

# Current scenario of malarial trends in Jamnagar district: a cross-sectional study

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Received August 22, 2015. Accepted November 23, 2015

## Abstract

**Background:** Malaria is one of the major public health problems in India. In the year 2012, across the globe, there were 40 million confirmed malaria cases and 106,887 confirmed malaria deaths. In the year 2012, India had 1.07 million confirmed malaria cases and provisional 519 malaria deaths. In the last 5 years, trends of India are showing that total number of malaria cases, *P. falciparum* cases, and deaths are reduced. In the study district, 3,328 total malaria cases and 519 *P. falciparum* cases were noted in the year 2008. The study district is one of the endemic regions of the country. Keeping in view the abovestated problem, there is a need to know the current scenario of malarial trends in Jamnagar district. This might help in introducing new policy and help to focus on demanding areas.

**Objective:** To know the current scenario of malarial morbidity and mortality in Jamnagar district.

**Materials and Methods:** A cross-sectional study was conducted in rural areas of the study district. Of the total talukas in the study district, one PHC was selected from each taluka by simple random sampling technique.

**Result:** In this study, total malaria cases were showing a gradual decrease in trend from the period 2009 to 2013. *P. falciparum* malaria cases were showing a gradual decrease in trend from the period 2009 to 2012. One upsurge of total malaria cases was noted from 2009 to 2010, and *P. falciparum* malaria cases were noted in the year 2013. In study district, no death was reported owing to *P. vivax* malaria. Malarial mortality owing to *P. falciparum* malaria was reported in the study district.

**Conclusion:** In this study, malarial morbidity showing declining trend for last 5 years but one upsurge for both total malaria cases and *P. falciparum* cases was noted. Malarial morbidity owing to *P. falciparum* malaria was showing rising trend—a concerning finding of study. There were five deaths reported owing to *P. falciparum* malaria in the year 2009 and 2010. There is no single death owing to *P. vivax* malaria reported.


**KEY WORDS:** Trends, morbidity, mortality

## Introduction

Malaria is one of the major public health problems in India. Currently, National Vector Borne Disease Control Program

(NVBDCP) is running in the country. NVBDCP is following a goal of Millennium Development Goal no. 6 (i.e., to combat malaria). Its objectives are to reduce malarial morbidity and mortality by 50% by 2012 (Baseline year is taken as 2006). Targets fixed were annual blood examination rate over 10%, annual parasite incidence 1.2% or less, and 25% reduction in morbidity and mortality owing to malaria by 2010 and 50% by 2012.<sup>[1]</sup>

In the year 2012, across the globe, there were 40 million confirmed malaria cases<sup>[2]</sup> and 106,887 confirmed malaria deaths.<sup>[3]</sup> In the year 2012, India had 1.07 million confirmed malaria cases<sup>[4]</sup> and provisional 519 malaria deaths.<sup>[5]</sup> In the last 5 years, trends of India are showing that total number of malaria cases, *P. falciparum* cases, and deaths are reduced.<sup>[5]</sup>

Access this article online	
Website: <a href="http://www.ijmsph.com">http://www.ijmsph.com</a>	Quick Response Code: 
DOI: 10.5455/ijmsph.2016.27082015244	

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The annual rainfall, temperature, and humidity of the area ranged from 638 mm,<sup>[6]</sup> 10–42°C,<sup>[7]</sup> and 30%–70%,<sup>[8]</sup> respectively, which makes the entire area conducive for mosquito proliferation. In the study district, 3,328 total malaria cases and 519 *P. falciparum* cases were noted in the year 2008.<sup>[9]</sup>

The study district is one of the endemic regions of the country. In the study district, in the year 2012, total malaria cases were 1,556, of which 72 were *P. falciparum* cases.<sup>[10]</sup> Keeping in view the abovestated problem, there is a need to know the current malarial trends in the study district. This might help in introducing a new policy and help to focus on demanding areas.

The primary objective of this study was to know the current scenario of malarial morbidity and mortality in Jamnagar district.

## Materials and Methods

This study was conducted in rural areas of the study (Jamnagar) district. A cross-sectional study was conducted for a period of 1 year (i.e. from July 2013 to June 2014). Of the total talukas in the study district, one primary health center (PHC) was selected from each taluka by simple random sampling technique. After selecting the PHCs, visits were made to the PHCs. From each PHC, data regarding last 5 years malarial morbidity and mortality were collected in a pre-designed and pretested pro forma.

The data entry was done using Microsoft office Excel 2007, and data analysis was done using Epi Info software and Microsoft office Excel 2007. Charts were prepared for showing trend of situation in district/PHC.

The study protocol was reviewed and approved by the institutional ethical committee of the institution. Prior consent was taken after fully explaining the purpose of the study.

## Result

Table 1 shows year-wise change in malarial morbidity in selected PHCs from the period of 2009 to 2013.

In this study, total malaria cases were showing gradual decrease in trend from the period 2009 to 2013. One upsurge of malaria cases was noted from 2009 to 2010. Malaria cases were increased up to 34.01% from 2009 to 2010. But, thereafter, there was gradual decrease in trend of malarial morbidity. Malaria cases were decreased 14.09% from 2010 to 2011, 46.38% from 2011 to 2012, and 30.30% from 2012 to 2013.

Figure 1 shows that, in the selected PHCs, malaria cases were reduced over the time period of 2009 to 2013. From the year 2009, malaria cases were rising in most of the PHCs (Aliabada, Bhatia, Latipur, Nikava, Padana, Surajkaradi, and Vadatra) to year 2010. But, thereafter, it shows decrease in trend of malaria cases up to 2013.

Table 2 shows year-wise change in *P. falciparum* malarial morbidity in selected PHCs from the period of 2009 to 2013.

In this study, *P. falciparum* malaria cases were showing gradual decrease in trend from the period 2009 to 2012. One upsurge of *P. falciparum* malaria case was noted in the year 2013. *P. falciparum* malaria cases were decreased 7.69% from 2009 to 2010, 41.67% from 2010 to 2011, and 64.28% from 2011 to 2012. Then, one upsurge of 60% was noted in the year 2013.

Figure 2 shows the trend of *P. falciparum* cases in selected PHCs.

*P. falciparum* cases were reduced over time period of 2009–2013. But, some PHCs (Aliabada, Bhatia, Nikava, Padana, and Vadatra), from 2009 to 2010, show increase in trend. In PHCs Vadatra and Padana, still a significant number of *P. falciparum* cases were present.

Figure 3 shows that, from the period of 2009 to 2010, malaria cases were showing increase in trend. But, thereafter, from 2010 to 2013, there was gradual fall in malaria cases. Simultaneously, *P. falciparum* cases also showed decrease in trend.

There were five deaths owing to *P. falciparum* malaria were reported in the year 2009 and 2010.

## Discussion

Malaria cases were increased up to 34.01% from 2009 to 2010. But, thereafter, there was a gradual decrease in trend of malarial morbidity. Malaria cases were decreased 14.09% from 2010 to 2011, 46.38% from 2011 to 2012, and 30.30% from 2012 to 2013.

In India, trends of total malaria cases were showing gradual decrease in trend from the period 2009 to 2013. One rise in malarial case was noted 2.33% from 2009 to 2010. But, thereafter, there was a gradual decrease in trend of malarial morbidity. Malaria cases were decreased 18.08% from 2010 to 2011, 18.53% from 2011 to 2012, and 17.42% from 2012 to 2013.<sup>[11]</sup>

In Gujarat, trends of total malaria cases were showing gradual decrease in trend from the period 2011 to 2013. Malaria cases were decreased 15.06% from 2011 to 2012 and 23.26% from 2012 to 2013.<sup>[11]</sup>

One upsurge of *P. falciparum* malaria case was noted in the year 2013. Malaria cases were increased up to 34.01% from 2009 to 2010. But, thereafter, there was a gradual decrease in trend of malarial morbidity.

In India, *P. falciparum* malaria cases were showing gradual decrease in trend from the period 2009 to 2013. *P. falciparum* malaria cases were decreased 0.66% from 2009 to 2010, 20.30% from 2010 to 2011, 19.75% from 2011 to 2012, and 13.09% from 2012 to 2013.<sup>[11]</sup> In Gujarat, trends of *P. falciparum* malaria cases were showing gradual decrease in trend from the period 2011 to 2013. *P. falciparum* malaria cases were decreased 34.94% from 2011 to 2012 and 12.98% from 2012 to 2013.<sup>[11]</sup>

**Table 1:** Year-wise change in total malaria morbidity in selected PHCs

	PHC	2009	2010	2011	2012	2013
No. of malaria cases	Aliabada	56	65	63	25	13
	Bhatia	49	68	48	28	13
	Gunda	45	24	32	12	9
	Hadiana	76	59	57	37	39
	Latipur	45	51	58	41	36
	Nikava	89	131	103	50	10
	Padana	87	153	110	63	49
	Samana	10	0	11	4	3
	Surajkaradi	8	22	21	24	2
	Vadatra	123	215	174	79	79
Total cases		588	788	677	363	253
Percentage change (+/-)			+34.01	-14.09	-46.38	-30.30

**Table 2:** Year-wise change in *P. falciparum* malaria morbidity in selected PHCs

	PHC	2009	2010	2011	2012	2013
No. of <i>P. falciparum</i> cases	Aliabada	1	1	0	0	0
	Bhatia	1	2	0	0	0
	Gunda	0	1	0	0	2
	Hadiana	7	1	2	0	0
	Latipur	8	6	1	3	1
	Nikava	24	18	19	3	0
	Padana	8	15	3	1	10
	Samana	1	0	0	0	1
	Surajkaradi	1	0	0	1	0
	Vadatra	1	4	3	2	2
Total cases		52	48	28	10	16
Percentage change (+/-)			-7.69	-41.67	-64.28	+60

There were five deaths owing to *P. falciparum* malaria that were reported in the years 2009 and 2010.

In India, malarial mortality was showing gradual decrease in trend from the period 2009 to 2013. Malarial mortality reported 1,144 in 2009 became 440 in the year 2013. In Gujarat, malarial mortality was showing gradual decrease in trend from the period 2011 to 2012. Malarial mortality reported 127 in 2011 became 29 in the year 2012. But, in the year 2013, there was increase in mortality up to 38.<sup>[11]</sup>

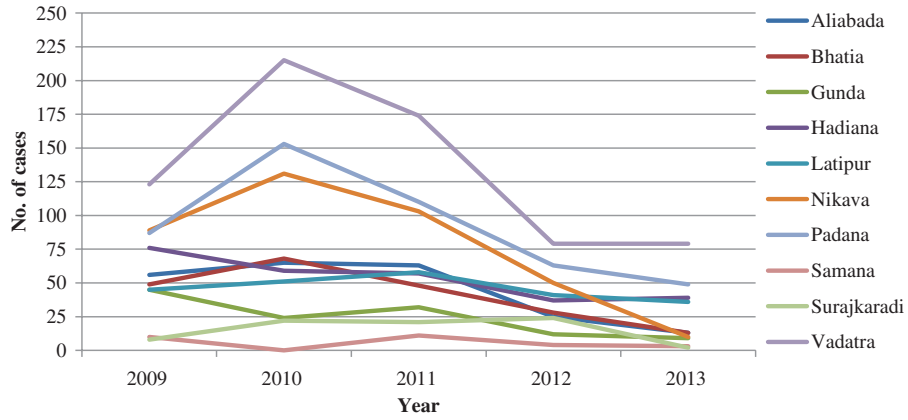
## Conclusion

Malarial cases show decrease in trend of malaria cases up from 2009 to 2013. One upsurge of malaria case was noted from 2009 to 2010. In the selected PHCs, declining trend may be owing to improved surveillance activities over time, and, simultaneously, malaria cases were showing decrease in

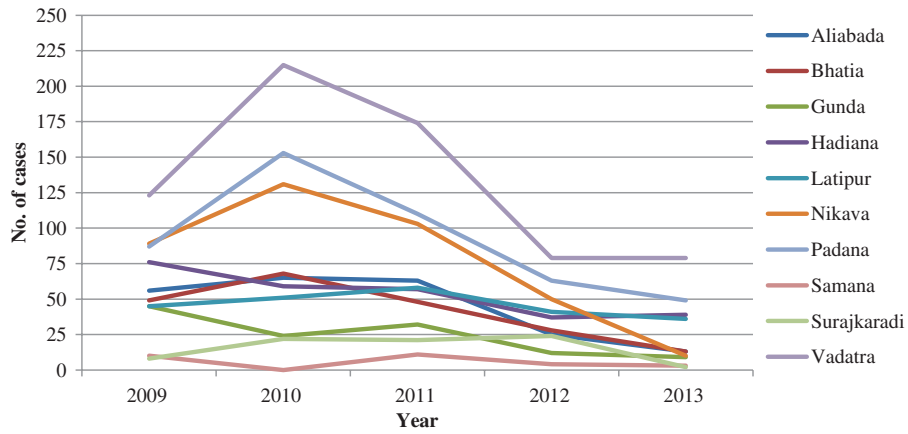
trend. This indicates declining trend of overall endemicity of malaria.

*P. falciparum* malaria cases were showing gradual decrease in trend from the period 2009 to 2012. One upsurge of *P. falciparum* malaria case was noted in the year 2013. In PHCs Vadatra and Padana, still, significant number of *P. falciparum* cases was present. Jamnagar being an agricultural and industrial area, every year, thousands of migrants from *P. falciparum* endemic districts migrate to the study district and stay in various areas of study district. So, rising trend of *P. falciparum* cases in study district may be owing to migrant population.

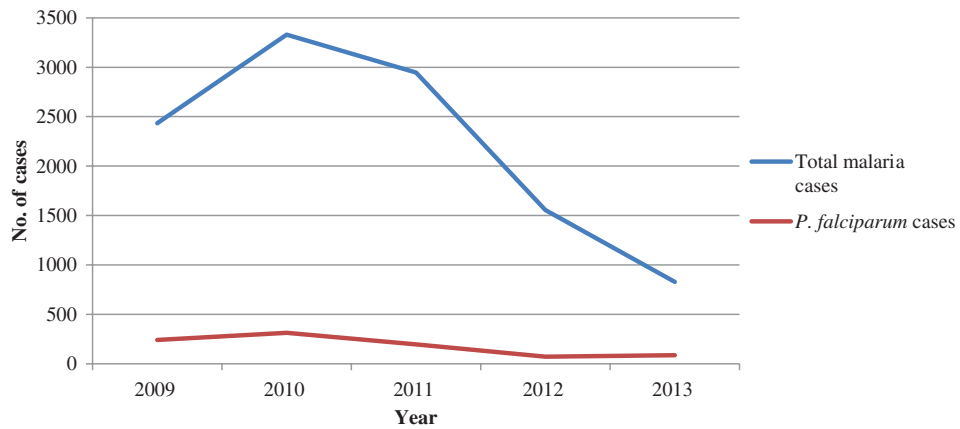
Malarial mortality owing to *P. falciparum* malaria was reported in the study district. It may be owing to delay in diagnosis of *P. falciparum* malaria either from patient side or health worker side or it may be owing to nonavailability of rapid diagnostic test kits. There is no single death owing to *P. vivax* malaria reported.



**Figure 1:** Year-wise trend of total malaria cases in selected PHCs.



**Figure 2:** Year-wise trend of *P. falciparum* cases in selected PHCs.



**Figure 3:** Year-wise trends of malaria cases and *P. falciparum* cases in study district.

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**How to cite this article:** Gohel A, Makwana N, Bhavsar S, Rathod M, Dhaduk K, Parmar D. Current scenario of malarial trends in Jamnagar district: a cross-sectional study. *Int J Med Sci Public Health* 2016;5:1549-1553

**Source of Support:** Nil, **Conflict of Interest:** None declared.