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Original Research Article

Evidence of laboratory confirmed cases of dengue with c hikungunya co infection in 2019 at GIMS, Kalaburagi, India

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ABSTRACT

Introduction: Dengue with Chikungunya co infection is an emerging epidemic illness in the tropical countries. Incidence of both the illness is the key to taking early preventive and treatment modalities.
Aim: The present study aims to describe the incidence of Dengue with Chikungunya co infection in Kalaburagi district based on variables such as age, gender and clinical features.
Setting and design: It is a hospital based cross sectional observational study conducted in Government General Hospital in Kalaburagi district part of Hyderabad Karnataka region.
Materials and Methods: The study was conducted at GIMS-VRDL, Department of Microbiology, Gulbarga Institute of Medical Sciences, Kalaburagi, Karnataka and data was analysed using Microsoft excel.
Result: Out of the total 5134 serum samples Dengue seropositive cases were 884, and Chikungunya seropositive cases were 591 and Dengue with Chikungunya co infection was 207. The percentage positivity of Dengue for the year 2019 was found to be 17.2% whereas for Chikungunya was 11.5%. 26% of the total co infected suspected cases were seropositive for Dengue with Chikungunya co infection. The average age distribution of dengue seropositive cases and that of Dengue with Chikungunya co infection was found to between 18 - 34 and 14 – 38 years respectively. Considering a p value of 0.5 there was no statistically significant difference seen in gender distribution emphasising on considering both male and female patients equally. The Dengue seropositive cases showed fever and myalgia as their primary symptoms followed by headache chills rashes and abdominal pain whereas Dengue with Chikungunya co infection cases presented with fever with arthalgia and chills as their primary symptom followed by headache, vomiting and nausea. 84% of Dengue positive cases reported to GGH were from Gulbarga city main and later followed by nearby talukas like Sedam (1%) Jewargi (1%), Afzalpur (4%), Aland (3%), Chincholi (4%), Chitapur (3%). Dengue with Chikungunya co infection seropositive cases, 88% reported from Kalaburagi city main, followed by Jewargi (2%), Sedam (2%), Chincholi (3%), Afzalpur (2%), Aland (2%), and Chitapur (1%). There were no reported casualties due to dengue during the study.
Conclusion: Dengue and Chikungunya are the two most important arboviral infections in the South East Asian subcontinent. India being hyper endemic with both these viral infections, diagnosis of a single viral outbreak is insufficient. Kalaburagi district of Karnataka experienced 4 outbreaks of Chikungunya in the last quarter of 2019. Also as compared to the previous two years 2018 (17.5%) and 2017 (15%) there has been an increase in positive cases as well as percentage positivity in Dengue with Chikungunya co infection in the year 2019 (26%). Diagnosis of both the illness is the need of the hour to help treat the patients and to guide the treating physician for early and appropriate primary care.

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1. Introduction

Dengue and Chikungunya fever are arboviral infections of global importance. Dengue virus belongs to family Flaviviridae and genus Flavivirus. It is a small enveloped RNA virus carrying a single stranded, positive sense RNA genome of 10.6 kb in length. Dengue virus exists as four serotypes (DENV 1-4). According to a recent study, patients having the Dengue and Chikungunya virus co-infection present with a high mortality rate when compared to mono-infection with these viruses[1]. The two diseases share a common mode of transmission and have common clinical presentation; hence Chikungunya is found reactive with Dengue viral infection. Data over Dengue and Chikungunya co infection in a particular region is imperative for providing assistance to clinicians while diagnosing the two infections. Statistics regarding the co infection will help the district health authorities in taking preventive and control measures.

The first documented case of Dengue and Chikungunya virus co infection in humans was reported as early as 1967. The two viruses were isolated from a patient seen in Vellore, South India. Dengue and Chikungunya viral infections have common clinical presentations including high grade fever, body pain, nausea, headache and rashes. In case of a mild infection, the viral load decreases in around 10 days and the symptoms subside since these are the self limiting infections. [1]

Chikungunya infection presents with severe joint pain as the most prominent feature and which sometimes can persist for a few months to a years. [2] In addition to this a severe Chikungunya viral infection can cause neurological and altered optical manifestations. Chikungunya viral infection is usually nonfatal while Dengue fever may result in severe complications including death. [3] The diagnosis and treatment of such patients becomes difficult since co infection with the two viruses may result in disease with overlapping symptoms. Timely diagnosis of the dual infections is important for better case management.

Limited investigations have studied the role of dual viral infections in clinical presentation of the disease. Dengue and Chikungunya co-infections are associated with more severe clinical disease than mono-infection. [4] The requirement of mechanical ventilation and blood transfusion was found to be higher in the co-infected patients. A recent study reported the involvement of central nervous system and hemorrhagic manifestations in such cases. [5,6]

The two different viruses cause dual infection of a mosquito vector by consecutive bites of two different infected human patients or by a single bite of a co-infected patient. Aedes albopictus has been shown to have the ability of getting orally co infected with Dengue and Chikungunya virus. [7] A recent study reported that both Dengue and Chikungunya viruses were able to replicate simultaneously in the mosquito and have the ability to deliver concomitantly infectious particles of Dengue and Chikungunya virus in a single bite via saliva. [8,9]

The present study included all suspected cases of Dengue and Chikungunya in and around Kalaburagi district reporting to Government General Hospital (GGH) Kalaburagi. The present study aimed at analysing the incidence and percentage prevalence of dengue mono infection and Dengue with Chikungunya seropositive cases reporting at Gulbarga General Hospital (GGH) in Kalaburagi district part of the Hyderabad Karnataka region of Karnataka, India.

1.1. Objective of the study

1. To study the incidence and percentage prevalence of Dengue mono infection and Dengue with Chikungunya co infection in Kalaburagi district.
2. To study the clinical presentation of each illness.

2. Materials and Methods

2.1. Source of data

Patients reporting to Government General Hospital Kalaburagi, Karnataka from January 2019 to December 2019. Patients presenting with fever more than 38.5° Celcius and clinical features suggestive of Dengue and Chikungunya illness.

2.2. Study design

It is a cross sectional study through random sampling technique. A total of 5,134 patients suspected of Dengue and Chikungunya were admitted to the GGH, Kalaburagi between January 2019 to December 2019. Clinical features varied from fever, dysentery, rashes to myalgia headache and arthalgia. Patients were admitted and investigations were commenced to the earliest. Diagnosis of Dengue and Chikungunya were based on WHO criteria. The present study aims to describe the burden of Dengue and Chikungunya separately as well as the percentage of Dengue Chikungunya co infection cases in Kalaburagi district and elaborate the most important clinical features recorded.

2.3. Inclusion criteria

Study population was divided according to their geographical distribution. All the patients with clinical features suggestive of Dengue and Chikungunya infection and later confirmed by IgM ELISA were included in the study.

2.4. Exclusion criteria

Critically ill patients, patients with laboratory confirmed malaria, leptospirosis infection and enteric fever. Also

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patients with haematological disorders were excluded.

2.5. Investigations Included

Blood samples from clinically suspected cases of Dengue fever and Chikungunya fever attending various departments of GGH Kalaburagi, Karnataka were collected and screened at Central laboratory GGH. The samples were maintained in cold chain and sent to Viral Research and Diagnostic Laboratory (VRDL), Department of Microbiology, GIMS, Kalaburagi for serological confirmation. Once samples reached VRDL the serological confirmation was performed by Anti dengue IgM and Anti Chikungunya IgM kits, supplied by National Institute of Virology, Pune, Maharashtra, India. All steps were followed as per manufacturer's instructions.

2.6. Ethics Approval

The Ethical clearance certificate has been taken from the Institutional Ethical Committee, GIMS, Kalaburagi, Karnataka.

2.7. Statistical analysis

The test of significance of the difference between the two values was performed by Fischer's exact test using Minitab software. P value of 0.5 was considered for the present study.

3. Results

The Dengue positive cases showed fever and myalgia as their primary symptoms followed by headache, chills and abdominal pain, whereas Chikungunya and Dengue with Chikungunya seropositive cases presented with fever with arthalgia and chills as their primary symptom followed by headache, vomiting and nausea (Figure 1). The study evaluated the clinical presentation and seroprevalance of Dengue and Chikungunya in the city of Kalaburagi. The study results are in unison with previous studies[6,10] with regards to clinical symptoms for each illness.

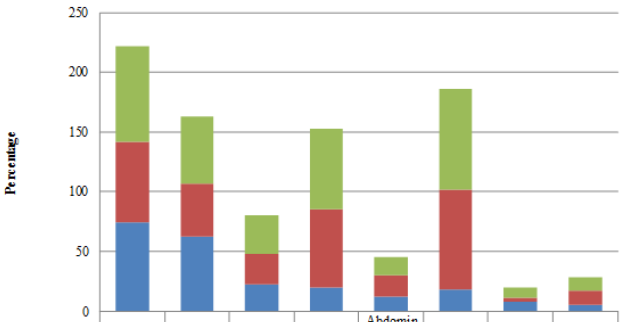
The numbers of cases were distributed on yearly and quarterly basis. All data collected were processed by frequency analysis, percentage, mean, paired t test. Total number of cases reported between January 2019 to December 2019 account to 5134 of which 207 were found positive (Diagram 1) for Dengue with Chikungunya co infection. Dengue mono infection seropositive cases had 17.2% positivity as compared to 14% in 2018 and 8.9% in 2017 and Chikungunya monoinfection seropositive cases were found to be 11.5% positivity as compared to 9% in 2018 and 4.5% in 2017 (Figure 2). 26% positivity was found for Dengue with Chikungunya co infection for 2019, 17.5% for 2018 and 15% for 2017 (Figure 2). Average age distribution among all Dengue with Chikungunya co infection was 26 years and Male to Female ratio was found to be 1.1:1. 84% of Dengue positive cases reported to GGH were from Kalaburagi city main and later followed by nearby talukas like Sedam (1%) Jewargi (1%), Afzalpur (4%), Aland (3%), Chincholi (4%), Chitapur (3%) (Diagram 2). Dengue with Chikungunya co infection cases, 88% reported from Kalaburagi city main, followed by Jewargi (2%), Sedam (2%), Chincholi (3%), Afzalpur (2%), Aland (2%), and Chitapur (1%) (Diagram 3).

4. Discussion

Since the first reported case in 1967, India is endemic to Dengue and Chikungunya on every or alternate year. Although Chikungunya viral infection not uncommon experienced a decline in trend since the year 2010 until the recent outbreak in 2016. Increase in human population and urbanization has contributed to more collection of water in pots and unused tyres, water collection at construction sites and the poor drainage systems with lack of knowledge on prevention among the masses has given rise to increase in the mosquito population. In the midst of a conducive environment for growth Dengue and Chikungunya viral infections sharing a common vector Aedes albopictus cases of Dengue with Chikungunya co infection cannot be ignored. According to Centre for diseases control and prevention before treating a Chikungunya positive patient with Non steroidal anti inflammatory drugs one should rule out the dengue infection as these drugs can further complicate the illness. Similarly only treating a dengue fever case without ruling out Chikungunya involvement can lead to long term arthralgia and other joint related complications.[11] Diagnosis of both the illness is widely performed by ELISA and is considered as one of the confirmatory tests. IgM capture ELISA has become popular due to reliable sensitivity and specificity. The present study found 17.2% positivity among the suspected cases of dengue and 10.9% positivity among the Chikungunya suspected cases in 2019. Dengue with Chikungunya co infection accounted to 26% cases which is higher as compared to previous year data at GIMS hospital, Kalaburagi. GIMS hospital Kalaburagi receives samples from neighbouring talukas namely Aland, Afzalpur, Chitapur, Chincholi, Sedam and Jewargi. With 5314 suspected cases reported this year Kalaburagi district experienced extended intermittent rains in the last quarter of the year 2019. This was a major reason for four outbreaks that occurred in the district of Kalaburagi.

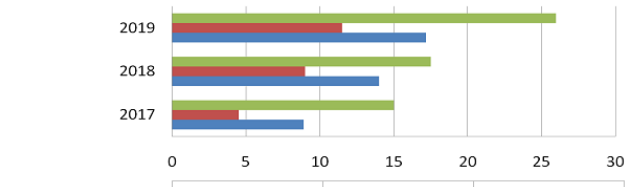
5. Conclusion

In the past Dengue and Chikungunya were presumed to be associated in rainy season only. In recent times Chikungunya has emerged as an important public health



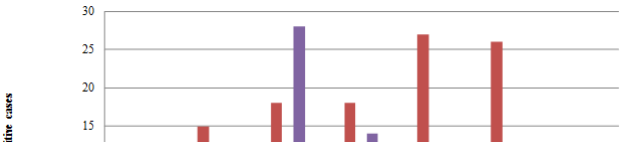
	Fever	Myalgia	Headache	Chills	Abdominal pain	Arthalgia	Nausea	Vomitting
D AND CK	80	56	32	68	15	84	9	11
Chikungunya	68	45	26	65	18	84	3	12
Dengue	74	62	22	20	12	18	8	5

Fig. 1: Clinical features



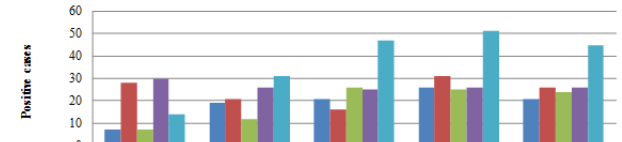
	2017	2018	2019
D and C co infection	15	17.5	26
Chikungunya	4.5	9	11.5
Dengue	8.9	14	17.2

Fig. 2: Year wise dengue and chikungunya case positivity



	Jan	Feb	March	April	May	June	July
Male	1	1	1	2	2	1	4
Avg Age Male	12	15	18	18	27	26	7
Female	0	2	1	1	0	3	0
Avg Age Female	0	4	28	14	0	7	0
Total	1	3	2	3	2	4	4

Fig. 3: Month wise number of degue with chikungunya co infection positive case in 2019



	Aug	Sep	Oct	Nov	Dec
Total Male	7	19	21	26	21
Avg age M	28	21	16	31	26
Total Female	7	12	26	25	24
Avg age F	30	26	25	26	26
Total samples	14	31	47	51	45

Fig. 4: Month wise number of dengue with chikungunya co infection positive cases in 2019

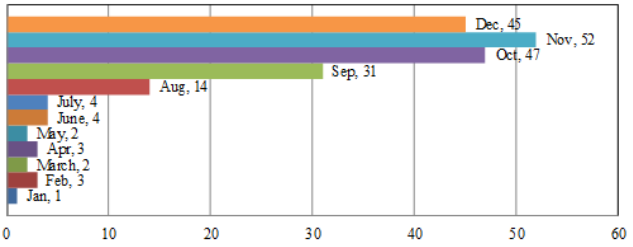


Diagram 1: Number of dengue with chikungunya co infection Case in the year 2019

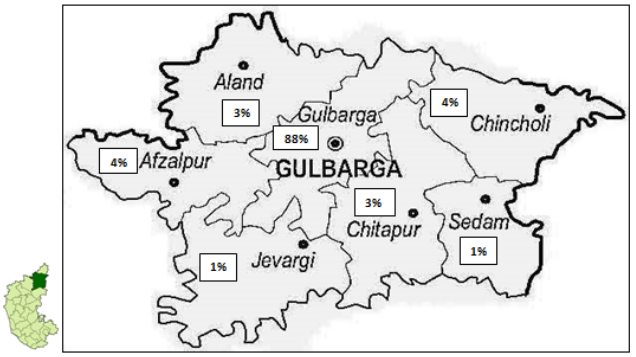


Diagram 2: Percentage of Dengue positive cases from Gulbarga district, Karnataka state.

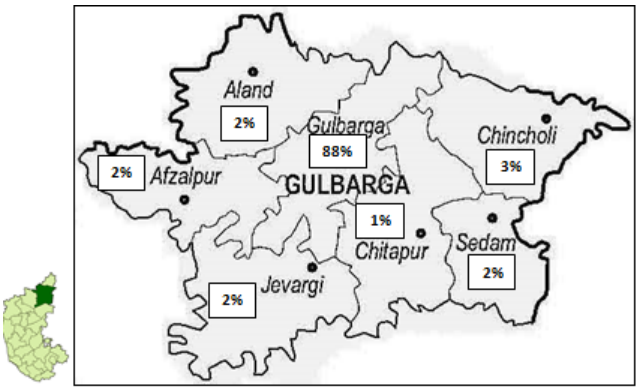


Diagram 3: Percentage of Dengue with Chikungunya co infection positive cases from Gulbarga district, Karnataka state.

concern in India.[10] In the year 2016 more than 1.3 million people were severely affected by Chikungunya infection[11] Both the viral infections need to be studied on the basis of seroprevalance to help predict the illness at the earliest. The present study gives data on the incidence and average age distribution and gender distribution as well as geographic spread of the disease in Kalaburagi district, Karnataka. Although both Dengue as well as Chikungunya is self limiting illness, the clinically suspected cases should be tested for both the pathogens in the endemic areas and

knowledge about its clinical presentation and exact time for diagnosis will help in preventing complications and result in successful clinical management. Scope of diagnosing Dengue and its subtypes along with Chikungunya co infections through molecular tests like Polymerase Chain Reaction needs to be considered for better understanding and spread of the illness.

Unlike Dengue, Chikungunya typically consists of a self-limiting and nonfatal acute illness characterised by fever, rash and incapacitating arthralgia.[12] Molecular techniques are promising and should be employed to rule out cases with cross reactivity. Further studies with molecular diagnosis based on Reverse transcriptase Real time Polymerase chain reaction on Serotyping and cross reactivity are required for better understanding of the co infection.

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8. Conflict of interest

There are no conflicts of interests for the present study.

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