Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 6, Issue, 04, pp.6273-6276, April, 2014

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

ISSN: 0975-833X

RESEARCH ARTICLE

RETROSPECTIVE STUDY OF MALARIA CASES ATTENDING AT TERTIARY CARE LEVEL HOSPITAL IN RAJKOT CITY, GUJARAT

*[1]Hadiya Taruna Jivabhai, [1]Vaghela Bhavika Kanubhai, [1]Agravat Amit Hariharbhai, [1]Dhruva Gauravi Animeshbhai and [2]Vaghela Vikas Kanubhai

[1]Pathology Department, P.D.U. Medical College, Rajkot, Gujarat, India
[2]Post-intern, B.J. Medical College, Ahmedabad, Gujarat, India

ARTICLE INFO

Article History:
Received 17th January, 2013
Received in revised form
08th February, 2014
Accepted 02nd March, 2014
Published online 23rd April, 2014

Key words:
Malaria,
P. falciparum,
P. vivax,
Slide positivity.

ABSTRACT

Background: Malaria is one of the important public health problems in India by considering its prevalence, virulence and drug resistance.
Aim: This study was undertaken to analyze and introspect the presentation of this disease in a tertiary referral centre.
Methodology: This record-based descriptive retrospective study was conducted in a tertiary care level hospital -P.D.U. Government Hospital, Rajkot city, Gujarat, India from January 2011 to December 2013. The data were collected from the medical records department of the hospital and analyzed by using Microsoft exce**l.** All the patients with fever as chief complain who had attended OPD of Medicine and patients admitted in ward, their blood samples were collected from Central laboratory & Pathology Department of hospital.
Results: Out of a total of 187690 cases studied, 3957(2.10%) cases were positive for malaria. 2430(61.41%) cases were positive for Plasmodium vivax and 1526(38.56%) were positive for Plasmodium falciparum. The overall slide positivity rate (SPR), slide falciparum rate (SFR) and P.falciparum (PF) were 2.10%, 0.81 % and 38.57% respectively. Further analysis with month wise distribution of cases shows that malaria cases are more or less high in month of August, September and October.
Conclusions: There is high prevalence of P. vivax as compare to P. falciparum infections. The maximum number of cases was reported in month of August to October which concludes that malaria has its peak incidence during rainy season. As year progresses there is gradual decrease in number of positive malarial cases concludes that awareness, availability of treatment, education &preventive measurements all of this help to decrease prevalence of malaria in Rajkot city.

INTRODUCTION

Malaria is endemic throughout most of the tropics. Of the approximately three billion people worldwide who are exposed annually, more than 240 million develop symptomatic malaria (WHO 2008). Between 2000 and 2010, the number of reported annual malaria cases in 34 malaria eliminating countries decreased by 85 percent, from 1.5 million in 2000, to 232,000 in 2010 (WHO 2011). According to the latest estimates, released in December 2013, there were about 207 million cases of malaria in 2012 (with an uncertainty range of 135 million to 287 million) and an estimated 627 000 deaths (with an uncertainty range of 473 000 to 789 000). Malaria mortality rates have fallen by 45% globally since 2000 and by 49% in the WHO African Region. Most deaths occur among children living in Africa where a child dies every minute from malaria. Malaria mortality rates among children in Africa have been reduced by an estimated 54% since 2000 (WHO 2014).

Corresponding author: Hadiya Taruna Jivabhai
Pathology Department, P.D.U. Medical College, Rajkot, Gujarat, India.

Malaria is caused by *Plasmodium* parasites. The parasites are spread to people through the bites of infected *Anopheles* mosquitoes, called "malaria vectors", which bite mainly between dusk and dawn. Other comparatively rare mechanisms for transmission include: congenitally-acquired disease, blood transfusion, sharing of contaminated needles, and organ transplantation (Filler *et al.,* 2003; Owusu-Ofori *et al.,* 2013).

There are four parasite species that cause malaria in humans:

- *Plasmodium falciparum*
- *Plasmodium vivax*
- *Plasmodium malariae*
- *Plasmodium ovale.*

Plasmodium falciparum and *Plasmodium vivax* are the most common. *Plasmodium falciparum* is the most deadly (WHO 2014). Malaria occurs throughout most of the tropical regions of the world, with P. falciparum causing the largest burden of disease, followed by P. vivax (Guerra *et al.,* 2008). P.

falciparum predominates in Africa, New Guinea, and Hispaniola (Haiti and the Dominican Republic); P. vivax is more common in the Americas and the western Pacific. The prevalence of these two species is approximately equal in the Indian subcontinent, eastern Asia, and Oceania (Snow *et al.*, 2005; Price *et al.*, 2007; Breman 2009; White 2008; Smith *et al.*, 2006). Important components for reducing the burden of malaria morbidity and mortality include more sensitive diagnostic tools, effective use of antimalarial drugs, and improved personal protection and mosquito control. The approach to elimination or control of malaria includes these basics, along with improvements in tracking of human illness and parasite surveillance, and effective resource delivery

MATERIAL AND METHODS

This record-based descriptive retrospective study was conducted in a tertiary care level hospital -P.D.U. Government Hospital, Rajkot city, Gujarat, India from January 2011 to December 2013. The data were collected from the medical records department of the hospital and analyzed by using Microsoft excel. All the patients with fever as chief complain who had attended OPD of Medicine and patients admitted in ward, their blood samples were collected from Central laboratory & Pathology Department of hospital. The cases were identified from computer records of the hospital during three year.

RESULTS

Total of 187690 cases were studied and the findings are presented in the Tables (Table 1 to 4). The overall slide positivity rate and slide falciparum rate were 2.10% and 0.81 % respectively. P.falciparum constituted 38.57% of the malaria cases. Number of positive cases is decreased during subsequent years. Similarly other parameters like SPR, SFR, Pf are also following the similar trends in this study. Further analysis with month wise distribution of cases shows that malaria cases are more or less high in month of August, September and October. A pie chart drawn is representative of profile of malaria cases (Figure 1).

DISCUSSION

Out of 3957 malaria cases reported in the study, 38.57% cases were Plasmodium falciparum, and 61.41% were Plasmodium vivax. (Madhu Muddaiah and Prakash 2006) in their study on malaria in South Canara, Karnataka states also reveals that Plasmodium vivax constitutes as highest; 52.54%, Plasmodium falciparum 33.75% and mixed malarial infection is 13.69%. In study of Pakistan (Ali Bin Sarwar Zubairi 1854) *P. vivax* and *P. falciparum* accounted for 83% and 13% of cases, respectively. Further analysis with month wise distribution of cases shows that malaria cases start increasing from June every year and remain more or less high till October, thereafter it tends to fall gradually. Similar finding were also reported by (Prajapati *et al.*, 2007).

Table 1. Various Indications Related To Malaria from January to December 2011

MONTH	Total cases	Malaria positive cases	P. vivax Positive cases	P. falciparum Positive cases	Slide Positivity Rate %	Slide Falciparum rate %	P.falciparum %
January	4077	65	10	55	1.59	1.35	84.62
February	3822	16	9	7	0.42	0.18	43.75
March	4287	43	17	26	1.00	0.61	60.47
April	4009	81	43	38	2.02	0.95	46.91
May	4057	122	98	24	3.01	0.59	19.67
June	4090	145	142	3	3.55	0.07	2.07
July	4940	171	155	16	3.46	0.32	9.36
August	5927	201	129	72	3.39	1.21	35.82
September	6917	561	275	286	8.11	4.13	50.98
October	6520	283	145	138	4.34	2.12	48.76
November	6310	199	72	127	3.15	2.01	63.82
December	5570	145	40	105	2.60	1.89	72.41
Total	**60526**	**2032**	**1135**	**897**	**3.36**	**1.48**	**60.47**

Table 2. Various Indications Related To Malaria from January to December 2012

MONTH	Total cases	Malaria positive cases	P. vivax Positive cases	P. falciparum Positive cases	Slide Positivity Rate %	Slide Falciparum rate %	P.falciparum %
January	3297	42	9	33	1.27	1.00	78.57
February	4679	21	19	2	0.45	0.04	9.52
March	4744	19	19	0	0.40	0.00	0.00
April	3963	49	47	2	1.24	0.05	4.08
May	4178	158	133	25	3.78	0.60	15.82
June	3911	154	145	9	3.94	0.23	5.84
July	4810	114	106	8	2.37	0.17	7.02
August	4941	163	132	31	3.30	0.63	19.02
September	5567	94	34	60	1.69	1.08	63.83
October	7038	118	61	57	1.68	0.81	48.31
November	6356	85	31	54	1.34	0.85	63.53
December	5123	62	35	27	1.21	0.53	43.55
Total	**58607**	**1079**	**771**	**308**	**1.84**	**0.53**	**28.54**

Table 3. Various Indications Related To Malaria from January to December 2013

MONTH	Total cases	Malaria positive cases	P. vivax Positive cases	P. falciparum Positive cases	Slide Positivity Rate %	Slide Falciparum rate %	P.falciparum %
January	4466	22	16	6	0.49	0.13	27.27
February	4636	23	17	6	0.50	0.13	26.09
March	5052	18	16	2	0.36	0.04	11.11
April	4121	39	26	13	0.95	0.32	33.33
May	3762	41	40	1	1.09	0.03	2.44
June	3833	27	25	2	0.70	0.05	7.41
July	5313	52	41	11	0.98	0.21	21.15
August	5893	104	58	46	1.76	0.78	44.23
September	8519	131	71	60	1.54	0.70	45.80
October	8111	181	77	104	2.23	1.28	57.46
November	8620	135	72	62	1.57	0.72	46.27
December	6797	73	65	8	1.07	0.12	10.96
Total	69123	846	524	321	1.22	0.46	37.99

Table 4. Various Indications Related To Malaria from January 2011to December 2013

Year	Total cases	Malaria positive cases	P. vivax Positive cases	P. falciparum Positive cases	Slide Positivity Rate %	Slide Falciparum rate %	P.falciparum %
2011	60526	2032	1135	897	3.36	1.48	60.47
2012	58607	1079	771	308	1.84	0.53	28.54
2013	69123	846	524	321	1.22	0.46	37.99
Total	188256	3957	2430	1526	2.10	0.81	38.57

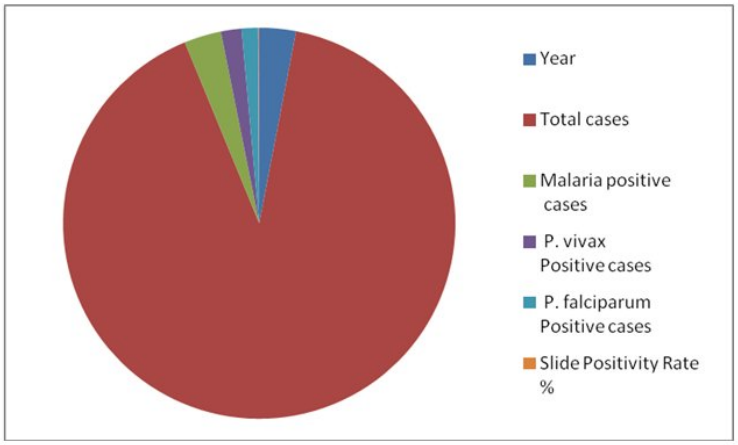

Figure 1. Pie chart for various indications related to malaria from January 2011 to December 2013

Bruno P Mmbando *et al.* (2010) revealed The prevalence of malaria parasitaemia in the lowland village decreased from 78.4% in 2003 to 13.0% in 2008, whereas in the highland village, the prevalence of parasitaemia dropped from 24.7% to 3.1% in the same period. Other studies (Okiro *et al.*, 2007; O'Meara *et al.*, 2008; Bhattarai *et al.*, 2007; Graves *et al.*, 2008; Biai *et al.*, 2007) mainly based on data collected at health facilities have documented that malaria transmission seems to be falling in other parts of East Africa and in some of these studies the decrease has been attributed to specific interventions. In study (Abebe Alemu *et al.*, 2012), a decreased in number of malaria cases occurred from 2005 to 2008 with a minimum number of malaria cases reported in 2007.

In Study by *B* Prajapati (2006), during the year 1999 and 2005 positive case of malaria were found respectively 334 and 226. From compile data of six years one can say that as year progressing there is gradual decrease in no of positive patients. Out of 207 malarial cases in last year (2005), maximum number of cases 47 (22.7%) were reported in this hospital during a month of august and 149 cases were reported during months of July to October; monsoon season. Their result suggests that 92 % of cases are due to P. vivax and only 8% of total cases are due to P. falciparum. In 2001, Karnataka (Prajapati *et al.*, 2006) accounted for 9.47% of total malaria cases of India. However, the data from the present study revealed that, there was a significant decline in the incidence by 89.3% for the last ten years (2001 to 2011).

Conclusion

There is high prevalence of P. vivax as compare to P. falciparum infections. The maximum number of cases was reported in month of August to October which concludes that malaria has its peak incidence during rainy season. There was a substantial reduction in prevalence and incidence rates of both P. vivax and P. falciparum. As year progresses there is gradual decrease in number of positive malarial cases concludes that awareness, availability of treatment and precautionary drugs from primary health centre, education &preventive measurements all of this help to decrease prevalence of malaria in Rajkot city. These findings will help policy makers, public health programmers and clinical workers in each country to develop and promote malaria control strategies.

REFERENCES

Abebe Alemu *et al*. Ten year trend analysis of malaria prevalence in Kola Diba, North Gondar, Northwest Ethiopia. Alemu *et al*. Parasites & Vectors 2012, 5:173 http://www.parasitesandvectors.com/content/5/1/173 (Assessed on 20/2/2014 ,12:15 pm Indian time.)

Ali Bin Sarwar Zubairi, Severe Plasmodium vivax Malaria in Pakistan, Emerging Infectious Diseases • www.cdc.gov/eid • Vol. 19, No. 11, November 2011pp-1851 1854.

Anirudh R. Acharya *et al*. Trend of malaria incidence in the state of Karnataka, India for 2001 to 2011. Anirudh R. Acharya *et al.* Arch. *Appl. Sci. Res*., 2013, 5 (3):104-111.

Bhattarai A, Ali AS, Kachur SP, Martensson A, Abbas AK, Khatib R, Al Mafazy AW, Ramsan M, Rotllant G, Gerstenmaier JF, Molteni F, Abdulla S, Montgomery SM, Kaneko A, Bjorkman A: Impact of artemisinin-based combination therapy and insecticide-treated nets on malaria burden in Zanzibar. PLoS Med 2007, 4:e309.

Bhupendra G. Prajapati, Amit K. Patel, Madhabha M. Patel: Study of Hospital Based Malaria Cases in Mehsana Cityt of North Gujarat: *The Internet Journal of Third World Medicine* 2007;5(1) .

Biai S, Rodrigues A, Gomes M, Ribeiro I, Sodemann M, Alves F, Aaby P: Reduced in-hospital mortality after improved management of children under 5 years admitted to hospital with malaria: randomised trial. BMJ 2007, 335:862.

Breman JG. Eradicating malaria. Sci Prog 2009; 92:1.

Bruno P Mmbando *et al*. A progressive declining in the burden of malaria in north-eastern Tanzania. *Malaria Journal* 2010, 9:216 doi:10.1186/1475-2875-9-216.

Mmbando *et al*. *Malaria Journal* 2010, 9:216 http://www.malariajournal.com/content/9/1/216 (Assessed on 20/2/2014 12:00 pm Indian time.)

Filler S, Causer LM, Newman RD, *et al*. Malaria surveillance--United States, 2001. MMWR Surveill Summ 2003; 52:1.

Graves PM, Osgood DE, Thomson MC, Sereke K, Araia A, Zerom M, Ceccato P, Bell M, Del Corral J, Ghebreselassie S, Brantly EP, Ghebremeskel T: Effectiveness of malaria control during changing climate conditions in Eritrea, 1998-2003. Trop Med Int Health 2008, 13:218-228.

Guerra CA, Gikandi PW, Tatem AJ, *et al*. The limits and intensity of Plasmodium falciparum transmission: implications for malaria control and elimination worldwide. PLoS Med 2008; 5:e38.

Madhu Muddaiah & P.S. Prakash, A study of clinical profile of malaria in a tertiary referral centre in South Canara, *J Vect Borne Dis* 43, March 2006, pp. 29–33

O'Meara WP, Bejon P, Mwangi TW, Okiro EA, Peshu N, Snow RW, Newton CR, Marsh K: Effect of a fall in malaria transmission on morbidity and mortality in Kilifi, Kenya. Lancet 2008, 372:1555-1562.

Okiro EA, Hay SI, Gikandi PW, Sharif SK, Noor AM, Peshu N, Marsh K, Snow RW: The decline in paediatric malaria admissions on the coast of Kenya. *Malar J* 2007, 6:151.

Owusu-Ofori AK, Betson M, Parry CM, *et al*. Transfusion-transmitted malaria in Ghana. Clin Infect Dis 2013; 56:1735.

Prajapati B, A Patel, M Patel. Study of hospital based malaria cases in Mehsana district Of North Gujarat. The Internet Journal of Third World Medicine. 2006 Volume 5 Number 1.

Price RN, Tjitra E, Guerra CA, *et al*. Vivax malaria: neglected and not benign. *Am J Trop Med Hyg* 2007; 77:79.

Smith T, Maire N, Dietz K, *et al*. Relationship between the entomologic inoculation rate and the force of infection for Plasmodium falciparum malaria. *Am J Trop Med Hyg* 2006; 75:11.

Snow RW, Guerra CA, Noor AM, *et al*. The global distribution of clinical episodes of Plasmodium falciparum malaria. Nature 2005; 434:214.

White NJ. Plasmodium knowlesi: the fifth human malaria parasite. *Clin Infect Dis* 2008; 46:172.

WHO Fact sheet N°94 Updated December 2011 http://www.who.int/mediacentre/factsheets/fs094/en/ Malaria (Accessed on February 4, 2014).

WHO, World Malaria Report, 2008. Geneva, Switzerland.

WHO. World malaria report 2011. Geneva: World Health Organization, 2011.

****