# **Original Research Article**

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# Ten years trend analysis of malaria cases at rural health and training centre Mandur, Goa

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## **ABSTRACT**

**Background:** Malaria is a complex disease that varies widely in epidemiology in different parts of the world. Through its strategic action plan for malaria control (2007-2012) and its updated national drug policy on malaria India has put a strong pillar to address malaria prevention and control. The purpose of the study is to evaluate the hospital-based proportion of fever cases being diagnosed as malaria and determine its trend.

**Methods:** A retrospective record-based study was carried out at rural and health training centre at Mandur. All suspected fever cases were reported to the centre sent for peripheral blood examination.

**Results:** A total of 6073 patients who had clinical history suggestive of malaria were examined for malaria parasites. Out of 6073 slides examined, 187 slides were positive for malarial parasites. Out of 187, 136 (72.7%) were *Plasmodium vivax*, 40 (21.3%) were *Plasmodium falciparum* and 13 (16.9%) were mixed infections. Of the 187 patients positive for malaria 155 (82.9%) were males and 32 (17.1%) were females. Maximum number of malaria cases i.e., 63 (33.7%) were in the age group 21 to 30 years. Out of 187 cases, maximum number of cases were reported during a period of 5 months (July to November), very minimum (10) microscopically confirmed malaria cases reported in 2014. Maximum (36) no microscopically confirmed malaria cases were found in 2013.

**Conclusions:** In the studied area *Plasmodium vivax* is the most common type and it was more in males than females, most affected age group was between 21-30 years.

Keywords: Epidemiological trend, Malaria, Rural area

# INTRODUCTION

Malaria is a life-threatening disease caused by parasites that are transmitted to people through the bites of infected mosquitoes. Approximately half of the world's population is at risk of malaria. It is a common and life-threatening disease in many tropical and sub-tropical countries. Malaria, one of the highly prevalent infectious diseases, accounted for about 216 million new cases and 0.45 million deaths in 2016, globally. In India about 95% of population resides in malaria endemic areas and 80% of malaria reported in the country is residing in tribal, hilly, difficult and inaccessible areas. Government of India has

launched National Vector Borne Disease Control Programme (NVBDCP) in 2002 to control the disease. Since then India has demonstrated significant achievement in malaria control with a progressive decline in total cases and death. Overall malaria cases have consistently decline from 2.09 million in 2001 to 0.84 million in 2017.<sup>2</sup> Goa state also has shown a decline of malaria cases from 12,331 cases in 2001 to 653 cases in 2017.<sup>3</sup>

In 2016, India accounted for 6% of the global malaria burden and 90% of the malaria cases in the World Health Organization (WHO) South East Asia region. Although, *Plasmodium falciparum* (*P. falciparum*) is the most

prevalent malaria parasite globally (about 95% cases), *Plasmodium vivax* (*P. vivax*) predominates in Asian region. In the year 2016, about 85% of estimated *P. vivax* cases were reported from five countries- namely India, Afghanistan, Ethiopia, Indonesia and Pakistan.<sup>4</sup> India is one of the major contributors to malarial morbidity and mortality to the world report 2017. In India, 60-65% of the malaria infections are reported due to *P. falciparum*, while 30-35% due to *P. vivax*.<sup>2</sup> India is one of the major contributors to malarial morbidity and mortality in the world. Malaria has been a serious problem in some parts of India due to the slow progress in its control.<sup>5</sup>

The increased construction activities happening, all round the year serve as a major reason for malaria cases. These construction sites offer favorable breeding ground for mosquitoes mainly because poor living conditions and unhygienic practices among migrant laborers working there. And there is a chance of introduction of malaria parasite in migrant workers coming from malaria endemic states. Thus, government of Goa under NVBDCP conducts several anti-malarial activities to compact this situation under control. NVBDCP is implemented through the primary health care system with the assistance of multipurpose workers at the grass roots level. In inaccessible areas, drug distribution centres (DDCs) and fever treatment depots (FTDs) are provided at the community level.<sup>6</sup> Anti-malaria activities being performed by the programme include- early detection and prompt treatment (EDPT) of cases. Integrated vector control measures, behaviour change communication strategies, capacity building and enforcement of provisions of Public Health Act. As a result of this stringent activities Goa state was able to reduce its malaria burden under control.

Malaria burden estimates at national and sub-national levels are vital not only to evaluate for priority setting and resource allocation but also to understand the programmatic achievements during disease elimination process.<sup>6</sup> Decline of malaria morbidity and mortality reflects tangible success in the control of the disease. Hence the present study was conducted to determine the proportion of fever cases being diagnosed as malaria and

to determine the epidemiological trend of malaria cases to measure progress towards malaria elimination.

The objective of the study was to determine the trends of malaria cases at rural health and training centre (RHTC), Mandur, Goa.

## **METHODS**

A retrospective record-based study was conducted to evaluate the prevalence of malaria cases in the RHTC, Mandur a field practice area under Department of Community Medicine, Goa Medical College. Study conducted during 10 year period starting from January 2008 to December 2017. All patients with fever and other symptoms suggestive of malaria infection (like chills and headache) who attended RHTC Hospital out-patient department (OPD) during the period the study period and underwent blood smear examination for malarial parasite included for evaluation. The slides were examined under the high power microscope for the identification of malarial parasites. Results were recorded as positive for *P*. falciparum, P. vivax and mixed infections. Ethical approval was taken from institution ethics committee. Data entered in excel sheets and analyzed using Statistical Package for the Social Sciences (SPSS) software.

#### **RESULTS**

A total of 6073 patients who had clinical history suggestive of malaria were examined for malaria parasites. Out of 6073 slides examined, 187 slides were positive for malarial parasites. Out of 187, 136 (72.7%) were *P. vivax*, 40 (21.3%) were *P. falciparum* and 13 (16.9%) were mixed infections. Of the 187 patients positive for malaria 155 (82.9%) were males and 32 (17.1%) were females. Maximum number of malaria cases i.e., 63 (33.7%) were in the age group 21 to 30 years (Figure 1). The slide positivity rate (SPR) and the slide falciparum rate (SFR) were 3.07% and 0.65% (Table 1). In the present study fluctuating trend was observed during study period. Out of 187 cases, maximum number of cases was reported during a period of 5 months (July to November) (Figure 2).

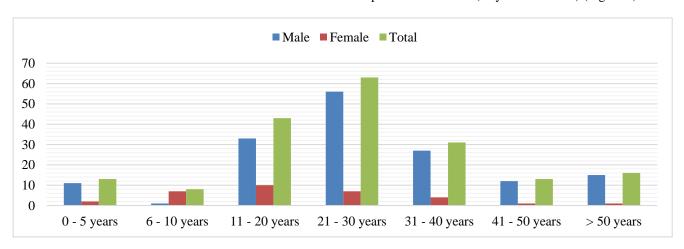


Figure 1: Age and gender-wise distribution of malaria cases.

Table 1.	Enidemiological	trends of n	alaria cases
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Year	Blood smears examined	Positive cases	P. falciparum	Slide positivity rate	Slide <i>falciparum</i> rate
2008	1068	12	6	1.12	0.56
2009	1174	20	7	1.7	0.60
2010	799	16	1	2.0	0.38
2011	538	15	3	2.79	1.12
2012	402	17	3	4.23	1.99
2013	467	36	1	7.71	0.21
2014	419	10	2	2.39	0.48
2015	350	30	8	8.57	2.28
2016	450	15	4	3.33	1.11
2017	856	16	4	1.87	0.58

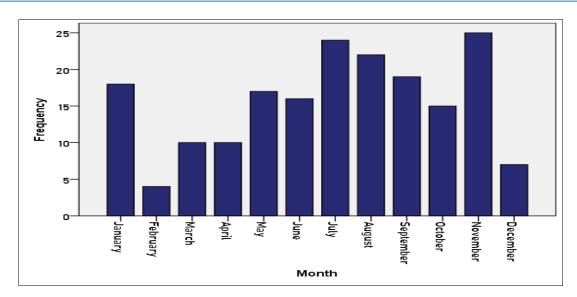


Figure 2: Month-wise distribution of malaria cases from January 2008 to December 2017.

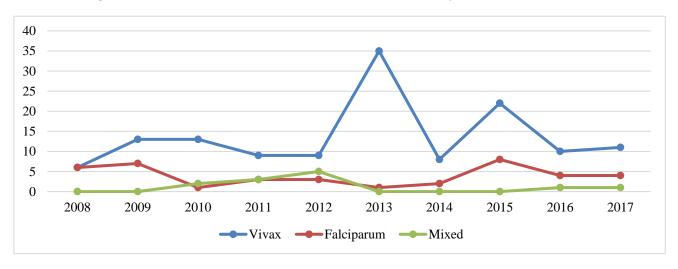


Figure 3: Year-wise distribution of malaria cases.

Malaria cases were decreases in number from year 2010-2012 and very minimum (10) microscopically confirmed malaria cases reported in 2014. Maximum (36) no microscopically confirmed malaria cases were found in 2013 (Figure 3).

# **DISCUSSION**

Malaria transmission occurs in Goa throughout the year. A total of 6073 patients were suspected for malaria and laboratory investigations done for malaria diagnosis in

rural health and training centre. Out of total patients suspected of malaria 187 (3.07%) were confirmed microscopically. In the present study distribution of malaria cases according to gender there were more in male i.e. 155 (82.9%) and 32 (17.1%) were females. In this study males are more exposed to the risk of acquiring malaria because of the outdoor life they lead. In a study conducted by Kumar et al reported A majority of cases were male (71.4%).7 Maximum number of malaria cases i.e. 63 (33.7%) were in the age group 21 to 30 years. in contrast, study done by Kumar in Rajasthan they (71.4%) malaria cases in 15-44 age group.<sup>6</sup> The present difference may be due to difference in area. Another study done by Alemu et al reported similar finding.<sup>8</sup> In the present study percentage of malaria cases up to the age of 5 years were 6% but the study conducted by Balpanade et al reported 14.9% of malaria cases in under five years of age, the present difference may be due to our study was done in nonendemic area.<sup>5,9</sup>

Out of 187 slide positive patients 136 (72.7%) were *P. vivax* cases and 40 (21.3%) cases were *P. falciparum* and 13 (6.9%) were mixed infection. Similar findings also reported in the study by Balpande et al wherein they found *P. vivax* was the predominant species in the study area and accounted for 95% of malaria morbidity. While in the study conducted by Jamaiah et al they found *P. falciparum* was the most common species (57%) reported in their study followed by *P. vivax* (38%) and (5%) mixed infection. In the present study fluctuating trend was observed during study period (2007-2017). Malaria cases have been decreasing in number from year 2010-2012 and very less number of cases reported in 2014. Higher number of cases were found in 2013.

In the year 2008 out of 1068 slides examined 12 slides came positive for malarial parasite with SPR of 1.12 and SFR of 0.56. In the year 2017, 856 slides examined and 16 slides showed malarial parasite, with SFR of 0.58. Maximum slide positivity noted in 2012. Increased construction activities happened during this period might be reason for this peak of cases.

# **CONCLUSION**

The trends in malaria cases in the study area for the past 2 years are gradually declining indicating that it is progressing towards malaria control and with sustained efforts malaria can be reduced substantially and elimination can be achieved by 2030.

# Limitation of the study

As study conducted in a rural population results may not correlate with entire states' prevalence pattern and sociodemographic distribution.

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Ethical approval: The study was approved by the

Institutional Ethics Committee

#### REFERENCES

- 1. Panda B, Mohapatra MK, Paital S, Kumbhakar S, Dutta A, Kadam S, et al. Prevalence of afebrile malaria and development of risk-scores for gradation of villages: A study from a hot-spot in Odisha. PLoS One. 2019;14(9).
- Magnitude of the problem. National Vector Borne Disease Control Programme (NVBDCP). Available at: https://nvbdcp.gov.in/index4.php?lang=1&level=0&
- 3. Directorate of Health Services, Govt. of Goa. Available at: http://www.dhsgoa.gov.in/nvbdcp.htm. Accessed on 10 July 2020.

linkid=420&lid=3699. Accessed on 10 July 2020.

- 4. Lal AA, Rajvanshi H, Jayswar H, Das A, Bharti PK. Malaria elimination: Using past and present experience to make malaria-free India by 2030. J Vector Borne Dis. 2019;56(1):60-5.
- Kumar A, Valecha N, Jain T, Dash AP. Burden of Malaria in India: Retrospective and Prospective View [Internet]. Defining and Defeating the Intolerable Burden of Malaria III: Progress and Perspectives. Am Soc Trop Med Hygiene. 2007;77(6).
- 6. Kumar A, Chaturvedi HK, Mohanty AK, Sharma SK, Malhotra MS, Pandey A. Surveillance based estimation of burden of malaria in India, 2015-2016. Malar J. 2020;19(1):156.
- 7. Kumar A, Valecha N, Jain T, Dash AP. Burden of Malaria in India: Retrospective and Prospective View. Defining and Defeating the Intolerable Burden of Malaria III: Progress and Perspectives. Am Soc Trop Med Hygiene. 2007;77(6).
- 8. Alemu A, Muluye D, Mihret M, Adugna M, Gebeyaw M. Ten year trend analysis of malaria prevalence in Kola Diba, North Gondar, Northwest Ethiopia. Parasit Vectors. 2012;5:173.
- 9. Balpande L, Gupta SK, Agarwal SS. Epidemiological trends of malaria cases in rural health and training centre of Madhya Pradesh. 2014;5(2):4.
- Ibrahim J, Rohela M, Nissapatorn V, Azlan H, Adli A, Rizan I, et al. A retrospective prevalence study of malaria in an aborigine hospital in Gombak, Selangor, Malaysia. Southeast Asian J Trop Med Public Health. 2006;37(3):1-4.

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