Original Research Article

Current Status and Trend of Malaria in Tertiary Care Level Hospital, Ahmedabad, Gujarat

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Abstract: Efforts to combat started since independence of country; we are still unable to curtail this protozoal disease. Due to technical, operational and managerial reasons and even shortage of DDT, malarial program have to face repeated set-backs. That's why, it also create huge burden of morbidity and mortality. The study was planned to draw attention of public health manager regarding current trend and case fatality rate due to malaria at tertiary care hospital. Secondary data analysis of registered cases of malaria at record section was planned. Case fatality rate was calculated and seasonal influence on number of cases of malaria was evaluated. The cases of P.vivax outnumbered to P.falciparum in defined studied period. Noteworthy findings, transmission of P.vivax was most common in monsoon season while transmission of P.falciparum was most common in post monsoon month and case Fatality Rate (CFR) was higher for P.falciparum (3.24%). Even though cases and deaths are admirably decreased in last few years, case fatality rate in our findings is not tolerable for this curable disease. There is need to strengthen malaria control activities.

Keywords: Case fatality rate, Malaria, Monsoon, Plasmodia genus

INTRODUCTION

Malaria, protozoal infection, is caused by infection with plasmodium genus parasites and transmitted to man by female infected anopheles mosquito species. According to the latest estimates, there were about 198 million (124-283 million) malaria cases in the year 2013 and an estimated 584,000 deaths (367,000-755,000) all over the world. The P.falciparum cases have declined from 1.14 million in 1995 to 0.44 million cases in 2013, with decrease in Annual Parasite Index (API) from 3.29 in 1995 to 0.88 in 2012 and Slide Positivity Rate (SPR) from 3.51 in 1995 to 0.51 in 2013 [1].

Even though drastic reduction in malariomatric indices, in India, there were 1.60 million, 1.31 million, 1.07 million, 0.88 million and1.07 million cases and 1018, 754, 519, 440 and 535 deaths were reported in 2010, 2011, 2012, 2013 and 2014 respectively as per data available from National Vector Borne Diseases Control Program (NVBDCP) [2].

World Malaria Report 2014 shows that, 22% (275.5 million) of India's population reside in high transmission areas (> 1 case per 1000 population), 67% (838.9 million) live in low transmission areas (0–1 cases per 1000 population) and 11% (137.7million) breath in malaria-free areas (0 cases) [3].

In 2013, near about 128 million tests being done on the suspected cases and among them 0.88 million cases have been recorded, with P. falciparum comprising 53% and P.vivax comprising of 47% of the infections. However, a study claims there is a 68% to 98% gap between India's real incidence of malaria and registered malaria cases [4, 5].The above difference is mainly due to only 20% of the total population takes benefit of government facility while major portion almost 80% seeks treatment from private facilities indicating that the burden of malaria in India is highly under-reported and even misdiagnosis as malaria negative was also seen at some primary health centres [6].

The aim of this study was to to find out the number of the cases of P.Vivax and P.Falciparum and to know the trend of malaria in monsoon and post monsoon months at tertiary care level, hospital, Ahmedabad. Calculated case fatality rate would help the tertiary health care physician and public health planner to change the strategy accordingly to curb this curable disease.

METHODOLOGY

- Study design: Secondary data analysis of reported cases since July 2013 to February 2014
- Study area: Tertiary care level hospital, Ahmedabad.
- Study subject: Clinically and laboratory diagnosed malaria cases.
- Study sample : 620 cases

- Study method: Data on morbidity and mortality attributable to malaria were collected from medical record section of tertiary care level hospital, Ahmedabad. Line listing of age, sex and seasonal distribution of malaria cases done in MS Excel.
- Statistical analysis: Appropriate data cleaning was done in Microsoft Excel and tables and graph of monthly trend were prepared in SPSS.
- Case Fatality Rate (CFR): Case fatality rate measures the risk of persons dying from a certain disease within a given time period was calculated.

$$CFR = \frac{\text{Number of deaths from a Malaria during a July to Feb } 2013-2014}{\text{Number of cases of the malaria during the same time period}} \times 100$$

RESULTS

Table 1: Month wise distribution of P.Vivax and P.Falciparum cases

Month	P.Vivax		P.Falciparum		Total	
	No.	%	No.	%	No.	%
July	76	12.26	22	3.55	98	15.81
August	100	16.13	60	9.68	160	25.81
September	97	15.65	70	11.29	167	26.94
October	40	6.45	65	10.48	105	16.94
November	14	2.26	47	7.58	61	9.84
December	10	1.61	11	1.77	21	3.39
January	1	0.16	2	0.32	3	0.48
February	4	0.65	1	0.16	5	0.81
Total	342	55.16	278	44.84	620	100.00

Most common month of malaria transmission, for P.vivax was August (16.13%) and September (15.65%), followed by July (12.26) and, for P.falciparum it was September (11.29%) and October (10.48%), followed by August (9.68%). Cases of P.vivax (55.16%) were higher as compared with P.falciparum (44.84%) in entire season with the ratio of 1.23:1.
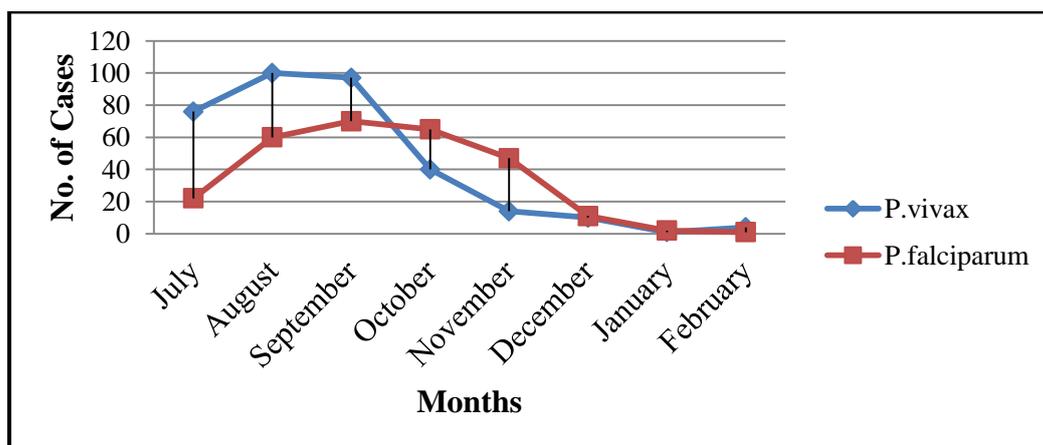

Fig 1: Time trend showing number of malaria cases

Figure 1 showing time trend of occurrence of malaria cases. In the month of October, November and December, cases of P.falciparum malaria outnumbered of P.vivax.

Table 2: Age & Case Fatality Rate (CFR) distribution of P.vivax and P.falciparum cases

Age	P.Vivax			P.Falciparum			Total		
	No.	Death	CFR	No.	Death	CFR	No.	Death	CFR
≤ 14	77	1	1.30	33	1	3.03	110	2	1.82
15 - 24	78	1	1.28	61	3	4.92	139	4	2.88
25 - 34	82	0	0.00	45	0	0.00	127	0	0.00
35 - 44	46	0	0.00	50	3	6.00	96	3	3.13
45 - 54	22	0	0.00	45	1	2.22	67	1	1.49
55 - 64	20	0	0.00	20	0	0.00	40	0	0.00
≥ 65	17	0	0.00	24	1	4.17	41	1	2.44
Total	342	2	0.58	278	9	3.24	620	11	1.77

Deaths were more reported with the cases of P.falciparum (3.24%) as compared with P.vivax cases (0.58%). Death from malaria was higher in the age bracket of 35-44 years (3.13%), followed by 15-24 years (2.88) of age group.
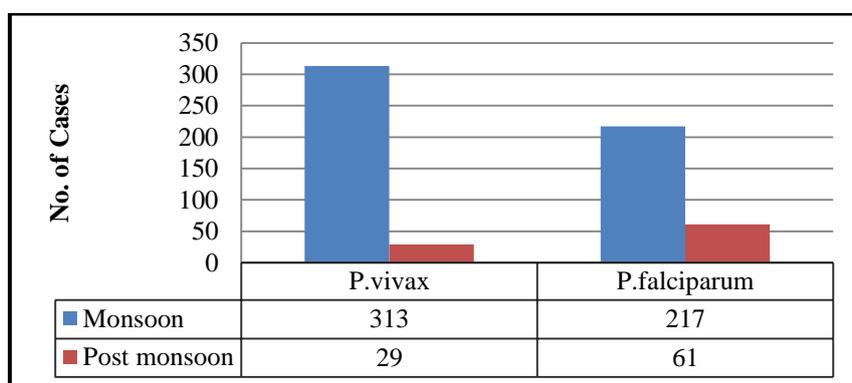

Fig 2: Total number of cases of P.vivax and P.falciparum in monsoon and post monsoon season

In the monsoon month (July to October), number of cases of P.vivax is outnumbered to P.falciparum with the ratio of 2.05:1 while in post monsoon month cases of P.falciparum was higher with the ratio of 3.55:1.
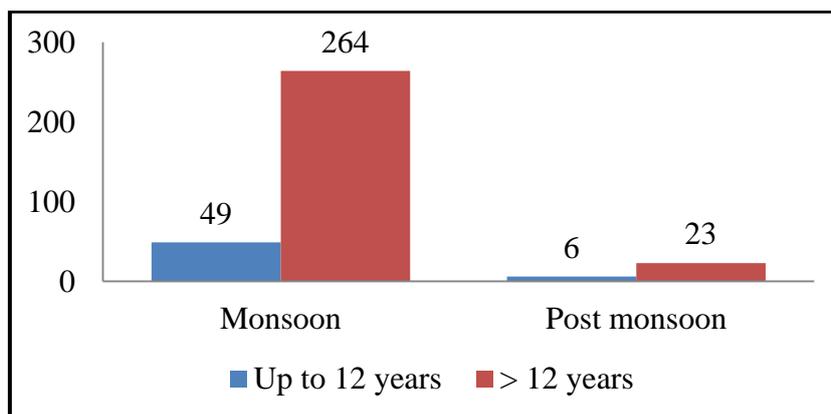

Fig 3: Age distribution of P.vivax malaria cases in monsoon and post monsoon season

Numbers of malarial cases were more reported in the season of monsoon and also in the age group of more than 12 years. Observed age wise distribution is also statistically significant with p-value <0.05.

DISCUSSION

A total of 640 patients diagnosed with malaria over a period of July 2014- February 2015. Male were prone to get malaria with male to female ratio of 1.74:1 in monsoon season and 3.83:1 in post monsoon season. Majority of the patients belongs to age group of 15 to 40 years (42.90%). Study findings providing agreement to the study which was done previously by Muddaiah M &. Prakash PS [7].

Incidence of malaria was increased in June onwards with the starting of rainy season. A total 530 cases was reported in monsoon months compared to 90 cases in post monsoon months with the effective ratio of 5.88:1 of seasonal variation. The result showed that malaria occurrence in this province is seasonal. The current findings are consistent with findings observed by other researcher earlier [7, 8]. An unexplained mode of transmission is responsible for rapid rise in malaria cases in the monsoon season; this also represents a major public health challenge to existing control activities. Rapid industrialization and activities of deforestation also do a climate change and make environment convenient to spread of malaria, especially in monsoon months.

Cases of P.vivax outnumbered to cases of P.falciparum in the monsoon months while cases of P.falciparum outnumbered in post monsoon months. The study finding is contrast to pattern given by Gupta S *et al.;* [8] and provides agreement on findings observed by Kevadiya SM *et al.;* [9]. Observed pattern of occurrence of cases in monsoon and post monsoon season is also noteworthy result for other researcher to search out the reason for the same.

The patient >12 years of age have had more malarial infection than the pediatric patient. Adult to pediatric ratio in monsoon month was 5.38:1 and, in post monsoon month was 3.83:1. This result supports the findings of a study done in New Delhi, the capital of India [8].

Over all case fatality rate in the current study was 1.77. It was high for P.Falciparum as compared to P.vivax (3.24 Vs 0.58). According to one reference, fatality rate of malaria is ranged from 10 to 30 among children referred to hospital with severe malaria [1]. Malaria attributed death rate is high in our studied region as compared with Orissa in which CFR is 0.3% [10]. There are limited references available to compare case fatality rate of malaria. Actual estimation of CFR is even more difficult. Because of limited health facilities; a severe case of malaria that died without any treatment or medical attention is erroneously diagnosed of having some other life-threatening fever in death audit and even some positive malaria slides misdiagnosis as malaria negative at health facility was also seen in quality check at some places [6].

CONCLUSION

Malaria is significant health problem in the studied region. The captured data was showing malarial case picture of only one tertiary care hospital and there is need to do the same study in private practitioner who are also providing the treatment to larger number of patients currently. P.vivax was more prevalent in rainy days and P.falciparum cases were more reported in post rainy season, is noteworthy finding of current study. Even though malaria cases and deaths are admirably decreased in last few years, case fatality rate in our findings is not tolerable for this curable disease. There is need to strengthen malaria control activities as well as implication of timely protocol based treatment.

AUTHORS' CONTRIBUTIONS

MS gestated the study, and procure the data from tertiary care hospital through proper channel and do cleaning of data and statistical analysis. CJ drafted the article, assisted in statistical analysis and manuscript preparation. Both the author read and agreed upon final manuscript. CA and SA assisted manuscript preparation and final drafting.

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