

A Study on Prevalence of Malaria in Pediatric Patients of Rajiv Gandhi Institute of Medical Sciences [RIMS], Adilabad

K Ananth Rao^{1*}, Mohd Inayatulla Khan²

¹Assistant Professor, Department of Pediatrics, Rajiv Gandhi Institute of Medical Sciences [RIMS] Adilabad, Telangana, India

²Department of Physiology, Rajiv Gandhi Institute of Medical Sciences [RIMS] Adilabad, Telangana, India

***Corresponding author**

K Ananth Rao

Article History

Received: 13.03.2018

Accepted: 26.03.2018

Published: 30.03.2018

DOI:

10.21276/sjm.2018.3.3.11



Abstract: Malaria is one of the important diseases affecting several areas in India especially in the tribal and interior forest regions causing great morbidity and mortality. The National Vector-Borne Disease Control Program [NVBDCP] was launched in 2003-04 to control all vector-borne diseases, however seasonal and local outbreaks, especially in tribal areas, are common. This study was done to determine the prevalence of malaria during Aug-Nov 2015 season outbreak of malaria in tribal regions of Adilabad district of Telangana State. The objective of the study was to understand the type of malaria in the pediatric patients and the treatment is done and the outcomes. Methods: The study was done in Department of RIMS Adilabad during the seasonal outbreak of malaria from August to November 2015 and all the patients detected with malaria, its treatment and complications were recorded and analyzed. Results: a total of 3361 patients have admitted in the pediatric wards for various illnesses out of which 201 patients had malaria. The prevalence of malaria in the pediatric ward patients was 6.25%. The most commonly affected age group was 5 to 10 years recording highest number (n= 73) 36.32% of the total number of cases recorded. In male out of 113 cases, 38 cases (33.63%) belonged to 5 -10 years of age group. In females, 35 out of total 88 cases (39.77%) were in 5 -10 years of age group. out of 201 patients 164 patients (81.59%) had developed *P. falciparum* malaria indicating this is the predominant form of malaria present in this group of the population. Similarly, *P. vivax* was recorded in 19 (9.45% of the patients) and 18 (8.96%) had both the type of parasites in the peripheral smears. Conclusion: Within the limitations of the present study it can be concluded that the prevalence of *P. falciparum* malaria is very common in tribal Adilabad district. There is a higher prevalence of malaria-related complications in pediatric patients. There is an urgent need to educate the people and create awareness among the tribal people regarding the growth and spread of malaria. This will reduce the burden of morbidity and mortality due to malaria in this region.

Keywords: Prevalence, Malaria, Pediatric Patients, Adilabad.

INTRODUCTION

Malaria is a protozoal disease caused by infection with parasites of the genus *Plasmodium* and transmitted to man by certain species of infected female Anopheline mosquito. Malaria is one major global health problem and the burden of malaria is high in tropical and subtropical countries like India. According to WHO, in the Southeastern Asian Region of 1.4 billion people living in 11 countries (land area, 8,466,600 km²; i.e., 6% of global area), 1.2 billion are exposed to the risk of malaria, most of whom live in India. Southeast Asia contributed to 2.5 million cases to the global burden of malaria [1]. India contributes substantially to global malaria incidence [2]. Most of the cases of malaria occur in children and especially under the age of 5 years [3]. Pregnant women are also especially vulnerable. Various factors are responsible for influencing malaria. They are highly diverse and

also vary from one region to another. Three climatic indicators such as Temperature, rainfall, and relative humidity have been considered as most important in influencing malaria epidemic and their pattern. *Plasmodium Falciparum* infections cause most serious forms of malaria. The parasite presentation varies from one place to another depending on factors like socioeconomic status, drug resistance and type of treatment done [4]. There is a wide distribution of nine anopheline vectors transmitting three Plasmodial species: *P. falciparum*, *P. vivax*, and *P. malariae* in India. *Anopheles culicifacies* is widely distributed and is the principal vector of rural malaria, *An. stephensi* is the primary urban vector, *An. fluviatilis* is a vector in the hills and foothills, and *An. minimus*, *An. nivipes*, *An. philippinensis*, and *An. dirus* are vectors in the northeast and *An. Sundaicus* is restricted to Andaman and Car Nicobar islands. *An. annularis* and *An. varuna* are

secondary vectors with wide distribution [5]. The climatic conditions in certain areas of India favor the transmission of malaria, that include rural areas, urban areas, forests and hills and 20% of population in states like Andhra Pradesh, Telangana, Chhattisgarh, Jharkhand, Madhya Pradesh, Maharashtra Odisha, Rajasthan, West Bengal and Karnataka [6]. In forest areas the malaria persistence is very common and both Plasmodium vivax and Plasmodium falciparum are seen [7]. World malaria report of 2014, estimated 22% of Indian population live in high transmission zones (>1 case per 1000 population) area, and 11% live in malaria-free areas. The biggest burden of malaria in India is borne by the most backward, poor and remote parts of the country with > 99-95% of cases reported from rural areas and < 5-10 % from urban areas [8]. With this background we in the present study tried to evaluate the prevalence of malaria in pediatric patients during the outbreak of malaria in 2015.

MATERIALS AND METHODS

This study was done in the Department of Pediatrics, RIMS, Adilabad from August 2015 to November 2015. Institutional Ethical committee permission was obtained for the study. The blood samples from suspected malaria cases were obtained in vacutainer and serum was prepared by using a centrifuge. The serum was then used for Malaria P. f/P.V Test [Rapid Card Test] it is a rapid, qualitative and differential test for the detection of antibodies to Plasmodium falciparum/ Plasmodium vivax in human serum by SD BIOLINE rapid card test by Alere Medical Pvt Ltd. Haryana India. For the positive card test cases, drops of finger-pricked blood were obtained for the blood smear preparation. Thick and thin smears

were prepared on standard glass slides. The blood smears were stained by Jaswant Singh and Bhattacharyaji stain [9] and examined under oil immersion [1000] magnification the malaria type Plasmodium falciparum/ Plasmodium vivax was identified and recorded. The treatment done as P. falciparum malaria patients were treated with body weight dependent doses of intravenous Artesunate followed by oral Artesunate – sulfadoxine and pyrimethamine tablets as per the guidelines of the National Vector Borne Disease Control Program, Ministry of Health and Family Welfare [9] and the outcome of the treatment and complications were also analyzed.

RESULTS

During the period from August 2015 to November 2015, a total of 3361 patients have been admitted to the pediatric wards for various illnesses out of which 201 patients had malaria. The prevalence of malaria in the pediatric ward patients was 6.25%. The most commonly affected age group was 5 to 10 years recording highest number (n= 73) 36.32% of the total number of cases recorded. In male out of 113 cases, 38 cases (33.63%) belonged to 5 -10 years of age group. In females, 35 out of total 88 cases (39.77%) were in 5 -10 years of age group. The second highest numbers of cases recorded were in 2-5 years of age group having total (n=65) 32.34% of cases. In Males 34 cases (30.09%) and female 31 (35.23%) cases were recorded in 2-5 years age group. The 10-14 years age group had a total of (n=32) 15.92% followed by the 0-1 year having 8.46% and 1-2 years having 6.96% of cases given in table-1.

Table-1: showing the age and sex wise distribution of cases

Age Group (yrs)	Male	Female	Total	Percentage
0 – 1	8	9	17	8.46
1 – 2	12	2	14	6.96
2 – 5	34	31	65	32.34
5 – 10	38	35	73	36.32
10 – 14	21	11	32	15.92
Total	113	88	201	100

The type of malaria was categorized as per the peripheral smear examination and out of 201 patients, 164 patients (81.59%) had developed P. falciparum malaria indicating this is the predominant form of

malaria present in this group of the population. Similarly, P. vivax was recorded in 19 (9.45% of the patients) and 18 (8.96%) had both the type of parasites in the peripheral smear given in table 2.

Table-2: Type of malaria positive cases detected

Malaria	Male	Female	Total	percentage
P. Falciparum +Ve	98	66	164	81.59
P. Vivax +Ve	7	12	19	9.45
P.F/P.V +Ve	8	10	18	8.96
Total	113	88	201	100

The mean hemoglobin levels recorded in males was 8.07gm/dl and 95% CI was between 7.69 – 8.44 gm/dl. Similarly, the female had the mean hemoglobin

level of 7.95 gm/dl and the 95% CI was between 7.49 – 8.40 gm/dl given in table 3.

Table-3: Mean hemoglobin levels in the malaria patients

	Average Hemoglobin [gm/dl]	Standard deviation	Confidence interval [95%]
Male	8.07	2.0	7.69 – 8.44
Female	7.95	2.18	7.49 – 8.40

Out of the 112 male patients, 84 patients (75%) developed cerebral malaria and they were treated as per standard protocol and those with severe complications were referred to the higher center for management. In female 68 out of 89 patients (76%) showed signs and symptoms of cerebral malaria all *P. falciparum* malaria patients were treated with body weight dependent doses of intravenous quinine/artesunate followed by oral quinine/artesunate – sulfadoxine and pyrimethamine tablets as per the guidelines of the National Vector Borne Disease Control Program, Ministry of Health and Family Welfare [10]. In supportive treatment, intravenous fluids and antibiotics were also given. Convulsions were maintained by body weight dependent doses of diazepam/phenytoin. Blood transfusions were given to the anemic patients immediately as per the requirement after hospitalization and serious cases with MOF were referred to higher centers.

DISCUSSION

In this study were found the prevalence of malaria in pediatric ward patients to be 6.25%. In a previous study done by Khan et al; in RIMS Adilabad in 2013 found the prevalence of 3.7% cases of fever due to malaria. In the study, they also found that the most prevalent malaria was due to *P. falciparum* (96%) [11]. In the present study we found the *P. falciparum* malaria cases in 81.59% of patients, *P. vivax* in 9.45% and both *P. falciparum* and *P. vivax* was found in 8.96% of the peripheral smear examination. This indicates that the *P. falciparum* is the most common organism for malaria prevalent in this area. In a study by Anjaneyulu M et al., [8] for the prevalence of malaria in different PHCs of Adilabad district during 2009 to 2014 found that the *P. falciparum* cases were three times higher than the *P. vivax* cases in agreement with the present study. V Jain et al; found that complicated malaria in Bastar region of Chhattisgarh State found 50% of malaria cases were due to *P. falciparum* and such cases were more severe [12]. According to DJ Jaydev et al., the high incidence of malarial cases were reported during the season of August to December [13]. Similarly we in the present study also found a high prevalence of malaria during August to November 2015. The season from August to November is the monsoon season in most parts of India, therefore, there is more prevalence of malaria during this season. Apart from that, the growth of mosquito due to poor drainage and sanitation facilities causes spread of malaria. We in the present study found the

highest prevalence of malaria in children of 5 – 10 years age group similarly Tripathi R et al., in the Odisha state of India found the mean age of 8 years for severe malaria cases [14]. M Hanumantha R et al; studying the prevalence of malaria in different mandals of East Godavari district of AP found high malaria during the year 2009 and decreased in 2010 and again increased in 2011. It was also found that the *P. falciparum* cases recorded were four times more than the *P. vivax* cases. The *P. falciparum* malaria was most prevalent the *P. vivax* cases in the agency areas of East Godavari district [15]. The prevalence of malaria in female was 43.78% and in male children, it was 56.21% a slightly more cases in male children. In the previous study by Khan et al., [11] found 7.88% female fever cases due to malaria and only 2.43% of cases in male to be malaria. However, the differences could be due to the fact that in the previous study it was done in all age groups and the present is only done in the pediatric patients. V Jain et al., observed that there is male predominance in hospitalization pattern in malaria [12] it is in agreement with our observation. In the present study, we found out of the 112 male patients 84 patients (75%) developed cerebral malaria and they were treated as per standard protocol and those with severe complications were referred to the higher center for management. In female 68 out of 89 patients (76%) showed signs and symptoms of cerebral malaria all the cases were due to *P. falciparum*. V Jain et al; studying the burden of cerebral malaria in central India found that out of 401 cases of malaria 199 were cerebral malaria 49.62% [16]. The main reason of increased percentage observed in our study may be due to the fact that RIMS Hospital is a secondary level hospital located in Tribal Adilabad region and many cases may have been referred from the primary level hospitals, as a result, the numbers of complicated malaria cases may have been increased.

CONCLUSION

Within the limitations of the present study, it can be concluded that the prevalence of *P. falciparum* malaria is very common in tribal Adilabad district. There is a higher prevalence of malaria-related complications in pediatric patients. There is an urgent need to educate the people and create awareness among the tribal people regarding the growth and spread of malaria. This will reduce the burden of morbidity and mortality due to malaria in this region.

REFERENCES

1. Kondrachine, A. V. (1992). Malaria in WHO Southeast Asia Region. *Indian J Malariol*; 29: 129–60.
2. Hay, S. I., Gething, P. W., & Snow, R. W. (2010). India's invisible malaria burden. *Lancet*, 376(9754), 1716.
3. Ghasparian, A., Moehle, K., Linden, A., & Robinson, J. A. (2006). Crystal structure of an NPNA-repeat motif from the circumsporozoite protein of the malaria parasite *Plasmodium falciparum*. *Chemical Communications*, (2), 174-176.
4. Singh, V., Mishra, N., Awasthi, G., Dash, A. P., & Das, A. (2009). Why is it important to study malaria epidemiology in India?. *Trends in parasitology*, 25(10), 452-457.
5. Dambhare, D. G., Nimgade, S. D., & Dudhe, J. Y. (2012). Knowledge, attitude and practice of malaria transmission and its prevention among the school going adolescents in Wardha District, Central India. *Global journal of health science*, 4(4), 76.
6. Srivastava, A., Nagpal, B. N., Saxena, R., Eapen, A., Ravindran, K. J., Subbarao, S. K., ... & Appavoo, N. C. (2003). GIS based malaria information management system for urban malaria scheme in India. *Computer methods and programs in biomedicine*, 71(1), 63-75.
7. Singh, N., & Khare, K. K. (1999). Forest malaria in Madhya Pradesh: changing scenario of disease and its vectors. *Indian J Parasit Dis*, 23, 105-12.
8. Anjaneyulu, M., Vanita, D., Shekhar, M., & Ramesh, B. (2015). Prevalence of Malaria in Different PHCS of Adilabad District, Telangana, India. *IJSR*; 4 (10):1973-76.
9. Singh, J., & Bhattacharji, L. M. (1944). Rapid staining of malarial parasites by a water soluble stain. *The Indian Medical Gazette*, 79(3), 102.
10. NVBDCP. (2013) Diagnosis and treatment of malaria 2013. Available at: <http://nvbdc.gov.in/Doc/Diagnosis-Treatment-Malaria-2013.pdf> [Accessed on 2 March, 2018].
11. Khan, T. A., Saleem, M., Tavrekar, S. K. R., Kondal, S., Tajuddin, M., & Kumar, S. (2015). Prevalence of Malaria among Hospitalized Fever Cases of a Tribal District Tertiary Care Centre of South India. *J Cont Med A Dent*, 3, 73-8.
12. Jain, V., Basak, S., Bhandari, S., Bharti, P. K., Thomas, T., Singh, M. P., & Singh, N. (2014). Burden of complicated malaria in a densely forested Bastar region of Chhattisgarh State (Central India). *PLoS One*, 9(12), e115266.
13. Jayadev, D. J., & Viveka V. V. (2013). Incidence of urban malaria in Vijayawada City of Krishna district, Andhra Pradesh, India, *Biolife*; 2(2): 4524-62.
14. Tripathy, R., Parida, S., Das, L., Mishra, D. P., Tripathy, D., Das, M. C., ... & Panigrahi, P. (2007). Clinical manifestations and predictors of severe malaria in Indian children. *Pediatrics*, 120(3), e454-e460.
15. Raju, M. H., Ganesh, N., Kumar, K. K., Sowjanya, M., Satish, P. V. V., & Sunita, K. A study on prevalence of malaria in different mandals of east godavari district, andhra pradesh, india.
16. Jain, V., Nagpal, A. C., Joel, P. K., Shukla, M., Singh, M. P., Gupta, R. B., ... & Singh, N. (2008). Burden of cerebral malaria in central India (2004–2007). *The American journal of tropical medicine and hygiene*, 79(4), 636-642.