

Burden of Malaria in Dumka District of Jharkhand, India

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ABSTRACT

Malaria is a major public health problem in India particularly in states having tribal population. Jharkhand state consisted 7% of total malaria cases in India. The objective of this analysis was to find out the burden of malaria in Dumka District, Jharkhand.

Method –It was conducted in 10 Blocks of District Dumka, Jharkhand. Convenience sampling technique was used in this study. Data analysis was done from the line-list of District Vector Borne Disease Control Office, Dumka from the year 2016-2020. This was a cross-sectional study.

Result – Gradual decline in number of malaria cases was observed during the study period. But a sharp decline in cases were seen in the year 2020 i.e. during Covid-19 pandemic. Male cases were more predominant. Majority of the affected population were tribal in origin. Maximum number of Malaria cases were observed in Blocks like Masalia, Gopikandar and Kathikund.

Conclusion- Our analysis showed annual reduction of Malaria cases. Thus, existing control programmes can further reduce Malaria burden in Dumka District. Consistent and vigilant surveillance is required.

Keywords - Malaria, *Plasmodium falciparum*, *Plasmodium vivax*, tribal malaria, Jharkhand, India

INTRODUCTION

Malaria is a mosquito-borne disease caused by Plasmodium group and a major health problem in India. It is most commonly spread by Anopheles mosquito

bite. The disease is widespread in Tropical areas which includes Africa, Asia and Latin America. In SEAR countries 61% cases are from India with 41% malaria deaths.¹ About 1.0 million malaria cases were reported in India in 2014.² Outside Africa, India is the main contributor to malaria and related morbidity and mortality in the South-East Asia. Hence, several attempts have been made to estimate malaria burden in India from time to time using secondary data.³ There are 539 million people in India who live in high transmission areas.¹ About 7% people originate from Jharkhand state (National Vector Borne Disease Control Programme of the Government of India) in 2014.⁴ In 2018, 228 million cases of malaria was found worldwide with 405,000 deaths.⁵ The disease rates have decreased from 2010 to 2014, on the other hand it has increased from 2015 to 2017 having 231 million cases.⁵ Malaria is one of the main causes of health hazard in Tribal areas of 9 states of central India and 16 states of eastern and north-eastern states [(NVBDCP) report, 2010-2014].¹ Jharkhand consists of forests and hilly areas which provide favourable conditions for mosquitoes to increase malaria burden in Jharkhand.

Malaria symptoms include fever, tiredness, headaches and vomiting.⁶ Diagnosis is done by microscopic examination of blood using blood films, or with antigen based rapid diagnostic tests.⁷ Polymerase chain reaction is used to detect

the parasite DNA but not commonly used for diagnosis.⁸

The parasite is introduced from female anopheles mosquito bite and through its saliva to person's blood. Plasmodium has five species that can infect humans.⁵ These are *P.falciparum*, *P.vivax*, *P.ovale*, *P.malariae* and *P.knowlesi*. *P.falciparum* and is responsible for most of the deaths. *P.knowlesi* is a rare cause disease in humans.⁹ Mostly children are affected, specially under 5 years with 67% death due to malaria worldwide in 2018.⁵ Among them, *Plasmodium falciparum* and *Plasmodium vivax* are the main factors for disease and mortality worldwide.¹⁰

Malaria is primarily confined to the poorest tropical areas with presence of various malaria parasites and vector species. Climatic diversity favouring growth and proliferation of the parasite and vector as well as a highly susceptible human population have resulted in high malaria transmission in tribal areas.¹¹ As estimated 40 ethnic communities among 54 million tribals reside in forest areas. In total Jharkhand population 28% consists of this group. The total population of India consists 8% of tribal population and contributes to 30% of malaria cases.¹² The main cause of malaria burden in Jharkhand is hilly terrain, forest, inaccessible area, migration, tribal culture.¹³ Dumka District consists of forest, hills, valleys and perennial streams,

favouring the growth of Malaria parasite and vector. The objective of this analysis is to find out various spectrum of disease in Dumka district by using the NVBDCP data (2016-2020).

MATERIAL AND METHODS

Present study is a community based cross-sectional study which was done in the population belonging to Dumka District. The study period was of five year duration (2016-2020). The study was carried out in Phulo Jhano Medical College, Dumka, Jharkhand, in Department of Microbiology. Present study was conducted in 10 Blocks of District Dumka, Jharkhand, India. 10 Blocks under District Dumka are Dumka Sadar, Jama, Shikaripara, Raneshwer, Masalia, Kathikund, Gopikander, Ramgarh, Jarmundi and Saraiyahat.

The database was generated from Malaria cases of 2016 to 2020. The annual line-list of the total Malaria patients treated during the year were obtained from the District Vector Borne Disease Control Office (DVBDCO), Dumka, Jharkhand.

Variables like age, sex, treatment history, date of treatment completion were used to assess the incidence of Malaria cases. In Excel spread sheet using Microsoft Office all data were stored. Graph preparations (bar and line graphs) and statistical analysis were performed using Excel and SPSS 20.0.

RESULT

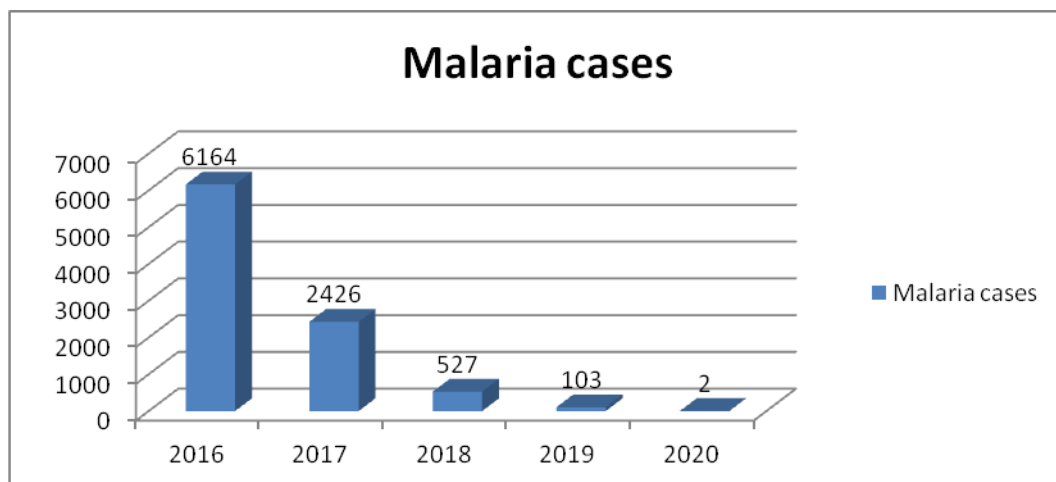


Fig.1. Cases of Malaria in Dumka District (2016-2020)

In 2016 malaria cases were 6164. In 2017, the cases were 2426, in 2018 the cases were 527, in 2019 it was 103 followed by only 2 cases in 2020. Maximum number of cases were seen in 2016. The data reveals annual reduction of malaria cases. Least number of cases were seen in 2020.

In 2016, 65.50% tribal cases were involved, in 2017, there were 78% tribal cases, in 2018 there were 87.50%, 2019 there were 87.40% and in 2020 there were 100% cases.

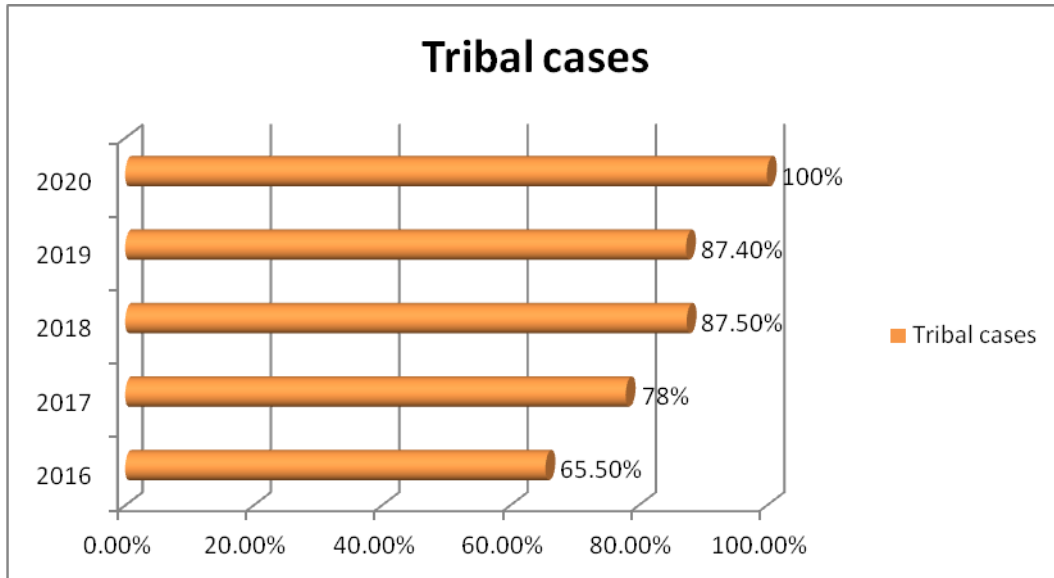


Fig.2. Percentage of Tribal cases among to total Malaria cases (2016-2020)

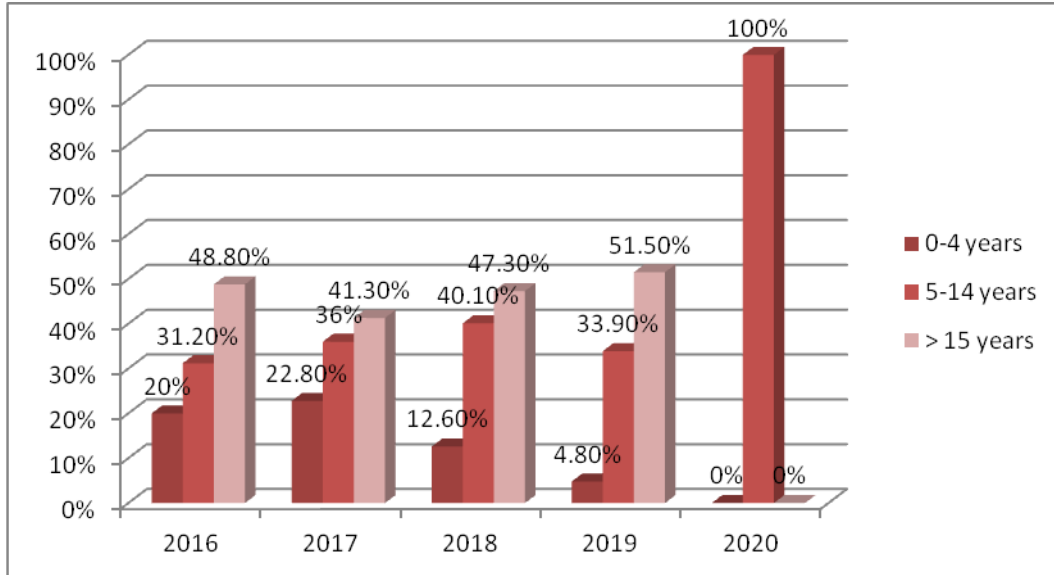


Fig.3. Percentage of various age-groups among Malaria cases(2016-2020)

In 2016, 20% cases were 0-4 years, 31.20% cases were between 5-14 years, 48.80% cases were >15 years of age. In 2017, 22.80% cases were of 0-4 years, 36% cases were 5-14 years, 41.30% cases were >15 years. In 2018, 12.60% cases were of 0-4 years, 40.10% cases were 5-14 years and

>15 years cases were 47.30%. In 2019, 4.80% cases were 0-4 years, 33.90% cases were 5-14 years and 51.50% cases were >15 years. In 2020, only 2 cases were found and both belonged to age group of 5-14 years (100%).

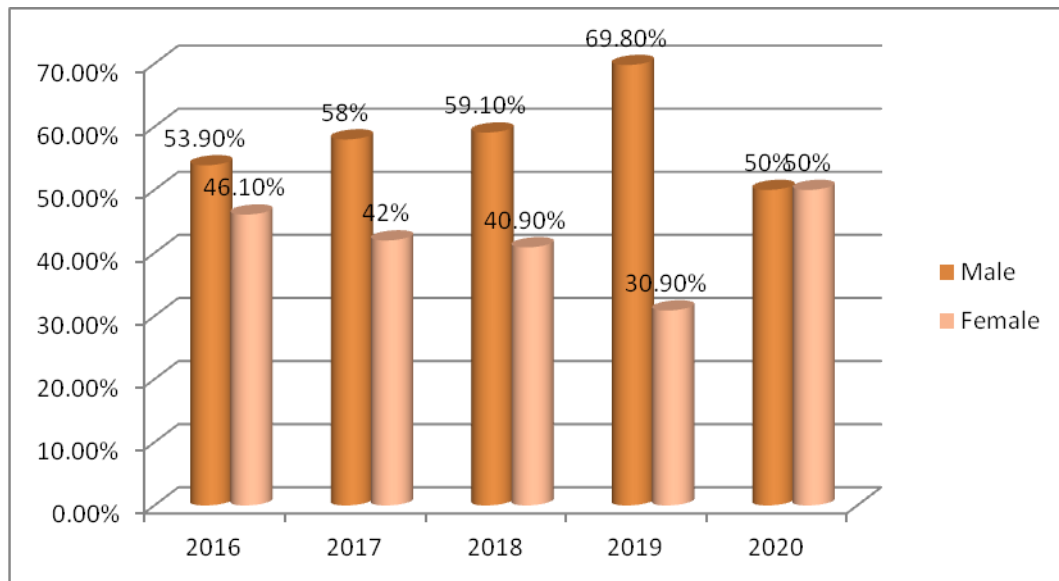


Fig.4. Male Female ratio of Malaria cases in Dumka District (2016-2020)

In 2016, 53.90% cases were male and 46.10% cases were female. In 2017, 58% cases were males and 42% cases were females. In 2018, 59.10% cases were males

and 40.90% cases were females. In 2019, 69.80% cases were males and 30.90% cases were female. In 2020, 50% was male and 50% was female.

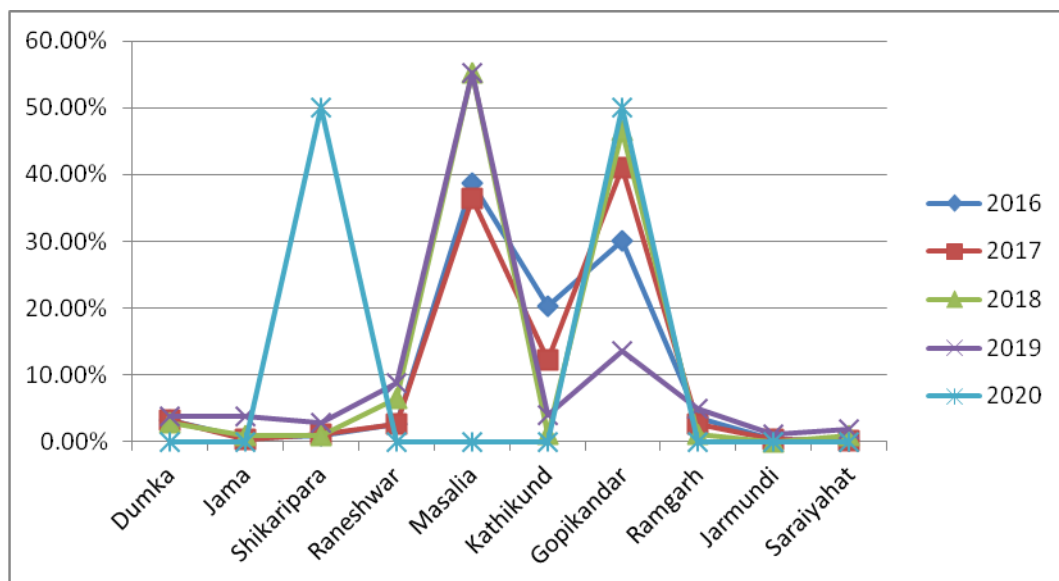


Fig.5. Percentage of Malaria cases in 10 Blocks of Dumka District (2016 - 2020)

In 2016, maximum number of cases were seen in Masalia (38.70%) followed by Kathikund (20.30%). In 2017, maximum number of cases were seen in Gopikandar (41%) followed by Masalia (36.40%) and then Kathikund (12.20%). In 2018, maximum number of cases were seen in Masalia (55.30%) and Gopikandar (46.50%). In 2019, maximum number of cases were seen in Masalia followed by

Gopikandar. In 2020, only 2 cases were found, 1 was from Shikaripara and another one was from Gopikandar.

DISCUSSION

The present data reveals that there was annual reduction of Malaria cases from 2016 to 2020. Least number of cases were seen in 2020. The reason may be due to lower vector transmission due social

distancing and lockdowns. The reason may also be due to underreporting during Covid-19 pandemic. Similar findings were also seen in Mohan et al.¹⁴

Maximum number of malaria cases were from tribal population. In 2016, 65.50%, in 2017- 78%, in 2018 - 87.50%, 2019 - 87.40% and in 2020 - 100%. Dumka District is a tribal region with numerous hills and rivers. The tribal villages consist of numerous hills, streams along with their tributaries which maintains mosquito breeding throughout the year. Rainfall and water logging is also a major problem in Tribal area.^{15,16,17} Further it is also seen that the ethnic communities prefer their treatment to untrained, unlicensed practitioner or spiritual healers. Moreover, their constant movement in forest makes it difficult to contact for diagnosis and treatment.^{18, 19} Socioeconomic development and adoption of multiple perspective for development of tribal population is needed. Improvement in socio-economic status can have positive impact on malaria incidence.²⁰

Age group between 5-14 years were mostly affected. Due to limited data availability, there was inability to specify various age groups involved above 15 years. In a study it was observed that in endemic areas individuals gradually develop anti-parasite immunity. A gradual decrease of prevalence of malaria with increasing age is seen.²⁰ Age dependant decrease in another study was observed in Odisha.²¹ Similarly in another study in Sundargarh district, Odisha, high level of antibodies against *P. falciparum* were observed in infected healthy adults but absent in children below 3 years of age.²²

Current study shows male predominance among malaria cases, except in the year 2020 where male female ratio was equal. Majority of cases were seen in Masalia, Gopikandar and Kathikund blocks of Dumka district.

CONCLUSION

India marches towards the goal of elimination of Malaria burden. In

conclusion, present analysis indicates gradual decline in number of malaria cases. A sharp decline in the year 2020 can be a result of lockdown, social distancing causing lower vector transmission or underreporting due during COVID-19 pandemic. A thorough assessment is needed to know the actual burden of the disease.

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