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Short Communication

Which Indicator Should Be used to Monitor Malaria Elimination in India?

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A B S T R A C T

The Annual Parasite Incidence (API) is currently being used by the National Vector Borne Disease Control Programme (NVBDCP) as an indicator to monitor malaria elimination efforts in states and union territories. This article is an attempt to find out how effective is the API as a tool to measure malaria elimination efforts in the country by reviewing documents published by the NVBDCP (for 2018 data) and National Statistical Office (for 2021 data) and by doing a web search. It was found that in the 2018 data set, there was no direct correlation between API and the number of malaria cases. Even in territories having low API, the number of malaria cases was high and in areas having high API, the number of malaria cases was low. From the 2021 data set, it was seen that the malaria problem was greatest in Chhattisgarh and least in Lakshadweep Islands. Thus, API by itself is not a useful indicator of malaria elimination efforts. Attention must also be paid to the actual number of malaria cases occurring in the state/ union territory, and at the present time, the focus must be on Chhattisgarh.

Keywords: India, Malaria, API, NVBDCP, Survey

Introduction

Malaria is thought to be a mild disease, but it is a life threatening one for thousands of years, causing 228 million cases and taking 405,000 human lives worldwide in 2018 according to the World Health Organization.[2] The majority of cases i.e., more than 90% of them were from the African region, and nearly 67% of the global death rates were of children below the age of 5 years. Plasmodium vivax and Plasmodium falciparum are the main parasite species out of the five Plasmodium affecting humans and pose the greatest threat of Malaria cases throughout the earth.[3] The World Health Organization (WHO) is very keen to reduce the incidence and mortality rate of Malaria by 90% and to eliminate it from at least 35 countries by 2030 and prevent the recurrence of Malaria cases in countries free from the disease.[4]

Material and Methods

The study design included an analysis of the annual report of the Malaria Division of the NVBDCP showing the APIs of the various States and Union Territories about the year 2018 which is the latest available in the public domain as well as an analysis of the website showing numbers of Malaria cases in the various States and Union Territories during 2018 as provided by the NVBDCP. Also, an analysis of the EnviStats 2022 document published by the National Statistical Office was carried out.

Annual Parasite Incidence (API): Annual Parasite Incidence (API) is given by the formula:

$$API = \frac{\text{Confirmed cases for one year}}{\text{Population under surveillance}} \times 1000$$

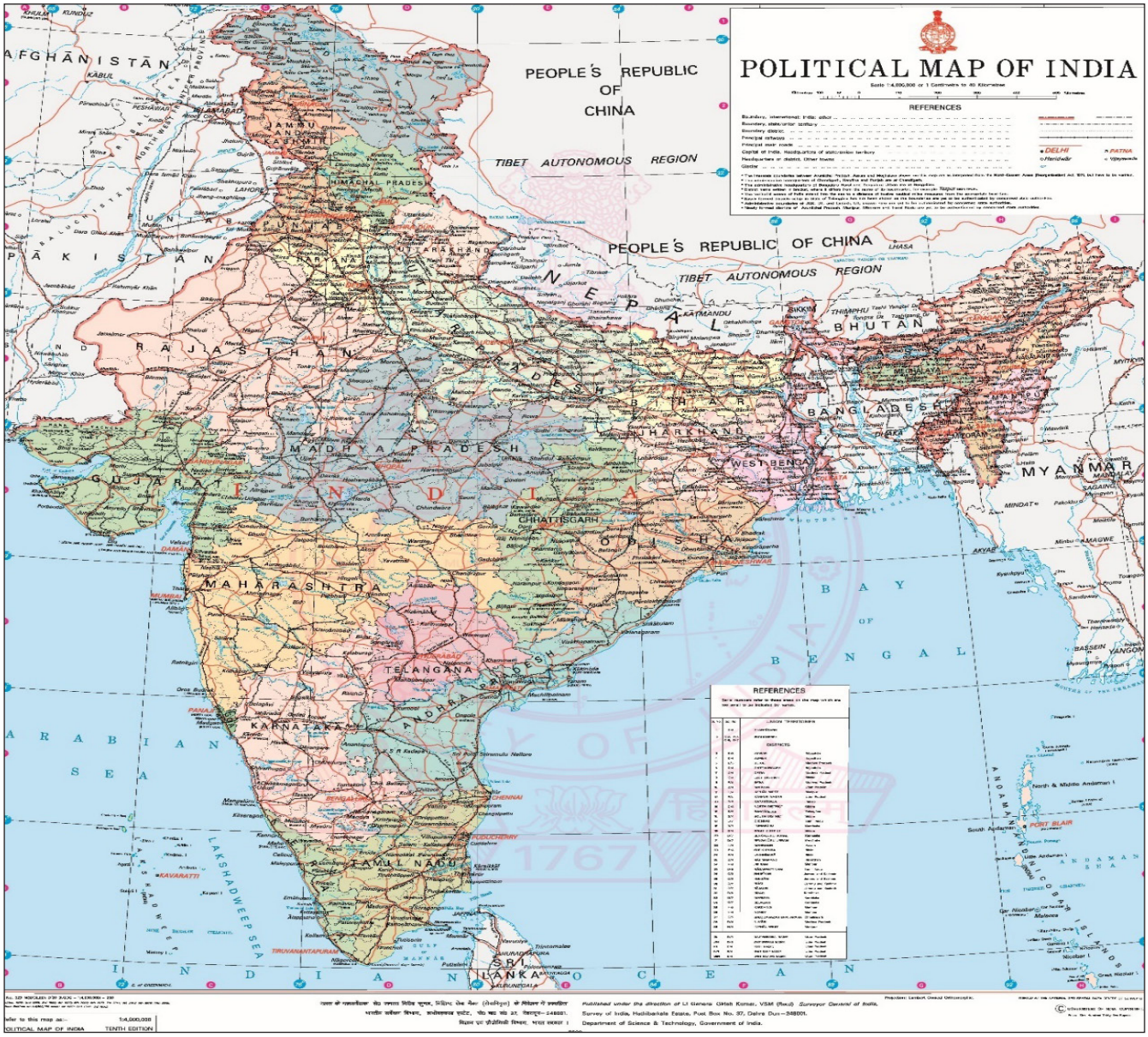

Figure: Map of India[1]

Results and Discussion

As seen in Table 1, though Mizoram had the highest API in the country of 3.58, the number of malaria cases was 4296 compared to Chhattisgarh which had a lower API of 2.63 but recorded 77140 malaria cases. Therefore, from an elimination point of view, the malaria problem is greater in Chhattisgarh even though Mizoram had a higher API.

Similar findings could be seen with other states and union territories. There was no direct correlation between API and the number of malaria cases. Even in territories having low API, the number of malaria cases was high and in areas having high API, the number of malaria cases was lower.

From Table 2, it is seen that, currently, the problem of malaria is greatest in Chhattisgarh followed by Odisha. It is least in Lakshadweep Islands followed by Sikkim.

In 2016, the Government of India adopted a framework for Malaria Elimination in India covering the period 2016-2030.8 This was based on WHO's Global Technical Strategy for Malaria covering the period 2016-2030 which was adopted in 2015 and updated in 2021.[9]

Table 1. API of States and U.T., 2018 (Arranged in Decreasing Order) & Actual Number of Malaria Cases, 2018[5, 6]

S. No.	State/ U.T.	API	Actual Number of Malaria Cases
1.	Mizoram	3.58	4296
2.	Tripura	3.23	13079

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3.	Chhattisgarh	2.63	77140
4	Meghalaya	1.83	6394
5	Jharkhand	1.48	53798
6	Odisha	1.48	66301
7	A & N Islands	0.56	259
8	Dadra & Nagar Haveli	0.46	173
9	Arunachal Pradesh	0.39	625
10	Uttar Pradesh	0.38	65431
11	Gujarat	0.33	21327
12	Madhya Pradesh	0.27	21311
13	W. Bengal	0.27	26382
14	Goa	0.24	377
15	Andhra Pradesh	0.12	6034
16	Assam	0.11	3816
17	Haryana	0.11	3147
18	Maharashtra	0.09	10726
19	Karnataka	0.08	5320
20	Lakshadweep Islands	0.08	5
21	Rajasthan	0.07	3502
22	Daman & Diu	0.07	24
23	Nagaland	0.06	115
24	Tamil Nadu	0.05	3762
25	Telangana	0.05	1787
26.	Uttarakhand	0.04	409
27.	Chandigarh	0.04	44
28.	Puducherry	0.04	54
29.	Jammu & Kashmir	0.03	161
30.	Kerala	0.03	908
31.	Sikkim	0.03	3
32.	Himachal Pradesh	0.02	98
33.	Punjab	0.02	643
34.	Delhi	0.02	473
35.	Bihar	0.01	1198
36.	Manipur	0.00	12
COUNTRY	INDIA	0.32	399134

Table 2. Number of Malaria Cases in States and Union Territories, 2021 (Till October) (Arranged in Decreasing Order)[7]

S. No.	State/ U.T.	Number of Malaria Cases
1	Chhattisgarh	24245
2	Odisha	22305
3	West Bengal	19237
4	Maharashtra	15021
5	Jharkhand	10178
6	Uttarakhand	9231
7	Tripura	8006
8	Mizoram	5441
9	Gujarat	4293
10	Madhya Pradesh	2428
11	Andhra Pradesh	1218
12	Karnataka	821
13	Rajasthan	755
14	Telangana	711
15	Tamil Nadu	687
16	Bihar	495
17	Meghalaya	401
18	Kerala	253
19	Delhi	160
20	Assam	120
21	Goa	78
22	Punjab	72
23	Haryana	51
24	Dadra & Nagar Haveli and Daman & Diu	48
25	Jammu & Kashmir	28
26	Andaman & Nicobar Islands	27
27	Manipur	14
28	Uttar Pradesh	13
29	Nagaland	12
30	Himachal Pradesh	10
31	Arunachal Pradesh	7
32	Chandigarh	4
33	Puducherry	2
34	Sikkim	2
35	Lakshadweep Islands	1
36	Ladakh	0
COUNTRY	INDIA	126375

The aim is to reach zero malaria cases by 2027 and then wait for three years before WHO can grant malaria-free status certification. It is already the middle of 2022 and India is about to reach the halfway mark of the period from 2016 to 2027.

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Conclusion

It is found that API alone is not a useful indicator of Malaria elimination efforts. Attention must be paid also to the actual number of Malaria cases occurring in the State/ Union Territory. Although India did not reach zero Malaria cases in 2018, it still has five years to do so but it must reach out to the States and Union Territories with high Malaria case-load first.

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