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Study of Trends of Chikungunya and Dengue in Aurangabad and Periphery

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A B S T R A C T

Dengue and chikungunya are infectious diseases that often result in hospitalizations and are associated with high public health costs. Due to the similarity of symptoms between dengue and chikungunya, improved diagnostic tests are desperately needed. Thus ELISA plays a key role to differentaiate between the two. The Aim/Scope of the study was to detect the seropositivity of Dengue and Chikungunya based on ELISA & study the trends in relation to season, region, gender and admission pattern. Study population included Serum Samples received from clinically suspected patients of Dengue and Chikungunya. Study period taken up was from June 2015 to May 2016. For Dengue, NS1 ELISA was done in fever less than 5 days while IgM ELISA was done in fever more than 5 days & IgM ELISA for suspected Chikungunya patients. Also, 42 samples tested for both Dengue and Chikungunya. Chikungunya showed a monthwise steady increasing trend from August to December followed by downfall. Males showed more seropositivity for Dengue while Females, for Chikungunya. Aurangabad city showed more cases of Dengue while periphery of Aurangabad showed more cases of Chikungunya. Suspicious In patient cases showed more seropositivity for Dengue,thus suggesting Dengue being a more severe form and more life threatening. 42 samples that were sent for both Dengue and Chikungunya tests, showed that 12 samples were Positive for Chikungunya & one patient showed co-infection. Thus, apart from getting to know the seasonal, regional,gender and admission related differences between the two diseases our study also lead to the conclusion that cases suspected for Dengue should be tested for Chikungunya as well and vice versa, for limiting the chances of misdiagnosis/ underdiagnosis and knowing actual rate of Incidence.

Introduction

Dengue, also called classic dengue or 'Break Bone Fever', is a Flaviviral infection found in large areas of tropical and subtropical regions[1] ,is potentially fatal. Chikungunya Virus belongs to the genus Alphavirus of Togaviridae. Dengue virus (DENV) and Chikungunya virus (CHIKV) are transmitted by the same species of mosquito, *Aedes aegypti*.

Dengue fever is a major public health problem in India[7] and is widespread and endemic in most major cities[3]. Dengue outbreaks have continued since the 1950s

but severity of disease has increased in the last two decades. Chikungunya on the other hand is having outbreaks since 2006 after a gap of three decades and cases a seen more frequently after the year 2010.

The clinical symptoms of dengue, caused by any of the four serotypes of DENV, may be mild as like fever, or severe, in the form Dengue hemorrhagic fever (DHF) and Dengue shock syndrome (DSS).Increased rates of hospitalization due to severe dengue, during outbreaks, leads to huge economic loss and strained health services. There is no specific antiviral therapy and treatment is only supportive.[5] Also, the rise in urbanisation, population explosion have additional effect on causing rise in seropositivity. Resurgence of chikungunya has been attributed to various factors including globalization, increase in the mosquito population, loss of herd immunity and the mutation A226V in the E1 gene causing a significant increase in CHIKV infectivity for *Ae. Albopicust*[4].In the absence of specific antiviral therapy, control of transmission of Dengue and Chikungunya virus by vector management is the sole method available for decreasing associated morbidity.

The main aim and objectives of this study includes, to detect the seropositivity of Dengue and Chikungunya based on ELISA and to study the regional, seasonal, gender and admission pattern related trend of Dengue and Chikungunya

Materials and Methods

This Study was conducted at GMC Aurangabad, India.

Study population: Samples received from clinically suspected patients of Dengue and Chikungunya from GMC Aurangabad and peripheral PHC's.

Study period: July 2015 to May 2016

Sample size :

a) 604 for Dengue ELISA only.
b) 162 for Chikungunya ELISA only.
c) 42 samples that were clinically suspected for both Dengue and Chikungunya were tested.

Dengue NS1 ELISA was done in fever less than 5 days[2] while Dengue IgM ELISA was done in fever more than 5 days. IgM ELISA were performed in all Chikungunya suspected cases.

Kits used: J.Mitra, New Delhi for NS1 and kits from National Institute Of Virology (NIV) Pune for Dengue and Chikungunya IgM ELISA

Results and Discussion

Total Dengue samples: 604

Positive for Dengue: 95

70 patients were positive for NS1 ELISA (19%) and 25 patients were positive for IgM ELISA(11%)thus indicating that fever less than 5 days showed more seropositivity.

Total samples for Chikungunya : 162

Positive For Chikungunya by IgM ELISA :40 (seropositivity of 25%)

42 samples were tested for both Dengue and Chikungunya ELISA of which 12 samples were positive for Chikungunya

Co-Infection : seen in a single patient

Symptomatically ; Dengue showed more

symptoms of fever and Rash while Chikungunya patients showed more symptoms of Joint pain, Bodyache and Headache .

50 cases (52.6%)of Dengue Patients & 6 cases (15%) Chikungunya patients had Platelet count less than 1 lakhs.

Chikungunya showed an uniformly monthwise increasing trend from August with maximum cases in December.

Male:Female ratio for Chikungunya was 1:1.6 while Male:Female ratio for Dengue was 2:1 Aurangabad showed more cases of Dengue while periheral areas showed more cases of Chikungunya.

80% serpositive cases for Dengue ELISA were needed to be managed on IPD basis while only 25% cases were managed on IPD basis For Chikungunya thus indicating that Dengue showed more severe pattern as compared to Chikungunya.

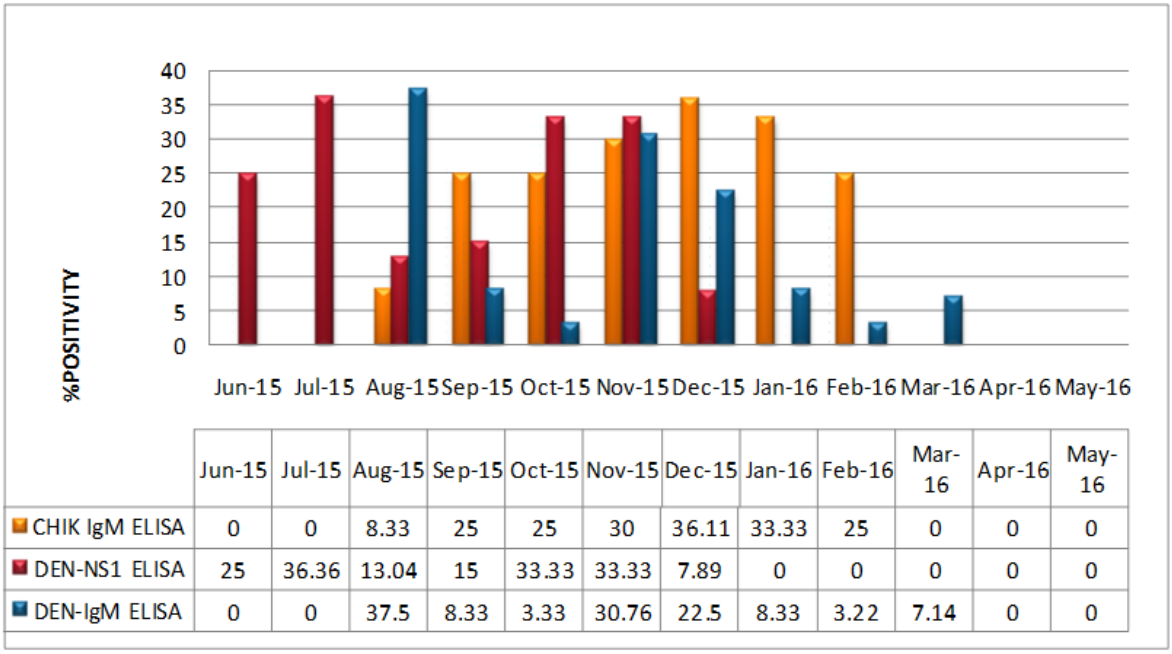
Table.1 Shows Month wise percentage seropositivity of Chikungunya

CHIKUNGUNYA				
Month	**Total**	**Positive**	**Negative**	**% Positivity**
June2015	**00**	**00**	**00**	**00**
July2015	**00**	**00**	**00**	**00**
Aug2015	**36**	**03**	**33**	**08.33**
Sept2015	**20**	**05**	**15**	**25.00**
Oct2015	**40**	**10**	**30**	**25.00**
Nov2015	**20**	**06**	**14**	**30.00**
Dec2015	**36**	**13**	**23**	**36.11**
Jan2016	**06**	**02**	**04**	**33.33**
Feb2016	**04**	**01**	**03**	**25.00**
Mar2016	**00**	**00**	**00**	**00**
Apr2016	**00**	**00**	**00**	**00**
May2016	**02**	**00**	**02**	**00**
TOTAL	**162**	**40**	**122**	**24.69**

Table.2 Shows positive cases and percentage seropositivity of Dengue NS1 ELISA and Dengue IgM ELISA

Month	Tested for IgM	IgM ELISA Positive cases	% Positivity	Tested For NS1 ELISA	NS1 ELISA Positive cases	% Positivity
Jun-15	02	0	0	08	02	25
Jul-15	05	0	0	11	04	36.36
Aug-15	08	3	37.5	92	12	13.04
Sep-15	60	5	8.33	100	15	15
Oct-15	30	1	3.33	72	24	33.33
Nov-15	13	4	30.76	30	10	33.33
Dec-15	40	9	22.5	38	03	7.89
Jan -16	12	1	8.33	05	00	00
Feb-16	31	1	3.22	12	00	00
Mar-16	14	1	7.14	02	00	00
Apr-16	02	0	0	02	00	00
May-16	13	0	0	02	00	00
TOTAL	**230**	**25**	**10.86**	**374**	**70**	**18.71**
Total Samples Tested For Dengue = 604				**Total Positive Samples For Dengue = 95**		**Overall % Positivity= 15.72**

Fig.1 Shows Monthwise percentage positivity pattern of Chikungunya, Dengue NS1 and Dengue IgM cases



	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	Jan-16	Feb-16	Mar-16	Apr-16	May-16
CHIK IgM ELISA	0	0	8.33	25	25	30	36.11	33.33	25	0	0	0
DEN-NS1 ELISA	25	36.36	13.04	15	33.33	33.33	7.89	0	0	0	0	0
DEN-IgM ELISA	0	0	37.5	8.33	3.33	30.76	22.5	8.33	3.22	7.14	0	0

Table.3 Shows Comparison of Chikungunya and Dengue Positive cases in terms of various Characteristics e.g : Sex, Region, Admission pattern & Symptoms

Characteristics	Chikungunya	% Positivity	Dengue	% Positivity
	Total Positive =40 (n)		Total Positive =95(n)	
Male	15	37.50	63	66.31
Female	25	62.50	32	33.68
Aurangabad city	11	27.5	83	87.36
Periphary(PHC)	29	72.50	12	12.63
Opd	30	75.00	19	20.00
Ward	10	25.00	76	80.00
Fever	37	92.50	95	100.00
Joint pain	36	90.00	45	47.36
Bodyache	37	92.50	76	80.00
Headache	09	22.50	20	21.05
Rash	04	10.00	22	23.15
Platelet Count	>1 lakhs(34) <1 lakhs(06)	85.00 15.00	>1 lakhs(45) <1 lakhs (50)	47.36 52.63

Fig.2 Shows Month wise percentage positivity pattern of Chikungunya, Dengue NS1 and Dengue IgM cases

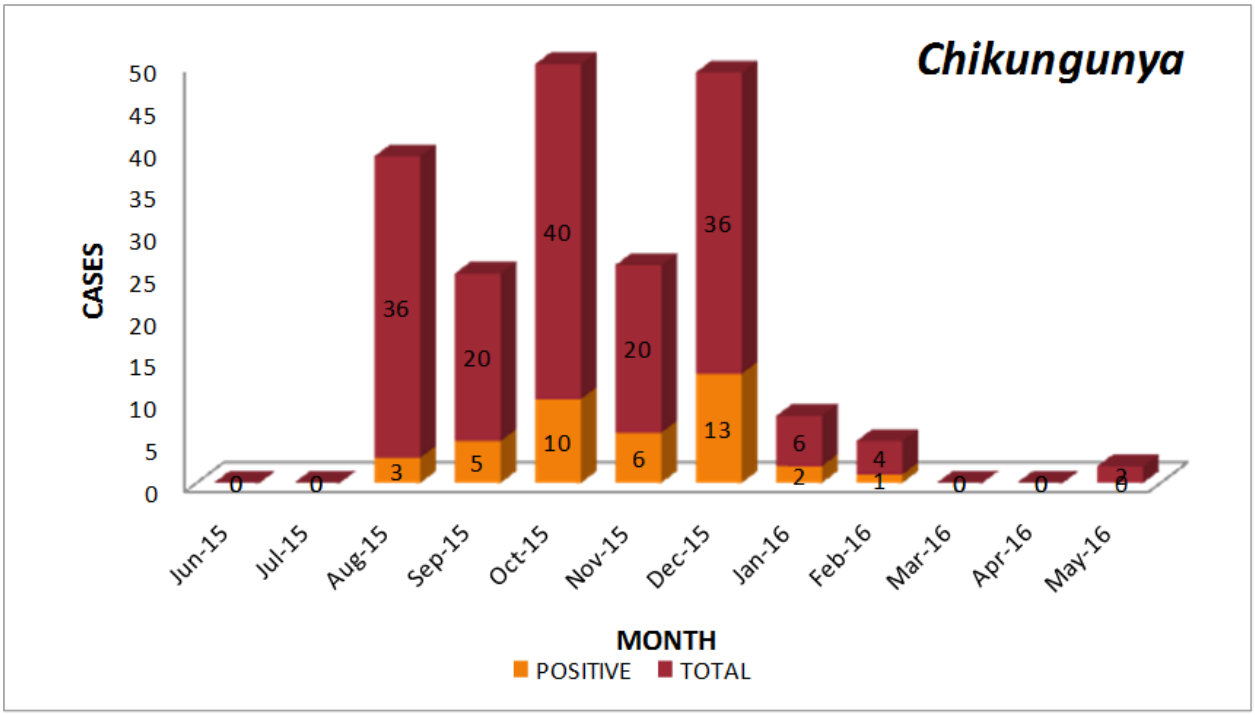


Fig.3 Shows Monthwise Positive cases of Chikungunya among total samples tested

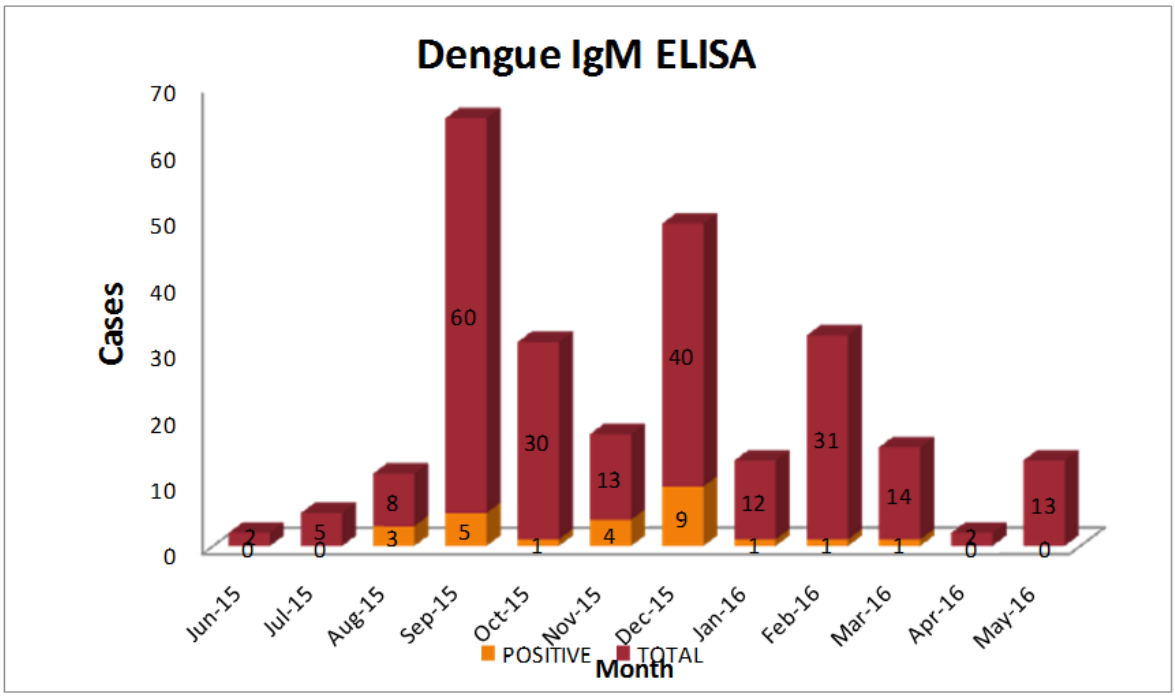


Fig.4 Shows Monthwise Positive Cases of Dengue IgM among total samples tested

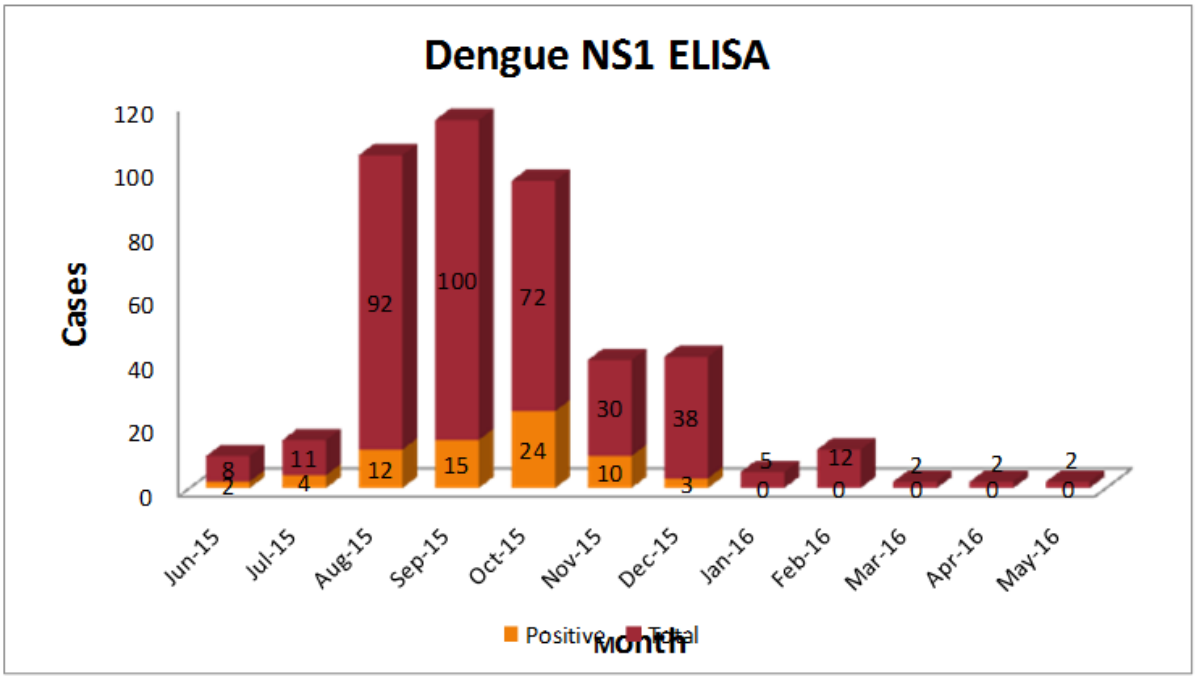


Fig.5 Shows Month wise Positive Cases of Dengue NS1 among total samples tested

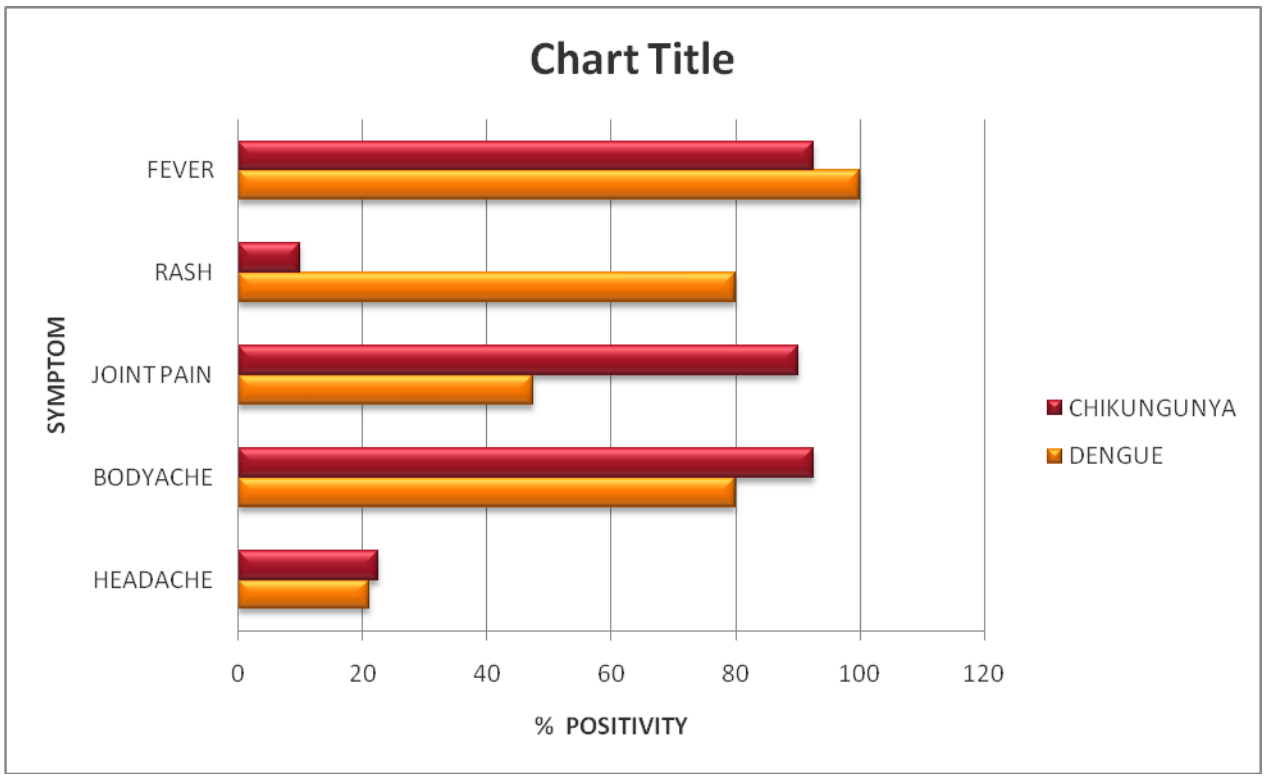


Fig.6 Shows graphic picture symptomatic variations in dengue and chickungunya

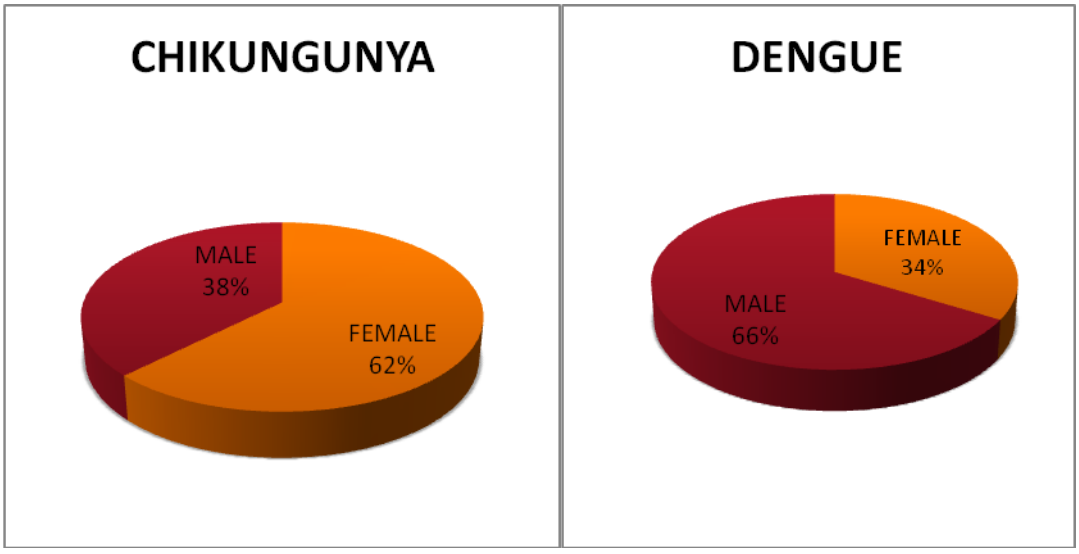


Fig.7 Shows Percentage positivity of Chikungunya and Dengue in males and females

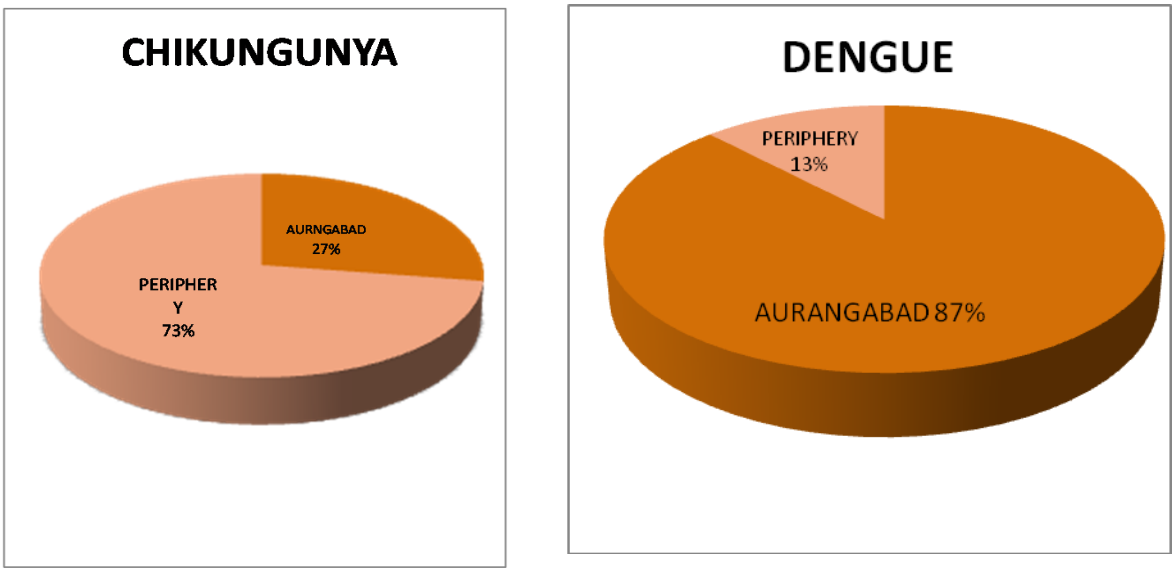
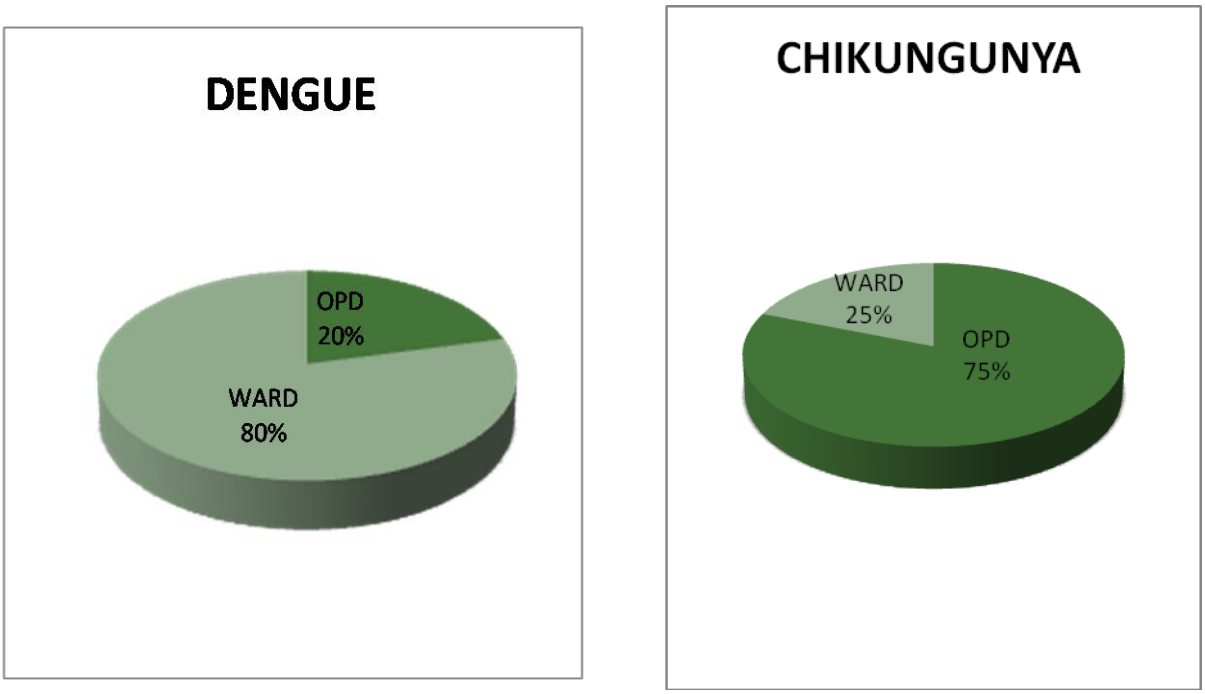


Fig.8 Shows Percentage positivity of Chikungunya and Dengue in Aurangabad and Periphery Regions



In conclusion, it is shown that the titres of NS1 represent the viral load and the viral load is directly proportional to complications[6]. Hence, inclusion of NS1 in the ELISA test format must be present for evaluation, whether patient is from endemic or non endemic areas. 42 samples were tested for both Chikungunya and Dengue. Out of which 12 samples were positive for Chikungunya and a single patient showed

presence of both the infections. This suggests that patient suspicious for Chikungunya must be tested for Dengue as well and vice versa, for knowing actual infection incidence.

Vector control is of utmost importance to reduce the impact of these diseases as no vaccines and specific antiviral treatment is present as of now.

Apart from this mass education with regards to proper sanitation, proper disposal of water and early presentation to outpatient department without delaying treatment, must be made.

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