



# A TEMPORAL STUDY ON MALARIA DISEASE TO FIND RISK ZONES IN VIZAG CITY, VISAKHAPATNAM, A.P, INDIA.

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## 1). Abstract:

Malaria is a major public health problem in GVMC, Visakhapatnam district of Andhra Pradesh, India. Year wise data of Malaria cases were collected for the GVMC (2010- 2019). To investigate, whether large-scale Malaria outbreaks in GVMC and to identify severely affected zone due to Malaria between 2010 and 2019. The yearly analysis of the data revealed that maximum cases of Malaria were recorded in the year of 2013 and the least cases were recorded in the year 2019 likewise highest cases were recorded in the Zone-II and Zone-III and the lowest cases were recorded in Zone- VI. With the aid of findings in this study, DM&HO, GVMC may implement health care facilities according to time and zone.

## 2). Introduction

Human is greatly affected by environmental factors such as soil, water and air, which play a definite role in the development of certain diseases. The spread of diseases and the threat of epidemics is exacerbated by population growth and increased transport facilities, which indirectly spread the disease (Susan and Paul, 2000). Overpopulation leads to congestion and poor maintenance of the environment, which eventually turn into store-houses of disease-causing vectors. One such vector-borne disease, often associated with environmental degradation, is malaria, one of the oldest chronic diseases affecting mankind for centuries, and was cited by Hippocrates in the early 5<sup>th</sup> century. 'Malaria' derived from the

Latin ‘‘malameans’ ‘bad’ and ‘aria’ means ‘air’. The term was first used by Dr. Francisco of Italy in the 18th century to refer to the association of the disease with bad air in swamps. Then in 1880 scientists discovered that malaria was a contagious parasitic disease Anopheles mosquito (Christian Nordqvist, 2009). Among the anopheles the female Anopheles mosquito which feeds on human blood plays the role of a vector in transmitting the parasite and incidence of malaria. Climatic elements namely temperature, relative humidity and rainfall have direct relation in the growth and In Anopheles, the female Anopheles, who eats human blood, plays a vector role in transmitting mosquito, parasite, and malaria cases. Direct sunlight is detrimental to the growth of the vector mosquito and temperatures of 20°C to 300°C are suitable for the malaria parasite. The parasite does not form at temperatures below 16°C and above 30°C (Park and Park, 1977). Humidity relative to the normal lifespan of host mosquitoes should always be above 60 per cent. Mosquitoes die quickly at low humidity, whereas at high humidity they become active and eager to feed. As a result, more parasites are released into human blood. Therefore, the higher the humidity the higher the cases of malaria will always be (Park and Park, 1977).

### 3). Data and Methodology:

The study mostly depends upon Secondary data and it was collected from the DM&HO (District Medical and Health Office) Visakhapatnam, District Malaria controlling office and Primary health care centers regarding numbers of dengue cases from 2010 to 2019 period for 10 years. In this study SPSS-2017 has been used for descriptive analysis and GIS-10.1 software is used for generating location Map of Visakhapatnam.

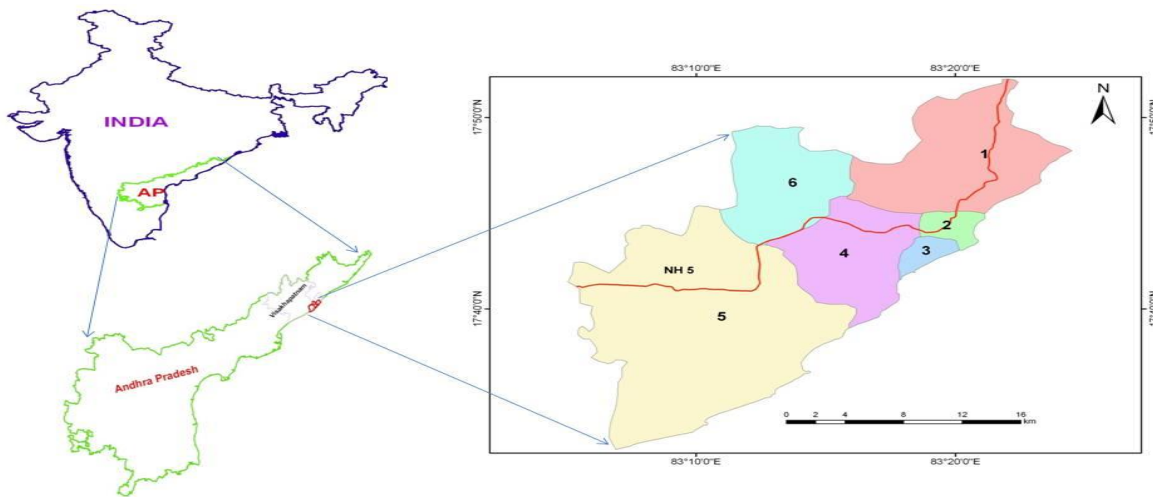
### 4). OBJECTIVES:

- 1). To assesses the temporal variation of malaria disease in GVMC.
- 2). To examine, within sex zones of GVMC, which zone is affected severely by malaria disease.

### 5). Study area:

Visakhapatnam city is 16<sup>th</sup> metropolitan city in India and comes under million cities category in the state of A.P. Visakhapatnam is one of the fastest-growing cities in the state as well as in the country, is experiencing rapid industrialization. The city has tremendous location advantages like extensive tracts of suitable land for the establishment of industries, natural harbor facilities.

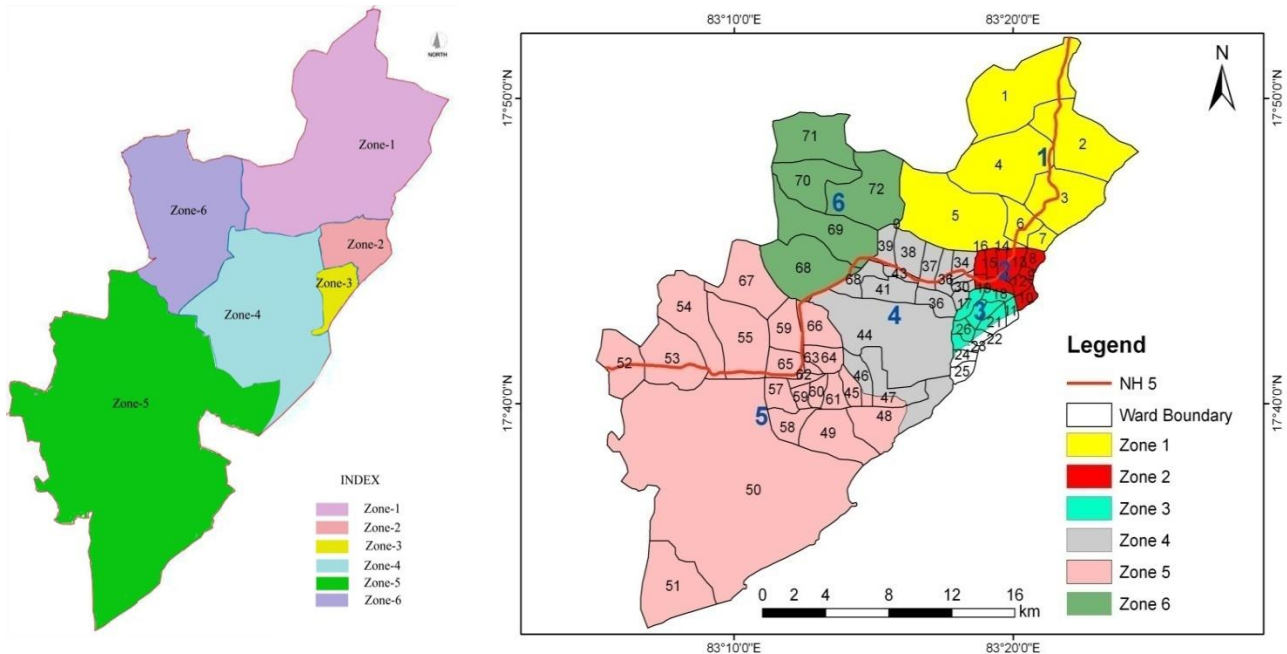
## LOCATION OF MAP OF GVMC- VISAKHAPATNAM



## GVMC'S ADMINISTRATIVE ZONES AND WARDS

Visakhapatnam is a fast developing port city with the highest population and second-largest in the urban agglomeration in population in united A.P. The account of rapid industrialization is one of the significant factor for migration into the city. Visakhapatnam was originally a small fishing village but due to its natural harbour, it developed into a major port. It has experienced rapid industrialization with the growth of industries including steel, petroleum refining and fertilizer with the formation of greater Visakhapatnam in 2005 the city's development is set for a quantum leap. The city has implemented several reforms including e-governance and citizen-friendly initiatives and this is the first city in the country to implement e-governance and still leads in offering a variety of services to its residents online.

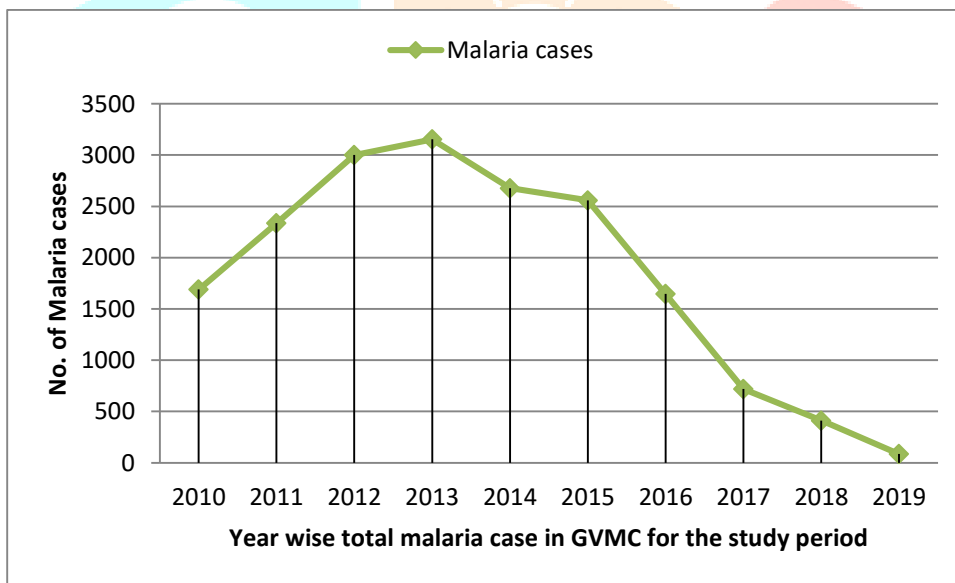
The total geographical area of Vishakhapatnam is 532 sq. km. The city is divided into six administrative zones by the government of AP under Greater Visakhapatnam Municipal Corporation (GVMC). Zone-I contains 6 wards and geographically the area is 119sq.km. The Zone-II has 12 wards and geographically the area covers 17sq.km. The Zone-III contains 12 wards and geographically the area covers 10sq.kms. Zone-IV has an area of 87sq.km and has 19 wards. The Zone-V contains 15 wards and the geographical area of 229sq.km and the zone-VI contains 7 wards and the geographical area covers with the 70 sq.km. In 1991 Visakhapatnam city has only 52 wards later they were increased to 72 Wards in six Zones which come under Greater Visakhapatnam jurisdiction limits.



GVMC'S ADMINISTRATIVE ZONES AND WARDS

6). RESULTS AND DISCUSSION:

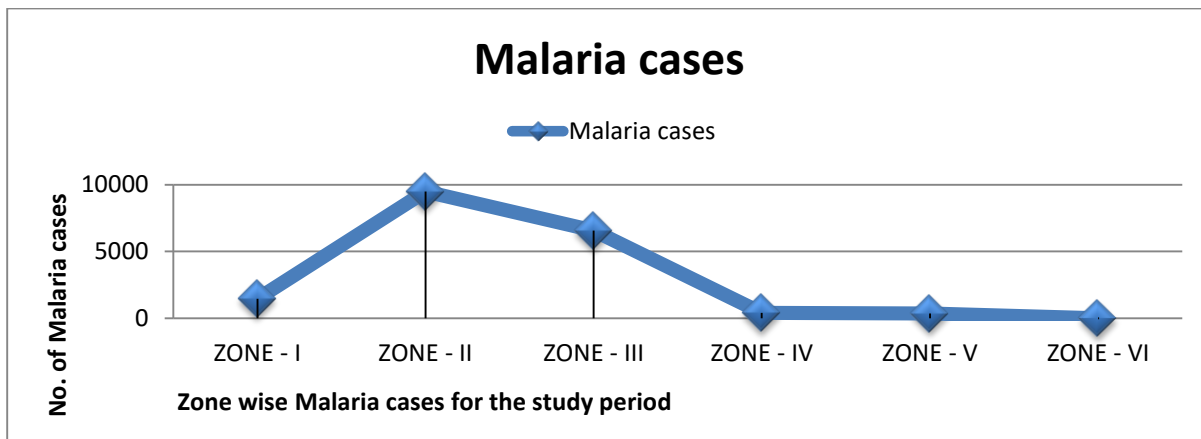
Figure- I



In the above figure, the graph is gradually increased to the year of 2013 from the year of 2010. After the year of 2013, the graph gently declines up to the year 2019.

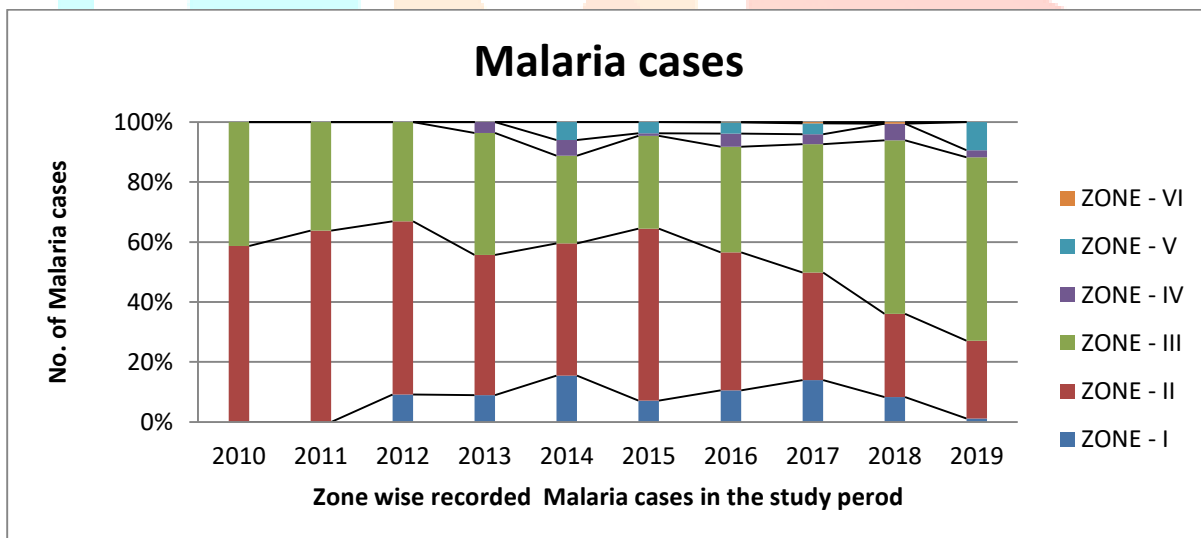
From the above graph, it can be understood that the maximum cases were recorded in the year of 2013 with 3153 cases and the minimum cases were recorded in the year of 2019 with 85 cases. In 2014 there is a sudden drop in the cases after the year 2013 because in 2013 HUDHUD cyclone hit the GVMC so the vegetation of the GVMC was destroyed due to the cyclone. The second highest cases were recorded in the year of 2012 with 3001 cases and the second-lowest cases were recorded in the year of 2018 with 411 cases.

**Figure-II total recorded Malaria cases according to Zones of GVMC.**



From the above graph, it can be observed that the maximum cases were recorded in Zone-II with 52% of cases and the minimum cases were recorded in the zone-VI with 0% cases. Coming to second highest cases were recorded in the zone-III with 36% of total cases and the second-lowest cases were recorded in the zone-IV and V with 2% of the total cases. Finally in the zone -I, 8% of cases were recorded.

**Figure- III shows year wise recorded Malaria cases according to zones in the GVMC.**



From the above bar diagram, it can be observed that in the year 2010 only cases were recorded in zone-III with 699 cases and Zone-II with 991 cases. Again in 2011 also dengue cases were recorded in the zone-III with 845 cases and zone -II with 1491 cases. In the year 2012 from zone -VI, V and IV there was not any recorded cases besides that in the zone -II highest cases were recorded for this year with 1733 cases and in this year lowest cases were recorded in the zone -I with 275 cases and in this year medium case were recorded in zone-III with 993 cases. Coming to the year of 2013, in this year highest cases were recorded in the zone -II with 1474 cases and in this year lowest cases were recorded in Zone-IV with 113 cases and there were no cases recorded in zone-VI. Move on to the year of 2014, in

this year the highest cases were recorded in Zone-II with 1180 cases, the lowest cases were recorded in Zone-IV with 113 cases and there were not any cases in the zone -VI. Coming to 2015, the highest cases were recorded in Zone-II, the lowest cases were recorded in the zone -IV with 22 cases and no case was recorded in zone-VI. Move on to the year 2016, the highest cases were recorded in Zone-II with 758, the lowest cases were recorded in the zone-VI with 1 case. in the year 2017, the highest cases were recorded in the zone-III with 308 cases, the lowest cases were recorded in zone-VI with 3 cases. Going to the year of 2018, the highest cases were recorded in zone-III with 238 and the lowest cases were recorded in the zone-VI with 2 cases. And in the year of 2019, the highest cases were recorded in zone-III with 52 cases, the lowest cases were recorded in zone-I with 1 case and there was no case in the zone- VI.

### 7). Conclusion:

In this study, it can reveal that Malaria cases were decreased from 2010 to 2019 due to malaria-causing mosquito controlling activities by GVMC. After the Hudhud cyclone, there was a decline in Malaria cases because the vegetation of the GVMC was destroyed. Half of the total cases were recorded in Zone-II because in this zone nearly 59 slums have existed and it contains 9% of the total slum population of GVMC so due to financial problems and lack of awareness, slum people could not able maintain a healthy environment.

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