 DOI: 10.18231/2454-6712.2016.0005

Study of dengue fever cases at a tertiary care hospital in Srinagar, Pauri Garhwal, Uttarakhand, North India

Avinash Sudan[1,*], Leena Firmal[2], K.S. Batola[3]

[1,2]Assistant Professor, [3]Professor, Dept. of General Medicine, VCSGGMS & Research Institute, Srinagar, Uttrakhand

***Corresponding Author**
Email: sudanavinash1983@gmail.com

Abstract

Introduction: Dengue viral infection is one of the most important mosquito born diseases of the Indian sub-continent and has become a major health problem. In recent decades, the geographical distribution of the virus and the mosquito vector has expanded, the epidemic activity increased, and DHF has emerged in new geographical regions; the reasons of which are complex and not fully understood. So in our study, we tried to find out the varied presentation of dengue patients who had been admitted in a tertiary care hospital in Srinagar city of Pauri Garhwal region of Uttarakhand.

Methodology: This being a retrospective study, the patients were selected from outpatient department and indoor of HNB Base teaching hospital, a tertiary care centre in the state. We included 147 patients suffering from dengue fever in the study period from July 2015 to Dec 2015. Demographic, clinical, haematological, and biochemical laboratory data was recorded from case files in a pre-designed format.

Results: We enrolled 147 patients in the study who were diagnosed with Dengue infection as per WHO guidelines. No patient died in this study. The most common symptoms were fever (100%, 147 cases), myalgia (47.61%, 70 cases) and headache (29.93%, 44 cases).Other commonly found symptoms included rash (18.37%, 27 cases), vomiting (15.65%, 23 cases), arthralgia (10.88%, 16 cases), retro-orbital pain (9.52%, 14 cases) and abdominal pain (8.2%, 12 cases). On clinical examination, hepatomegaly was seen in 5 patients (3.4%) and splenomegaly in 2 patients (1.36%). 2pts (1.36%) had pleural effusion and 2 pts (1.36%) had ascites. Haemorrhagic manifestations in the form of upper GI bleed were seen in 2 patients (1.36%). Neurological manifestations were seen in 6 patients (4.08%) while shock was seen in 1 patient (0.68%).

Conclusion: Dengue infection poses a huge burden to the health-care system; its spectrum ranges from mild self-limiting illness to severe fatal disease. It can have varied and multi-systemic manifestations which can go unrecognized. Clinicians should have a high index of suspicion for atypical manifestations. Community awareness, early diagnosis and management and vector control measures need to be strengthened in order to reduce the increasing number of dengue cases.

Keywords: Dengue, Dengue haemorrhagic fever, Dengue shock syndrome, Acute liver failure.

Introduction

In the past few years, dengue has become a major global health problem. Approximately, 2.5 billion people, living mainly in urban areas of tropical and subtropical regions, are estimated to be at risk of acquiring dengue infections.[(1)] While dengue is endemic in more than 100 countries, most cases are reported from South East Asia and western Pacific areas.[(2)] Though several measures taken to prevent and control it, recurrent outbreaks have been reported in India, since the first outbreak in India in 1812.[(3)] During recent outbreaks in India, the clinical manifestations which were shown by the patients were slightly different from those in previous years.[(4)]

In recent decades, the geographical distribution of the virus and the mosquito vector has expanded, the epidemic activity increased, and DHF has emerged in new geographical regions.[(5)] the reasons of which are complex and not fully understood. Presumably, demographic, social, and public health infrastructure changes in the past decades have contributed greatly to this phenomenon. Demographic factors like uncontrolled population growth, unplanned urbanisation resulting in substandard housing and poor solid waste disposal and need for water storage aided vector proliferation and hence increased exposure. Enhanced awareness and availability of laboratory facilities have made the recognition and differentiation of the infections easy.

Dengue infection occurs in three forms – DF, DHF, and DSS. According to the WHO case definition, DF is defined as an acute febrile illness with two or more manifestations among headache, retro-orbital pain, myalgia, arthralgia, rash, haemorrhagic manifestations, leucopenia, supportive serology, occurrence at the same location and time of other confirmed cases.[(6)] DHF is defined as a 2 to 7 day acute febrile illness with bleeding, thrombocytopenia and evidence of plasma leakage. When all features of DHF are present along with evidence of circulatory failure, the patient is categorised as DSS.[(7)] Reports of rare presentations have recently become more frequent in the past few years.[(6)]

So in our study, we tried to find out the varied presentation of dengue patients who had been admitted in a tertiary care hospital in Srinagar city of Pauri Garhwal region of Uttarakhand.

Methodology

The patients were selected from outpatient department and indoor of HNB Base teaching hospital, Srinagar, Pauri Garhwal, a tertiary care centre in the state, presenting between July and December 2015. We

included 147 patients diagnosed with dengue virus infection, either from primary referral facilities or in our hospital in this study. Demographic, clinical, haematological, and biochemical laboratory data was recorded from case files in a pre-designed format. Serology for dengue antibody was done in all cases using SD Bioline Dengue Duo (Dengue NS1 Ag; IgM/IgG test). This test has 84% sensitivity, 98% specificity, 99% positive and 68% negative predictive value. Patients with IgG positive were labelled as having secondary dengue infection.

Children below 12 years of age and the pregnant female population was excluded from this study. Patients with thrombocytopenia diagnosed in the past or with a concomitant cause contributing to thrombocytopenia, viz., malaria, septicaemia, chemotherapy, etc., were also excluded from the study.

Cases were classified as DF, DHF, or DSS as per WHO definition.[7] Other investigations were carried out as and when indicated. Platelet recovery was considered if two consecutive counts from samples drawn 24 hours apart showed an increasing trend, or the platelet count increased beyond 50,000/cu mm when less at presentation. Statistical analysis was performed with the necessary software required.

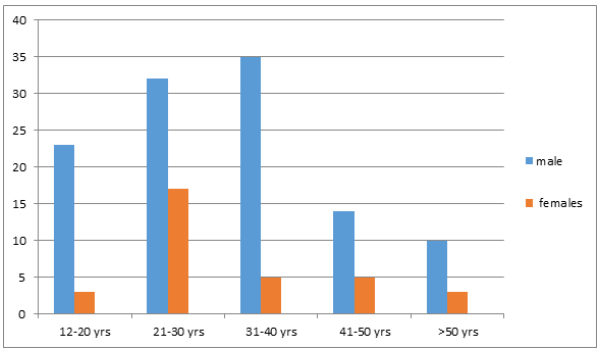
The study was approved by the Institutional Ethics Committee. Consent was taken from Medical superintendent of the hospital to go through the files and medical record section.

Results

Table 1: **Agewise distribution of dengue patients**

Age (in years)	Males n (%)	Females n (5)	Total
12-20	23 (15.7%)	3 (2.0%)	26 (17.7%)
21-30	32 (21.8%)	17 (11.6%)	49 (33.4%)
31-40	35 (23.8%)	5 (3.4%)	40 (27.2%)
41-50	14 (9.5%)	5 (3.4%)	19 (12.9)%
More Than 50 Years	10 (6.8%)	3 (2.0%)	13 (8.8%)
Total	114 (77.6%)	33 (22.4%)	147 (100%)

Bar diagram representation of age wise distribution of Dengue patients:

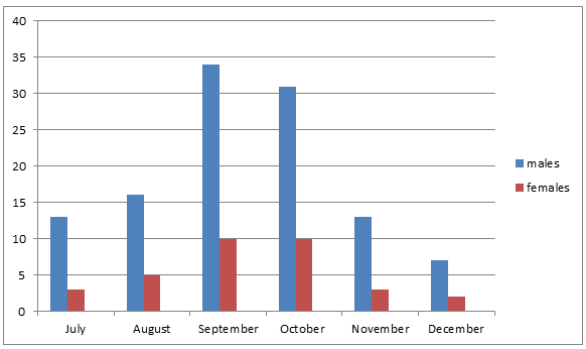


About 89% of those affected were in the economically productive age-group (20-40 years) and males constituted nearly three-fourth (n = 114; 77.55%) of the study population. 26 patients (17.69%) were in the 12-20 age group and 19 patients (12.92%) were in the 41-50 age group while 13 patients (8.84%) were above 50 years of age

Table 2: **Monthwise distribution of dengue patients**

Month of Admission	Males n (%)	Females n (%)	Total
July	13 (8.8%)	3 (2.0)	16 (10.8%)
August	16 (10.9%)	5 (3.4)	21 (14.3%)
September	34 (23.1%)	10 (6.8)	44 (29.9%)
October	31 (21.1%)	10 (6.8)	41 (27.9%)
November	13 (8.9%)	3 (2.0)	16 (10.9%)
December	7 (4.8%)	2 (1.4)	9 (6.2%)
Total	114 (77.6%)	33 (22.4)	14 (100%)

Bar diagram showing month wise distribution of Dengue patients.



No dengue case was reported to our hospital before July, 2015. Although sporadic cases were diagnosed regularly from July 2015, the maximum incidence of dengue cases was seen in September and October (85 cases; 57.82%). 37 cases (25.17%) were admitted in July

and August while 25 (17%) cases were admitted in November and December.

Table 3: Dengue serological markers (Antigen/ antibody detected)

Serological markers	Positive in number of cases	% (Out of total 147 cases)
NSI only	44	29.99%
NSI and IgM	54	36.73%
IgM only	34	23.12%
IgM and IgG	8	5.44%
IgG only	3	2.04%
NSI, IgM, IgG	4	2.72%

Isolated positivity of NS1 was encountered in 29.9% cases (n = 44), Isolated positivity of IgM was encountered in 23.12% cases (n = 34), of NS1 and IgM in 36.73% (n = 54) and of IgM and IgG in 5.44% (n = 8) cases. All three serological markers were positive in 4 cases (2.72%) Of all serologically proven cases of dengue, 15 (10.2%) were having secondary dengue infection and 132 (89.8%) had primary dengue infection.

Table 4: **Clinical parameters of patients**

Clinical Parameters	Positive in number of patient	% (Out of total 147 cases)
Fever	147	100%
Headache	44	29.93%
Retro-orbital pain	14	9.52%
Arthralgia	16	10.88%
Myalgia	70	47.61%
Rash	27	18.37%
Vomiting	23	15.65%
Abdominal pain	12	8.16%
Hepatomegaly	5	3.40%
Splenomegaly	2	1.36%
Pleural effusion	2	1.36%
Ascites	2	1.36%
Bleeding manifestations	2	1.36%
Neurological Features	6	4.08%
Shock	1	0.68%

No patient died in our study. The most common symptoms were fever (100%, 147 cases), myalgia (47.61%, 70 cases) and headache (29.93%, 44 cases).Other commonly found symptoms included rash (18.37%, 27 cases), vomiting (15.65%, 23 cases), arthralgia (10.88%, 16 cases), retro-orbital pain (9.52%, 14 cases) and abdominal pain (8.2%, 12 cases).

On clinical examination, hepatomegaly was seen in 5 patients (3.4%) and splenomegaly in 2 patients (1.36%). 2pts (1.36%) had pleural effusion and 2 pts (1.36%) had ascites. Haemorrhagic manifestations in the form of upper GI bleed was seen in 2 patients (1.36%). Neurological manifestations were seen in 6 patients (4.08%) while shock was seen in 1 patient (0.68%).

Table 5: Biochemical parameters of patients

Parameters	No. of Patient (%)	Mean $\pm$ SD
Haemoglobin < 11gm%	45 (31%)	11.9 $\pm$ 0.88
WBC < 4000	96 (65.3%)	3825 $\pm$ 958.15
Platelet count < 1.00,00	57 (38.7%)	106.29 $\pm$ 42.7
Transaminases > 3 times normal	111 (75.5%)	157 $\pm$ 50.67
Total Proteins < 5.5gm%	10 (15%)	6.98 $\pm$ 0.26

Table 6: Average platelet counts in dengue cases

Average Platelet counts	No. of cases	% (out of total 147 Cases)
More Than 1,00,000	90	61.22%
50,000 – 1,00,000	38	25.85%
20,000 – 49,000	12	8.16%
Less than 20,000	7	4.76%
Total	147	

As per laboratory parameters, Hb less than 11gm% was seen in 45 patients (30.6%). Leukopenia was seen in 96 patients (65.3%) and thrombocytopenia was seen in 57 patients (39%). Platelet count of less than 20,000 was seen in 7 patients (4.76%). Liver enzymes more than three times normal were seen in 111 patients (75.5%). The clinical and biochemical parameters in patients with dengue fever and DHF are shown in Tables 4 and 5 respectively.

Discussion

In Uttarakhand in 2015, post-monsoon period was the most affected period. Our study showed maximum number of seropositive cases during monsoon (July to September) and post-monsoon (October, November) period of 2015. This is in par with other reported patterns of dengue transmission.[8,9]

In the present study, male to female ratio was 3:1 in contrast to the earlier observation but is in concordance with a study from Delhi[10] and Dehradun.[11]

The clinical profile of dengue revealed that fever was the most common presenting symptom (100%). Similar studies in and around India have also substantiated fever as being the most common presenting symptom. Studies by Sajidet al[12] and Misra et al[13] also reported fever in 100% cases whereas Aggarwal et al[14] reported fever in 93% cases and Narayanan et al[15] reported fever in 98.3% cases.

Headache and retro-orbital pain mostly from systemic inflammatory mediators, are well known features in dengue fever. In our study, headache and retro-orbital pain were seen in 29.93% and 9.52% cases, respectively. In a similar study by Sanjay Kumar Mandalet al[16] 62.16% patients presented with headache while a study by Singh NP et al[3] reported headache in 61.6% cases. But in some studies like by Itoda I et al[17], in Japan, headache was present in 90%cases. On the

other hand the north Indian study by Seema A et al[4] reported headache in only 9% of cases.

In DF, cutaneous manifestations can vary from maculopapular rash, petechiae, flushing to even desquamation. In our study, 18.37% patients presented with rash. In another study done by VK Singh et al[18] rash was seen in 37.84% cases. In a study conducted by Nadiaet al,[19] cutaneous manifestations were present in 72% cases. In a study of patients in Japan, by Itodaet al[17] rash was more frequent in 82% cases. Rahim& Sikdar[20] also found rash in high frequency of 78.5% in a Bangladesh based study.

Hepatomegaly was found in 3.4% cases in this study. In contrast 52% cases in a study by Kale AV et al[21] had hepatomegaly. 72% cases in Aggarwalet al[14] study and 52.5% cases in Narayanan M et al[15] study had similar finding.

Ascites and pleural effusion were found in 1.36% cases each in our study. Similar findings were reported by Singh et al,[3] who foundas cites and pleural effusion in 1.08% cases each.In the study by VK Singh et al[18] ascites and pleural effusion were seen in 18.92% and 8.11% of cases In a study by Mia et al[22], 41% patients developed ascites and 42% had pleural effusion.

A high incidence of bleeding has been reported in DF because of low platelet count and leakage from blood vessels.[12] However, in the present study, only 1.36% had bleeding episodes while 4.76% of these cases had platelet counts <20,000/cumm. This is similar to a north Indian study by Seema et al,[4] where only8% patients had bleeding episodes while 26% patients hadplatelet count below 20,000/cmm. Similar findings were reported by Minakshi Dharet al[11] and Sumarmo.[13] In our study, melaena was the major bleeding manifestation in contrast to other studies which may be attributed to the high prevalence of acid peptic disease in this region as reported in the study done by Minakshi Dhar et al.[11] DSS was seen in one of the patients admitted.

We found that 96 cases (65.3%) had leukocyte count below 4000/cmm in this study. It may be due to virus induced inhibition/destruction of myeloid progenitor cells. Similar findings were reported by Itodaet al[17] who reported leucopenia in 71% cases, and Ageep AK et al[23] who reported leucopenia in 90%. Mittalet al[24] found leucopenia in 19.2% cases and in Bangladesh based study by Rahim & Sikdar[20] detected it in only 4.1% cases.

In our study, apart from classical clinical features of dengue fever, neurological features were seen in 4% patients. Neurological involvement in dengue may occur because of neurotropism of the virus, immunologic mechanism, cerebral anoxia, intracranial haemorrhage, hyponatremia, cerebral oedema, fulminant hepatic failure with portosystemic encephalopathy, renal failure or release of toxic products. Dengue fever can give rise to various neurological manifestations like GB syndrome, encephalopathy, ADEM, Lumbosacralplexopathy, polyradiculopathy, etc. as evidenced by various studies. A similar study done in western Uttar Pradesh region in 2014 by VK Singh et al[18] found neurological manifestations in 16 of patients. In the study by Kamathet al[25] neurological manifestations were noticed in 20% of the patients and Mendez et al[26] reported 25% patients with neurological manifestations.

Atypical forms of dengue infection may present with hepatic and renal dysfunction. Although liver is not the target organ of dengue virus, several pathological findings including fatty change, centrilobular necrosis, and monocyte infiltration in the portal tract, have been reported.[27] Transaminitis, a common feature in dengue infection[28] was also apparent in our study. In this study, AST levels were greater than those of ALT levels in 75.5% of dengue infected patients, a finding that has also been reported earlier.[29] Acute hepatic failure, a rarely reported manifestation of dengue hemorrhagic fever,[30] was diagnosed in 2 of our patients. Deranged liver function in dengue infection can be a result of the direct effect of the virus on liver cells or the unregulated host immune response against the virus. Fulminant hepatic failure occurs because of acute severe hepatitis and massive necrosis of the liver, causing hepatic encephalopathy and even death.

Renal injury comprising azotaemia, proteinuria, glomerulonephritis, acute kidney injury (AKI) and haemolytic uraemic syndrome have been reported in dengue patients.[31] In the present study, all the patients had normal renal function tests.

No patient dies in our study. Mortality in the study by Kale AV et al,[21] was 0.67%. Ratageriet al[32] reported no single mortality in their study whereas higher mortality was found in studies by Aggarwal et al[14] i.e. 6% mortality and Narayanan M et al[15] study with mortality of 3.3%.

Conclusion

Dengue has become a major international public concern particularly in tropical and subtropical regions, affecting urban and suburban areas. In the last few years, various atypical manifestations of the Dengue fever have been reported from different parts of the world, which makes the diagnosis as well as the treatment of this disease more complicated.

Very few cases of dengue were seen in this region of Uttarakhand prior to 2015. However in 2015, a gradual increase in cases was noticed from July with a peak in September and October. One of the reason for this is global warming due to which dengue is spreading to mountainous regions which were too cold to sustain mosquito populations year-round. A combination of unplanned urbanisation, construction of the Tehri dam in the Garhwal region and increase in the number of pilgrims to this hilly region has changed the ecology of this area. In addition, poor water and sanitation services and insufficient healthcare coverage also are responsible for the rise in dengue cases. The high incidence rate in

our region during monsoon and post monsoon season gives an alarm not only to the doctors regarding early and accurate diagnosis of dengue and its complications but also calls for preventive measures against dengue infection during water stagnation periods after the initial bouts of rainfall and at the end of monsoon. In addition, a continuous sero-epidemiological surveillance and timely interventions to identify the cases should be undertaken so that its complications, outbreak and mortality can be minimized.

References

1. Halstead SB (2007) Dengue. Lancet 370: 1644-1652.
2. WHO (2009) Dengue Guidelines for Diagnosis, Treatment, Prevention and Control WHO (2009) http://whqlibdoc.who.int/publications/2009/9789241547871_eng.pdf. Last accessed 5 July 2012.
3. Singh NP, Jhamb R, Agarwal SK, Gaiha M, Dewan R, Daga MK et al. the 2003 outbreak of dengue fever in Delhi, India. Southeast Asian J Trop Med Public Health 2005;36:1174-78.
4. Seema A, Singh V, Kumar S, Kumar A, Dutta S. the changing clinical spectrum of Dengue fever in the 2009 epidemic in North India: a tertiary hospital based study. Journal of Clinical and Diagnostic Research 2012 august; Vol 6(6): 999-1002.
5. Gubler DJ. The global emergence/resurgence of arboviral diseases as public health problems.Arch Med Res 2002; 33: 330-42.
6. Gulati S and Maheshwari A (2007) Atypical manifestations of dengue. Trop Med Int Health 12:1087-1095.
7. World Health Organization, Geneva (1997) Dengue hemorrhagic fever: Diagnosis, treatment prevention and control. 2nd edition:12-23.
8. Jayasimha V.L, Thippeswamy M.T.R, YogeshBabu K.V, Vinod Kumar C.S, Niranjan H.P, Raghukumar K.G, Basavarajappa K.G Dengue : Seroprevalence, comparison of Rapid test with ELISA National journal of Basic Medical Sciences volume III, Issue – I p: 57-60.
9. Narayan Manjit, Aravind MA. Dengue fever outcome in Chennai-A study of clinical profile and outcome-Indian paediatric-2002 Nov. 17:39:1027-33.
10. Kabra SK, Pandey A, Broor S, GuleriaR. The evolution of dengue over a decade in Delhi. J ClinVirol2007;40:87-8.
11. Minakshi Dhar, Nadia Shirazi, Sohaib Ahmad, De novo experience of a single outbreak of dengue infection at a tertiary referral centre of Uttarakhand, North India, JIACM 2013;14(3-4):225-9.
12. Sajid A, Ikram A, Mubashir A. Dengue fever outbreak 2011: clinical profile of children presenting at Madina teaching hospital Faisalabad. JUMDC Jan-Jun 2012;3(1):42-47.
13. Misra UK, Kalita J, Syam UK, Dhole TN. Neurological manifestations of dengue viral infection. J Neurol Sci 2006;244(1-2):117-122.
14. Aggarwal A, Chandra J, Aneja S, Patwari AK, Dutta AK. An epidemic of dengue hemorrhagic fever and dengue shock syndrome in children in Delhi. Indian Pediatr. 1998;35:727–32.
15. Narayanan M, Aravind MA, Thilothammal N, Prema R, Sargunam CS, Ramamurty N. Dengue fever epidemic in Chennai-a study of clinical profile and outcome. Indian Pediatr. 2002;39:1027–33.
16. Sanjay Kumar Mandal et al (print ISSN: 2249 4995 | eISSN: 2277 8810.
17. Itoda I, Masuda G, Suganuma A, Imamura A, Ajisawa A, Yamada K. Clinical features of 62 imported cases of dengue fever in Japan. Am J Trop Med Hyg. 2006 Sep;75(3):470-4.
18. VK Singh, JM Haria, SK Jain. "Hospital Based Study of Dengue Hemorrhagic Fever in Western Uttar Pradesh Region". International Journal of Scientific Study. 2014;1(5):32-34.
19. Nadia A, Malik M, Jamil A, Jahangir M, Tirmiz N, Majid A, Ashraf M, Malik M. Cutaneous manifestations in patients of dengue fever. Journal of Pakistan Association of Dermatologists 2012;22(4):320-24.
20. Rahim MA, Sikder MS. Clinicopathologic manifestations and outcome of dengue fever and dengue haemorrhagic fever. Bangladesh Med Res Counc Bull. 2005;31(1):36-45
21. Kale AV, Haseeb M, Sandeep Reddy C, e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 13, Issue 9 Ver. VII (Sep. 2014), PP 14-19.
22. Mia MW, Nurullah AM, Hossain A, Haque MM. Clinical and sonographic evaluation of dengue fever in Bangladesh: a study of 100 cases. Dinajpur Med Col J. 2010;3:29-34.
23. Ageep AK, Malik AA, Elkarsani MS. Clinical presentations and laboratory findings in suspected cases of dengue virus. Saudi Med J 2006 Nov;27(11):1711-3.
24. Mittal H, Faridi MM, Arora SK, Patil R. Clinicohematologicalprofi le and platelet trends in children with dengue during 2010 epidemic in north India. Indian J Pediatr. 2012;79(4):467-71.
25. Kamath SR, Ranjit S. Clinical features, complications and atypicalmanifestations of children with severe forms of dengue hemorrhagic feverin South India. India J Pediatr. 2006;73(10):889-95.
26. Mendez A, Gonzalez G. Abnormal clinical manifestation of dengue hemorrhagic fever in children. Biomedica2006;26(1):61-70.
27. Huerre MR, Lan NT, Marianneau P et al. Liver histopathology and biological correlates in five cases of fatal dengue fever in Vietnamese children. Virchows Arch 2001;438(2):107.
28. Parkash O, Almas A, JafriWasmin SM, Hamid S, Akhtar J, Alishah H (2010) Severity of acute hepatitis and its outcome in patients with dengue fever in a tertiary care hospital Karachi, Pakistan (South Asia). BMC Gastroenterology 10: 43.
29. de Souza LJ, Goncalves Carneiro H, Souto Filho JT, Ferreira de Souza T, Azevedo Cortes V, Neto CG, Bastos Assed D, Wallace da Silva Siqueira E (2002) Hepatitis in dengue shock syndrome. Braz J Infect Dis 6:322-327.
30. Kumar R, Tripathi P, Tripathi S, Kanodia A, Venkatesh V (2008) Prevalence of dengue infection in north Indian children with acute hepatic failure. Ann Hepatol 7:59-62.
31. Basu G, Chrispal A, Boorugu H et al. Acute kidney injury in tropical acute febrile illness in a tertiary care centre – RIFLE criteria validation. NephrolDial Transplant 2011;26(2):524-31.
32. Ratageri VH, Shepur TA, Wari PK, Chavan SC, Mujahid IB, Yergolkar PN. Clinical profile and outcome of Dengue fever cases. Indian J Pediatr. 2005 Aug;72(8):705-6.