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SEASONALITY OF MALARIA IN UNION TERRITORY OF DADRA AND NAGAR HAVELI (2010 to 2020)

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ABSTRACT

Background – Among all the vector – borne diseases, malaria remains to be one of the largest contributors to disease burdens in terms of death and suffering and from the public health point, it is certainly the most devastating parasitic disease in most of the tropical developing countries. The present study aims to observe the seasonal variation of malaria in Union Territory of Dadra and Nagar Haveli.

Method – A retrospective record base study was carried out in U. T. of Dadra and Nagar Haveli during the period of January 2010 to December 2020. All positive cases were taken from the register maintained at the office of NVBDCP, Vinoba Bhave Civil Hospital, Silvassa. Data was analysed in the form of percentage, t – test and ANOVA.

Result – The incidence of malaria positive cases occurred through out of the year. The highest number of cases were recorded in August and difference in monthly incidence of malaria was significant (p=0.0000). The incidence of malaria was higher in Rainy season than winter and summer season (p=0.0000). In the year 2010 to 2020 positive cases of malaria were found respectively 5709 and 40. From 10 years data analysis, the present study concludes that as years progress there is gradual decrease in number of positive cases. Conclusion – A seasonal pattern of malaria was observed in U. T. of Dadra and Nagar Haveli, which provide basis for future malaria monitoring and control strategies in the study area.

Keywords: Malaria, seasonality, Month wise, Dadra and Nagar Haveli

INTRODUCTION

Malaria is one of the great causes of concern. It does not cause the deaths but also the scourges of poverty. It engulfs the vital energy of millions which results in wastage of man – days in illness. Due to this, the output

and earnings are low which consequently results in poverty. Thus, it creates a vicious circle which becomes difficult to break. As a result, malaria holds back economic and socio-economic development of the societies. Most of the countries lost billions of dollars annually due to malaria but human pain and sufferings cannot be expressed in rupees or dollar terms. AS per WHO, there were 229 million new cases of malaria and estimated 4,09,000 malaria deaths worldwide in 2019. India contributed to the largest absolute reductions in malaria positive cases in South-East Asia Region, from about 20 million cases in 2000 to about 5.6 million in 2019. In the WHO South-East Asia Region, malaria deaths reduced by 74%, from about 35000 in 2000 to 9000 in 2019. India accounted for about 86% of all malaria deaths in the WHO South-East Asia Region. Malaria positive cases are reported from high disease burden states namely North – Eastern (NE) states, Andhra Pradesh, Chhattisgarh, Gujarat, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Rajasthan and West Bengal.

Malaria is a febrile disease caused by the four species of human malaria parasites namely Plasmodium Vivax, Plasmodium falciparum, Plasmodium malariae, Plasmodium oval. This Plasmodium is transmitted to the host by the bite of an infected female Anopheles mosquito. The Common symptoms of malaria fever are mild to higher fever, headache, cold and shivering and pains in the joints. In Plasmodium falciparum malaria, infected red cells can block the blood vessels of the brain. It can affect the brain and the rest of the central nervous system. It may cause cerebral malaria, which is often fatal. Other crucial organs can also be damaged, with serious consequences.

Climate is the most determinant factor in the occurrence to malaria. Climate directly affects the disease agents and the hosts. It also indirectly affects the socio-economic environment of the region. The vector of the disease, mosquito, is highly vulnerable to climatic extreme conditions. The incubation rate of the parasite and the longevity of the vector are also influenced by the climate. In this way, climate plays a vital role in the incidence and dispersion of malaria.

Therefore, the present study was designed with objectives to find out trend and seasonal variation in malaria cases in Union Territory of Dadra and Nagar Haveli.

Data Analysis

The total number of monthly cases of malaria positive cases from January 2010 to December 2020 was taken from the office of NVBDCP, Vinoba Bhave Civil Hospital, Silvassa NVBDCP, New Dehli, which is

umbrella institution which help in control and prevention of other vector borne diseases like Japanese Encephalitis, Chikungunya, Kala – azar, Lymphatic, Filariasis, dengue and Malaria.

Statistical Analysis

The Data is entered into a SPSS 17 spread sheet and analysed to compare the means of the monthly reported cases. The descriptive statistics give information about the mean monthly reported cases in each year, the minimum and maximum number of reported cases each year. One sample t – test is used to test that the mean monthly cases of malaria of the year 2010 – 2020 are significantly different or not. The Kruskal – Wallis test (H – test) was used to investigate whether there was seasonability in the recorded figures from 2010-2020.

RESULT

The descriptive statistical of registered positive malaria cases is shown in **Table 1**. 5709 and 40 positive cases of malaria were found during the year 2010 and 2020 respectively. The least number of maximum monthly cases was recorded as 40 in 2020 and highest number of maximum monthly cases was recorded in 2010 as 5709. From compile data of 10 years we can say that there is gradual decrease in annual positive malaria cases. From figure No. 1 in 2010, the highest number was recorded in August as 1217 and then, highest reported cases were 1061 (in September, 2011) and 1032 (in August, 2012).

Table 1: Descriptive Statistics of Malaria positive cases in Dadra and Nagar Haveli (UT)

Year	No. of Cases per Year	Minimum Malaria positive cases reported in Month during the year	Maximum Malaria positive cases reported in Month during the year
2010	5709	76	1217
2011	5149	99	1061
2012	4922	58	1032
2013	1778	32	357
2014	669	15	175
2015	536	3	142
2016	423	9	95
2017	328	8	59
2018	245	8	39
2019	81	2	19
2020	40	0	13

Table 2: Reported Cases are differential by Month (Period)

Malaria Positive Cases Reported by Month	t Value	p - value	95 % Confidence Interval of the Difference	
			Lower	Upper
	0.26 with 131 d. f.	0.796	107.8	193.4

It is revealed from above **Table 2** that the mean malaria positive cases are significantly different with a probability value of 0.0000 which is less than 00.05. This

implies that if 100 similar studies were carried out under the same conditions all of them would show that there is a significant different in the malaria cases. This leads to the rejection of the null hypothesis and a conclusion is made that on average the malaria cases considered are significantly different.

Table 3: Seasonally Reported Malaria Cases

Seasons	No. of Months during study period	mean No. of Cases (Mean ± SD)	F - Value	P - Value
Summer (February - May)	44	104.3 ± 146.3	8.48 with 131 df	0.0000
Rainy (June - September)	44	269.1 ± 358.9		
Winter (October - January)	44	78.4 ± 128.4		

From **Table 3** it is established that the maximum cases were recorded in June to September (Rainy Season) and followed by October to January (Winter Season). The null hypothesis is thus rejected and it is concluded that the series exhibited seasonality for the period recorded. As observed in figure 1, most cases were recorded in June, July, August and September of which each accounted for 10.06%, 14.27%, 18.40% and 16.84% of the total cases respectively.

DISCUSSION

The geographical position and climatic condition of Dadra and Nagar Haveli has been favourable to the transmission of malaria. In our study the maximum numbers of cases were found in the months of June to October with peak in August. The high prevalence of malaria in this period could be due to collection of water in rainy season and development of mosquito breeding sites which continues till November. In the context of present study location and physiographic factors have greatly influence the climate characteristics of the UT. Being adjacent to the Arabian Sea; the climate of Dadra and Nagar Haveli has become typical of its type. DNH enjoys maritime climate. Ample rainfall (about 250 cm), relative humidity (more than 60%) and temperature between (18^0 to 32^0 C) favour the spread of malaria in UT of DNH. The minimum malaria incidence was observed during January which was less than the mean annual incidence. The resent study follows the decrease trend of malaria as it occurs in all years of the study period. The same may be due to increase in awareness of malaria; increase in proper precautionary steps conducted by local government against malaria or may be due to seasonal changes.

Malaria is strongly weather dependent i. e. it is depend on average amount of rainfall, humidity and mean temperature. Malaria transmission was found to occure between the months of June to September with peak in month of August. Rainy season in DNH starts

in June and lasts till September. This shows that the incidence of malaria in DNH has strong correlation with rainfall. Maximum malaria positive cases of recorded in rainy season (59.57%) followed by summer season (23.07%) and winter season (17.36%). Transmission is seasonal with increases intensity related to rain. The correlation coefficient for the association between monthly rainfall and monthly incidence of malaria was found greater than the association between temperature and malaria incidence. This indicates that rainfall seems to play a more important role in transmission of the disease than temperature. Based on the results of the present study, the malaria cases show high peak of incidence in rainy season and the trend will continue to occur in the near future if appropriate actions are not taken on time.

CONCLUSION

In the present study, there is gradual decrease in number of positive malarial cases annually from 2010 to 2020. The transmission of malaria and incidence of positive malaria cases is closely associated with the seasonal character in the UT. There is high prevalence of Malaria in monsoon; as compared to other seasons. Most of the cases were recorded during July and August. It indicates that malaria is a seasonal disease. Our study result will be helpful to the local government agencies for planning of prevention measures to control malaria.

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