PHCs of Adilabad District during the year 2009 to 2014

The *falciparum* cases found to be more in 2014 when compared to the previous years. But the *p. vivax* cases were declining. It was also observed that incidence of malaria was

high during the year 2009, 2010, 2011 but decreased in 2012 and increased in 2013 and 2014. It was also noticed that *falciparum* cases were recorded three times more than the

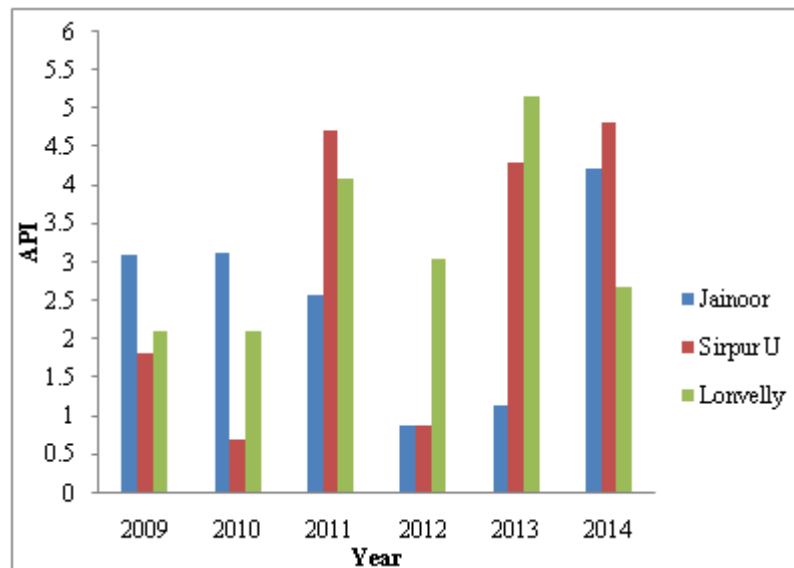
*vivax* cases. Thus according to our study *P.falciparum* malaria was more prevalent than *P.vivax* malaria in three PHCs of Adilabad district.

Thus the P.f. cases are increasing which Conveys that P.f. parasite is becoming a drug resistance in Adilabad district population. Thus there is an urgent need to study the molecular basis for multidrug resistant *falciparum* malaria. The Annual Blood Examination Rate (ABER) was observed

high in Jainoor followed by Sirpur(U) and Lonvelly PHCs from 2009-2014. Other parameters like Annual Parasite Incidence (API), in the year 2009 and 2010 high in Jainoor followed by Lonvelly and Sirpur(U), in the year 2011 high in Sirpur (U) followed by Lonvelly and jainoor, in the year 2012 and 2013 Lonvelly Sirpur (U) followed by and Jainoor, in the year 2014 high in Sirpur(U) followed by Jainoor and Lonvelly.

**Table 2:** PHC Wise Malaria Parasite Incidence In Adilabad From 2009 To 2014

Name of the PHC	JAINOOR				SIRPUR (U)				LONVELLY			
YEAR	ABER	API	SPR	SFR	ABER	API	SPR	SFR	ABER	API	SPR	SFR
2009	27	3.1	1.16	1.16	31	1.81	0.57	0.5	15	2.1	1.40	0.7
2010	32	3.13	0.96	0.94	20	0.69	0.35	0.30	12	2.1	1.70	0.99
2011	49	2.57	0.53	0.53	31	4.73	1.51	1.48	15	4.09	2.66	1.59
2012	61	0.88	0.15	0.14	23	0.89	0.38	0.38	13	3.06	2.33	0.99
2013	49	1.14	0.11	0.24	21	4.31	0.43	2.02	19	5.17	0.52	1.22
2014	80	4.23	0.53	0.51	48	4.82	1.01	1	16	2.68	1.45	0.87



**Figure 2:** PHC wise Malaria Parasite incidence in Adilabad district during the year 2009 to 2014

The present study revealed that *P.falciparum* cases are gradually increasing over the time and also the P.f cases were three times higher than p.v cases. This situation correlates with the findings of NVBDCP, presently screening about 10% of fever cases of the population annually of which about 1.5 to 2.0 million are positive for malaria parasite and around 45-50% of these cases are due to *p.falciparum* (Daslipet et al., 2008) but in the study 75-80% of cases are due to *P.falciparum*.

It is noticed that *P.falciparum* is more deadly from among other plasmodium species through the annual Parasite Incidence (API) as come down in the country it varies from one state to other another. According to Jayadev and Viveka vardhani (2013), the high incidence of malarial cases was reported in August, September, October, November and December 2008 and in January 2009 during the survey period. Month wise analysis of reported cases showed that the disease prevalence reached peak in September 2008 and started decreasing from September in males during the one year study. In the present study malaria prevalence is more

especially *P.falciparum* which is due to lack of awareness and preventive measures because most of the people belong to the tribal areas. Similar studies made by peer researchers which correlate with present study. Mehrunnisa et al., (2002) also found higher transmission of *P. vivax* than *P. falciparum* in OPD (Out Patients Department) of Jawaharlal Medical College, Aligarh during 1998 & 1999. The report of Director of health (2010) ([http://www.google.co.in/search/Health Medical & Family Welfare department/dhreport on malaria, rural, tribal and urban in Tel.angana. also stated that urban areas are generally seasonal and low-grade malaria transmission areas. The predominant P. vivax transmission is common in some urban areas with few pockets of P. falciparum but in rural or agency villages the P. falciparum is predominant transmission according to our study. Barua Madhumita et al.\(2009\) described P. vivax and P. falciparum as common.](http://www.google.co.in/search/Health+Medical+&+Family+Welfare+department/dhreport+on+malaria,+rural,+tribal+and+urban+in+Tel.angana.+also+stated+that+urban+areas+are+generally+seasonal+and+low-grade+malaria+transmission+areas.+The+predominant+P.+vivax+transmission+is+common+in+some+urban+areas+with+few+pockets+of+P.+falciparum+but+in+rural+or+agency+villages+the+P.+falciparum+is+predominant+transmission+according+to+our+study.+Barua+Madhumita+et+al.(2009)+described+P.+vivax+and+P.+falciparum+as+common.))

#### 4. Acknowledgement

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