ORIGINAL RESEARCH

Prevalence of Various Causes of Acute Abdominal Pain in Dengue Illness and its Association with Serious

Baban Maroti Dhad[1], Shivprasad Kachrulal Mundada[2]

[1]Junior Resident, Vilasrao Deshmukh Government Medical College, Latur, Maharashtra, India.
[2]Professor & HOD, Vilasrao Deshmukh Government Medical College, Latur, Maharashtra, India.

ABSTRACT

Background: Dengue viral infections are one of the most important mosquito borne diseases in the world. They may be asymptomatic or may give rise to undifferentiated fever, dengue fever (DF), dengue haemorrhagic fever (DHF), or dengue shock syndrome (DSS). Early recognition and prompt initiation of appropriate treatment are vital if disease related morbidity and mortality are to be limited.1 Abdominal pain is one of the common symptoms of DF and severe pain abdomen is strongly associated with DHF. About 500 000 people with severe dengue fever require hospitalization each year out of which about 2.5% die.6

Aim & Objective: 1.To study prevalence of various causes of acute abdominal pain in dengue illness patients. 2.To study association of causes of acute abdominal pain with severity of dengue illness. 3. To study the age wise association of acute abdominal pain with dengue illness.

Methods: Hospital based Cross sectional analytical study, Study setting: Pediatric ward tertiary care centre

Study duration: 2 years (from October 2018 to March 2020)

Study population: The study population included all the dengue fever cases with acute abdominal pain admitted at a tertiary care center

Sample size:110

Results: In this study, majority of study subjects belongs to age group 7-9 years e.g 38 (34.5%) followed by 4-6 years age group 30 (27.2%), 10- 12 years age group 26 (23%) and 1-3 years age group found 13 cases (11,8%). majority of the cases were found in females e.g 60 (54.60%) and Males were 50 (45.40%), proportion of acute abdomen with dengue illness was statistical significant in age group 7 and above (p < 0.05), majority of cases had Dengue fever e.g 98 (89.09%, followed by Dengue Hemorrhagic 8,(7.27%) and Dengue shock syndrome was found in 4 cases (3..64%).

Conclusions: Most common cause of abdominal pain in dengue fever was ascites, pleural effusion, hepatitis. Most common clinical features found in dengue cases was fever, followed by vomiting and skin rash. Majority of cases was found in 7-9 years age group, Majority of the dengue cases were found in females.

Keywords: Dengue Fever, Dengue Hemorrhagic, Dengue Shock Syndrome

Corresponding Author: Dr. Baban Maroti Dhad, Junior Resident, Vilasrao Deshmukh Government Medical College, Latur, Maharashtra, India.
Email: babandhad123@gmail.com

INTRODUCTION

India is an endemic country for dengue virus infection. Dengue virus infection may be Asymptomatic or present as undifferentiated fever: dengue fever (DF) or dengue hemorrhagic fever (DHF).[1] Dengue shock syndrome (DSS) may lead to hypovolemic shock. Abdominal pain is a frequently reported symptom in patients with dengue fever. Pain in abdomen is associated strongly with DHF. Up to 40% of patients with DHF may have abdominal pain at presentation.[2]

For the past ten years, the number of dengue cases has gradually increased in India. Dengue is driven by complex interactions among host, vector and virus that are influenced by climatic factors. The total number of dengue cases has significantly increased in India since 2001. In the early 2000s, dengue was endemic in a few southern and northern states. It has recently spread to many states, including the union territories.[3]

In addition to the increased number of cases and disease severity, there has also been a major shift in the geographical range of the disease. Dengue had been restricted to urban areas, but it has now spread to rural regions.[4]

The expansion of dengue in India has been related to unplanned urbanization, changes in environmental factors, host–pathogen interactions and population immunological factors. Inadequate vector control measures have also created favorable conditions for dengue virus transmission and its mosquito vectors. Both Aedesaegypti and Aedesalbopictus are the main competent vectors for dengue virus in India.[5]

The number of dengue cases has increased 30-fold globally over the past five decades.[6] Dengue is endemic in more than 100 countries and causes an estimated50million infections annually.[7] Nearly 3.97 billion people from 128 countries are at risk of infection.[8,9]

Individuals infected with dengue exhibit a wide spectrum of clinical symptoms ranging from asymptomatic to severe clinical manifestations, such as dengue shocksyndrome.[10] The WHO regions of Southeast Asia (SEA) and the western Pacific represent ~ 75% of the current global burden of dengue.[11]

METHODOLOGY

Study design: Hospital based Cross sectional analytical study
Study setting: Pediatric ward tertiary care centre
Study duration: 2 years (from October 2018 to March 2020)
Study population: The study population included all the dengue fever cases with acute abdominal pain admitted at a tertiary care center
Inclusion criteria:
1. 1 year to 12 years
2. Dengue fever with acute abdomen pain
3. Dengue serology positive
Exclusion criteria:
1. All patients with negative dengue serology
2. Died within 24 hours after admission
3. Discharge against medical advice within 24 hours
Approval for the study:
Written approval from Institutional Ethics committee was obtained beforehand. Written approval of paediatric department was obtained. After obtaining informed verbal consent from all patients with the definitive diagnosis of DF admitted to paediatric ward tertiary care centre and, those with acute abdominal pain will be included for study.

Sample size: 110
Sampling technique
Total population sampling technique used for data collection
All patients admitted in pediatric department tertiary care center from Jan 2019 to Dec 2019 with acute abdomen with dengue illness. Explained the purpose of study and who gave consent and detailed history of Dengue illness with acute abdomen pain such cases included in this study.
Methods of Data Collection and Questionnaire
Predesigned and pretested questionnaire was used to record the necessary information. Questionnaires included general information, such as age, sex, religion, occupation of parents, residential address, socioeconomic status and date of admission.
Medical history- chief complain, past history, immunization history Nutritional status, general examination, systemic examination
Method
Explained the purpose of study and who gave consent and detailed history of Dengue illness with acute abdomen pain such cases included in this study. After obtaining informed verbal consent from all patients with the definitive diagnosis of DF admitted to paediatric ward tertiary care centre and, those with acute abdominal pain were included in the study.
 The diagnosis of DF made based on supportive clinical findings and a positive enzyme-linked immunosorbent assay (ELISA) result for specific dengue IgM or NS 1dengue test in acute-phase serum.
        The severity of DF categorized in accordance with the World Health Organization definitions; grade III DHF and grade IV DHF were grouped as dengue shock syndrome (DSS) Proportion of acute abdomen in dengue fever compared among various grades of severity. Management of dengue patients as per WHO protocol .acute abdomen due to surgical or medical causes rulled out by investigation according to WHO guidelines Managed all cases of DF with acute abdomen as per WHO protocol
        The data were entered in Microsoft Excel and data analysis was done by using SPSS demo version no 21 for windows. The analysis was performed by using percentages in frequency tables and correlation of acute abdominal pain with severity of dengue illness. $p < 0.05$ was considered as level of significance using the Chi-square test

RESULTS AND OBSERVATIONS
Table 1: Prevalence of various causes of abdominal pain in dengue infection

Sr No	Diagnosis	Frequency	Percentage
1	Hepatitis	17	15.45%
2	Calculous cholecyctitis	3	2.7%
3	Pleural effusion	20	18.18
4	Ascites	36	32.7%
5	Pancreatitis	4	3.6%
6	Appendicitis	1	0.9%
7	Mesenteric lymphadenopathy	5	4.5%
	Total	**86**	**100**

The above table shows majority of cases presented with ascites 36 (32.7%) followed by pleural effusion 20 (18.18%), hepatitis 17 (15.45%), Mesenteric lymphadenopathy 5 (4.5%), Pancreatitis 4 (3.6%),Calculous cholecyctitis 3 (2.7%) and appendicitis 1 (0.9%).
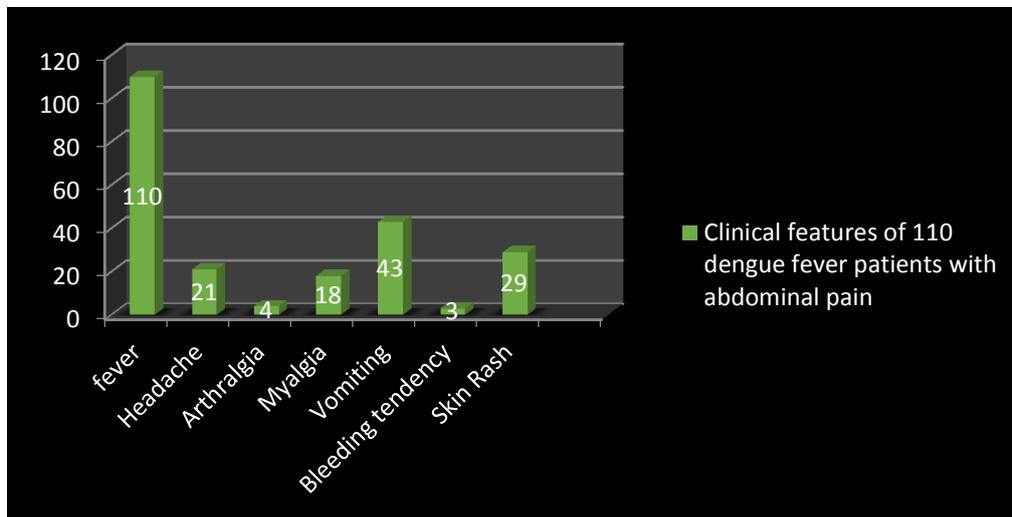

Figure 1: Clinical features of 110 dengue fever patients with abdominal pain
The above Figure 1 shows majority of cases presented with fever 110 (100%), followed by vomiting 43 (39.09%),skin rash 29 (26.3%),headache 21 (19%) ,myalgia 18 (16.3%), arthralgia 4 (3.6%) and bleeding tendency 3 (2.7%).

Table 2: Distribution of study patients according to age

Age In Years	No of Dengue illness cases	Percentage
1 -3	13	11.8%
4-6	30	27.2%
7-9	38	34.5%
10-12	26	23%
Total	**110**	**100**

The above table shows majority of cases found in 7-9 years age group e.g 38 (34.5%) followed by 4-6 years age group 30 (27.2%), 10- 12 years age group 26 (23%) and 1-3 years age group found 13 cases (11,8%).
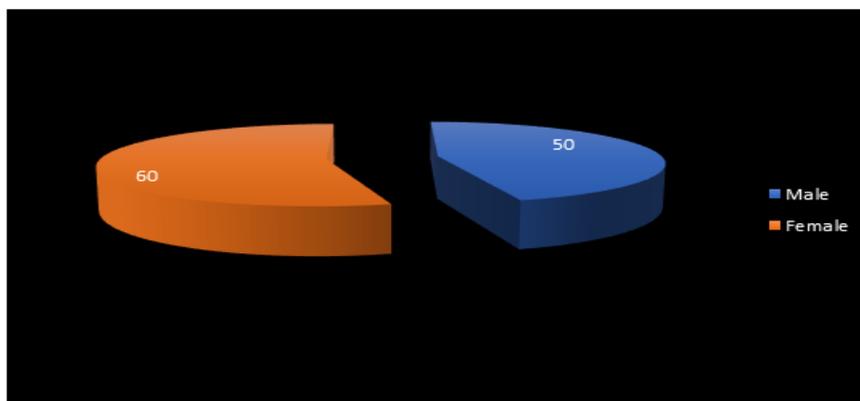

Figure 2: Distribution of Dengue illness cases according to Sex

The above figure 2 shows majority of the cases were found in females e.g 60 (54.60%) and Males were 50 (45.40%)

Table 3: Distribution of Dengue illness cases according to TLC

TLC	Frequency	Percentage
Leucocytosis	26	23.63%
Leucopenia	33	30%
Normal	51	46.36%
Total	**110**	**100**

The above table shows majority of the cases was found with Normal TLC e.g 51 (46.36%), 33 cases was found with Leucopenia (30%) and 26 cases with Leucocytosis (23.63%).

Table 4: Association of acute abdomen with dengue illness cases with age

Age	acute abdomen with dengue illness				Total (%)
	Present	**Percentage**	**Absent**	**Percentage**	
1-3	3	23.07%	10	76.93%	13(100)
4-6	17	56.66%	13	43.34%	30(100)
7-9	30	78.94%	8	21.06%	38(100)
10-12	18	62.06%	11	37.94%	29(100)
Total	**68**	**61.81%**	**42**	**38.19%**	**100**

When statistical analysis using Chi- square test was done, proportion of acute abdomen with dengue illness was statistical significant in age group 7 and above ($p < 0.05$).

Table 5: Proportion of Stage of Dengue Infection

Stage of Dengue Infection	frequency	percentage
Dengue Fever	98	89.09%
Dengue Hemorrhagic	8	7.27%
Dengue Shock Syndrome	4	3.64%
Total	**110**	**100**

The above table shows majority of cases had Dengue fever e.g 98 (89.09%, followed by Dengue Hemorrhagic 8,(7.27%) and Dengue shock syndrome was found in 4 cases (3..64%)

Table 6: Various causes of abdominal pain presenting in different stages of dengue infection

Diagnosis	Stage of Dengue infection			Percentage
	DF	**DHF**	**DSS**	
Hepatomegly	4	6	7	17(15.45%)
Acalculous cholecyctitis	0	1	2	3(2.7%)
Pleural effusion	4	6	10	20(18.18%)
Ascites	8	12	16	36(32.7%)
Pancreatitis	1	1	2	4(3.6%)
Appendicitis	0	1	0	1(0.9%)
Mesenteric lymphadenopathy	1	2	2	5(4.5%)
Total	**18**	**27**	**39**	**84(100)**

The above table shows majority of cases presented with ascites 36 (32.7%) followed by pleural effusion 20 (18.18%), hepatitis 17 (15.45%), Mesenteric lymphadenopathy 5 (4.5%), Pancreatitis 4 (3.6%), Acalculouscholecyctitis 3 (2.7%) and appendicitis 1 (0.9%).majority of cases had Dengue fever e.g 58 (52.72%), followed by Dengue Hemorrhagic 38,(34.54%) and Dengue shock syndrome was found in 14 cases (12.72%)

DISCUSSION

Dengue viral infections are one of the most important mosquito borne diseases in the world. They may be asymptomatic or may give rise to undifferentiated fever, dengue fever (DF), dengue haemorrhagic fever (DHF), or dengue shock syndrome (DSS).

Early recognition and prompt initiation of appropriate treatment are vital if disease related morbidity and mortality are to be limited.[12] Dengue is widely distributed in many countries in southeast and southern Asia, Central and South America, and the Western Pacific regions.[13]

The common symptoms in dengue infection are fever, malaise, headache, musculoskeletal pain, nausea and vomiting. Nonetheless, a significant number of patients develop one or more complications that include bleeding, effusions, acute hepatic failure, seizures, acute myocarditis, dengue encephalitis, acute renal failure, dengue shock syndrome (DSS).[14]

The abdominal pain in dengue infection can be either specific or non-specific. Of the specific cases, surgical emergencies like acute pancreatitis, acute acalculous cholecystitis and gastrointestinal bleeding are found in literature. In addition, there are reports of dengue enteritis mimicking appendicitis. However, in many cases of severe abdominal pain, no cause can be found.[13]

Abdominal pain is one of the common symptoms of DF and severe pain abdomen is strongly associated with DHF. About 500 000 people with severe dengue fever require hospitalization each year out of which about 2.5% die.[15] Severe pain abdomen may mimic many of the surgical emergencies like acute cholecystitis, appendicitis and pancreatitis.

In this study majority of cases presented with ascites 36 (32.7%) followed by pleural effusion 20 (18.18%), hepatitis 17 (15.45%),Mesenteric lymphadenopathy 5 (4.5%), Pancreatitis 4 (3.6%),Calculous cholecyctitis 3 (2.7%) and appendicitis 1 (0.9%).

Similar result was found in Satya Sudhish Nimmagadda et al (2014)[33] A prospective hospital based observational study conducted at hospitals of Kasturba Medical College in Mangalore, India, over a period of two years (June–2010 to May–2012) . A total of 150 patients with DF were included in the study. He revealed that the hepatitis in 40.6% patients, renal failure (8%), acalculous cholecystitis (6.66%) and acute pancreatitis (1.33%).

Chen et al (2004)[40] Conducted observational study and found that Acute pancreatitis is a rare complication of dengue fever. There are isolated case reports highlighting pancreatic involvement in dengue fever.

In this study majority of cases found in 7-9 years age group e.g 38 (34.5%) followed by 4-6 years age group 30 (27.2%), 10- 12 years age group 26 (23%) and 1-3 years age group found 13 cases (11,8%).

Similar result was found in Khanna S et al (2005)[26] Conducted a cross-sectional study in Tertiary care center in India during July to November 2003 and July to November 2004. A total of 100 patients who presented with fever and abdominal pain The mean age of the patients was 7 years (range 1-12 years).

In this study majority of the cases were found in females e.g 60 (54.60%) and Males were 50 (45.40%) similar result was found in Khanna S et al (2005)[26] Conducted a cross-

sectional study in Tertiary care center in India during July to November 2003 and July to November 2004. A total of 100 patients who presented with fever and abdominal pain .Fifty-five of these patients had DF were included in the study. He found that the 55 patients with DF, there were 35 male and 20 female patients.

In this study majority of cases had Dengue fever e.g 98 (89.09%), followed by Dengue Hemorrhagic 8,(7.27%) and Dengue shock syndrome was found in 4 cases (3..64%) similar result was found in Wasay M, Channa R, Jumani M, Zafar A et al(2008)[19] he Reviewed 225 cases of confirmed dengue virus infection from years 2000-2004 .The diagnosis was confirmed by presence of IgM antibodies against Dengue by ELISA in addition to fever according to WHO criteria. He found that the 30 (73%) had Dengue Fever (DF), 10 (24%) had Dengue Haemorrhagic Fever (DHF) and 1(2.4%) had Dengue shock syndrome (DSS) while after 2005, 107 (58%) had DF, 71 (39%) had DHF and 6 (3%) had DSS. Six patients (2.6%) died. Presence of shock (OR 2.9, 95% CI; 1.7-6.2), coma at presentation (OR 1.89, 95% CI; 1.02-3.3) and seizures (OR 1.6, 95% CI; 0.9-3.0) were important predictors of mortality.

CONCLUSION
- Most common cause of abdominal pain in dengue fever was ascites , pleural effusion , hepatitis.
- Most common clinical features found in dengue cases was fever , followed by vomiting and skin rash.
- Majority of cases was found in 7-9 years age group.
- Majority of the dengue cases were found in females.
- Leucocytosis and Leucopenia most common hematological changes was found in dengue cases.
- Highest Proportion of Stage of Dengue Infection was dengue fever

REFERENCES
1. World Health Organization. *Dengue haemorrhagic fever: diagnosis, treatment, prevention and control.* 2nd ed. Geneva, 1997 resources/publications/dengue/itoviii.pdf
2. Richards AL, Bagus R, Baso SM, Follows GA, Tan R, Graham RR, Sandjaja B, Corwin AL and Punjabi N. The first reported outbreak of dengue hemorrhagic fever in Irian Jaya, Indonesia. *Am J Trop Med Hyg.*1997; 57(1): 49-55.
3. Chakravarti A, Arora R, Luxemburger C. Fifty years of dengue in India. Trans R Soc Trop Med Hyg 2012; 106: 273–282.
4. Arunachalam N, Murty US, Kabilan L et al. Studies on dengue in rural areas of Kurnool District, Andhra Pradesh, India. J Am Mosq Control Assoc 2004; 20: 87–90.
5. Gubler DJ. Dengue and dengue hemorrhagic fever. ClinMicrobiol Rev 1998; 11: 480–496.
6. World Health Organization. Dengue: Guidelines for Diagnosis. Treatment, Prevention and Control: New Edition. World Health Organization: Geneva, 2009.
7. Lam SK, Burke D, Gubler D et al. Call for a World Dengue Day. Lancet 2012; 379:411–412.
8. Bhatt S, Gething PW, Brady OJ et al. The global distribution and burden of dengue.Nature 2013; 496: 504–507.
9. Brady OJ, Gething PW, Bhatt S et al. Refining the global spatial limits of dengue virus transmission by evidence-based consensus. PLoSNegl Trop Dis 2012; 6: e1760.

10. World Health Organization. Dengue and severe dengue. Available at mediacentre/factsheets/fs117/en/.

11. Aguiar M, Rocha F, Pessanha JEM et al. Carnival or football, is there a real risk for acquiring dengue fever in Brazil during holidays seasons? Sci Rep 2015; 5: 8462.

12. World Health Organization. Dengue hemorrhagic fever: diagnosis, treatment, prevention and control. 2nd ed. Geneva: *WHO*, 1997.

13. Khan E, Siddiqui J, Shakoor S, Mehraj V, Jamil B, HasanR.Dengue outbreak in Karachi, Pakistan, 2006: experience at a tertiary care centre. *Trans R Soc Trop Med Hyg*2007; 101:1114-9.

14. Casali CG, Pereira MR, Santos LM, Passos MN, Fortes Bde P, Ortiz Valencia LI, Alexandre Ade J and MedronhoRde A. The epidemic of dengue and hemorrhagic dengue fever in the city of Rio de Janeiro, 2001/2002. *Rev Soc Bras Med Trop.* 2004; 37(4): 296-299.

15. Goh BK, Tan SG. Case of dengue virus infection presenting with acute acalculouscholecystitis. *J GastroenterolHepatol*2006;21:923-4.

16. Nimmagadda SS, Mahabala C, Boloor A, Raghuram PM, NayakAU.Atypical manifestations of dengue fever (DF) – Where do we stand today? J ClinDiagn Res 2014; 8(1): 71–73.

17. Chen TC, Pernq DS, Tsai JJ et al. (2004) Dengue Hemorrhagic Fever complicated with pancreatitis and seizure. Journal of the Formosan Medical Association 103, 865–868

18. Khanna S, Vij J.C ,Kumar A,etal.Etiology of Abdominal Pain in Dengue Fever. Dengue Bulletin .Vol 29, 2005

19. Wasay, M., Channa, R., Jumani, M., Zafar, A. (2008). Changing patterns and outcome of Dengue infection; report from a tertiary care hospital in Pakistan. *Journal of Pakistan Medical Association, 58*(9), 488-489.