

Clinical and laboratory profile of dengue fever in children from a tertiary care centre of Gandaki Province, Nepal

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ABSTRACT

Introduction: Dengue, the arthropod borne viral disease is serious public health problem in Nepal. The clinical diagnosis of dengue has become challenging in children as it is presented with nonspecific symptoms. The objective of present study was to assess different clinical presentations and outcomes of dengue fever in tertiary care centre. **Methods:** A record based observational cross-sectional study was carried out on all dengue positive patients of aged 11 months to 15 years presented in Gandaki Medical College from July to November 2019. Total 74 patients with history of fever with dengue seropositive were included in the study. All the clinical and haematological findings were recorded in semi-structured questionnaire form. **Results:** Of 74 patients 40 (54.1%) males and 34 (45.9%) were females. Fifty-one (68.9%) were cases of dengue without warning sign, 18 (24.3%) were dengue with warning signs and 5 (6.8%) cases had severe dengue symptoms. Most of the patients (78.38%) were from Kaski district. Fever (100%) was the most common clinical presentation followed by headache (36.5%), vomiting (25.7%), and retro orbital pain (20.3%). Common laboratory findings included thrombocytopenia (59.4%) and leukopenia (35.1%). Among 74 cases, 68 were in stable condition and treated in OPD or in ward, and 6 were admitted in ICU of which one developed warning signs and other 5 had severe dengue. All the enrolled children recovered well and there was no mortality during this period. **Conclusions:** Fever, headache, vomiting, thrombocytopenia and leukopenia were most common presentation of dengue fever among children. Appropriate clinico-laboratory diagnosis and management is relatively simple, inexpensive and very effective in saving lives as long as correct and timely interventions are instituted.

Keywords: Severe dengue; Thrombocytopenia; Warning signs; WHO.

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INTRODUCTION

Dengue fever is the most common arboviral febrile illness caused by flavivirus of four serotypes: DENV-1, DENV-2, DENV-3 and DENV-4.¹ The spread of dengue is attributed to expanding geographic distribution of four dengue virus and their mosquito vectors predominantly by *Aedes mosquito*.² The global prevalence of Dengue fever has grown dramatically in recent decades and outbreaks been reported from both developed and developing countries that is now classified as major health threat by WHO.³ WHO currently estimates 50 million cases of dengue infection worldwide every year. An estimated 500,00 cases are severe dengue infection require hospitalization each year, of which very large population are children. The WHO revised the guidelines for dengue disease classification in 2009 as Dengue without warning signs, Dengue with warning signs and Severe Dengue.³

DENV occurs in tropical and subtropical region worldwide with Asia always remaining as high endemicity.^{3, 4} Nepal being

surrounded by the India and China, the dengue endemic countries^{5, 6} reported the first case of dengue disease in 2004.^{7,8} Major outbreaks occurred in 2010 with 917 cases and in 2013 with 683 cases and in 2016 with 1473 cases.⁸⁻¹⁰ Since then the sporadic cases and the outbreaks suggestive of dengue fever illness is seen in Nepal from time to time. Dengue cases were initially reported from lowlands of southern Terai Nepal and has now expanded to urban highlands of Nepal like Kathmandu and Pokhara.¹¹

Dengue fever is the self-limited disease but the mortality in severe dengue is as high as 20-30% if left untreated.³ Early recognition, careful monitoring and appropriate fluid therapy has resulted in reduction of case fatality with excellent outcome. The aim of our study was to assess clinical and laboratory profile and outcome of dengue cases in tertiary care centre of hilly region of Western Nepal for strategic alteration of public health programs.

METHODS

This was a record based observational study carried out in Paediatric department of Gandaki Medical College Teaching Hospital, tertiary centre. Seventy-four complete medical records of all laboratory confirmed dengue cases who were presented or admitted in Gandaki Medical College from 1st July 2019 to 30th November 2019 were retrieved. The clinical features with NS1 positive and/or IgM positive were labelled as Dengue confirmed. WHO classification and case definitions were used to classify the disease as Dengue without warning signs, Dengue with warning signs and Severe Dengue.³ Patients' demography, signs and symptoms, findings of laboratory investigation like complete blood counts, serum electrolytes, Liver function test, Renal function test, USG abdomen and pelvis, Chest x-ray recorded in semi structured questionnaire forms. BeneSphera Dengue NS1 and IgG/IgM rapid card test (lateral flow) kit was used for serology. Statistical analysis was done using SPSS 25. Descriptive analysis is expressed as numbers and percentage in tables. Median is calculated for quantitative variable (age).

RESULTS

Total number of cases was 74, the minimum and maximum age of our respondent were 11 months and 15 years respectively with median age 10 years. Among the patients of Dengue Without Warning Signs, more than one-third (37.3%) were from age group 8 to 11 years whereas 44.5 % of patient of age group 12 years and more had Dengue With Warning Signs. Forty percent of patients with Severe Dengue were from age 8 to 11 years. The classification of dengue with gender distribution is shown in table 1.

Table: 1 **Classification of Dengue cases with gender**

Classification of Dengue	Male n (%)	Female n (%)	Total n (%)
Dengue without warning sign	26 (51)	25 (49)	51 (68.9)
Dengue with warning sign	10 (55.6)	8 (44.4)	18 (24.3)
Severe dengue	4 (80)	1(20)	5 (6.8)
Total	40 (54.1)	34 (45.9)	74 (100)

Fifty-nine patients out of 74 were admitted in hospital. Out of them, 53(89.2%) were admitted in ward and 6 (10.2%) were admitted in ICU where 5 were Severe dengue and 1 was dengue with warning signs.

Place distribution

Most of the dengue cases were from Kaski district of ward no.9 followed by Tanahun, Syangja as shown below in the table 2.

Table 2: Place distribution of the Dengue cases

District	Number	Percentage
Kaski	58	78.38
Tanahun	11	14.88
Syangja	3	4.05
Baglung	2	2.70
Total	74	100

As the cases were more from ward no. 9 from Pokhara, effective program for preventive measures can be launched and enhance the knowledge of dengue among the population residing in these areas.

Clinical findings of dengue in children

Fever was present in all (100%) the patients with headache (36.5%), vomiting (25.7%), and retro orbital pain (20.3%) being the common symptoms of dengue in children as shown in Table:3.

Vomiting (100%), Headache (60%), Abdominal pain (60%) were most common presenting symptoms and common signs were low blood pressure (100%) and hepatomegaly (60%) among Severe Dengue cases.

Laboratory findings

In dengue fever, common laboratory findings were thrombocytopenia, leukopenia and raised haematocrit level. NS1Ag positive cases were more as the most (77%) of the patients were presented within 3 days of fever while 12.2 % of patient presented within 4-5 days of fever and 10.8% presented after 5 days of fever.

Table: 3 Clinical presentation of Dengue cases and SEVERE Dengue

Clinical features	Total dengue cases (n=74) n (%)	SEVERE Dengue (n=5) n (%)
Fever	74(100)	5(100)
Headache	27(36.5)	3(60)
Vomiting	19(25.7)	5(100)
Abdominal Pain	11(14.9)	3(60)
Retro-orbital pain	15(20.3)	2(40)
Myalgia	12(16.2)	1(20)
Rash	9(12.2)	0
Hepatomegaly	9(12.2)	3(60)
Hypotension	5(6.8)	5(100)

Among Severe Dengue, the common laboratory findings were thrombocytopenia, leukopenia, raised alkaline transaminases, and raised haematocrit level.

Table:4 Laboratory findings on dengue types (column total)

Laboratory Test		Dengue without warning(n=51) n(%)	Dengue with warning sign(n=18) n(%)	Severe dengue (n=5) n(%)	Total N=74 n(%)
Total Leukocytes count cell/mm ³	Leukopenia <4000	13(25.5)	9(50)	4(80)	26(35.1)
	Normal (4000-11000)	38(74.5)	9(50)	1(20)	48(64.8)
ALT U/L	Normal (0-40)	47 (92.2)	17 (94.4)	1(20)	65(87.9)
	High (>40)	4 (7.8)	1(5.6)	4(80)	9(12.1)
	>1.5,00,000/mm ³	19 (37.3)	5 (27.8)	0	24(32.4)
Total Platelet count /mm ³	1,00,000-1,50,000	23(45.1)	9(50)	2(40)	34(45.9)
	75,000-99,000	9(17.6)	1(5.6)	0	10(13.5)
	<75000	0	3(16.7)	3(60)	6(8.10)
	30.1-35%	4 (7.8)	4 (22.2)	0	8(10.8)
Hematocrit	35.1-40%	28 (54.9)	7 (38.9)	4(80)	39(52.7)
	40.1-45%	19(37.3)	7 (38.9)	1(20)	27(36.5)
	NS1	43 (84.3)	13 (72.2)	1(20)	57 (77)
Serology positivity	IgM, NS1	5 (9.8)	5 (27.8)	3(60)	13(17.6)
	IgM	3 (5.9)	0	1 (20)	4 (5.4)

Management and Outcome

Among 74 cases, 68 cases were in stable condition and treated on OPD basis or in ward, and 6 were admitted in ICU and treated. All the enrolled children recovered well and there was no mortality during this period. Hence, the early recognition of signs and symptoms of dengue fever is very important for successful outcome.

DISCUSSION

Global incidence of dengue fever has increased dramatically in the recent decades.⁶ There are very few studies based on the revised new dengue classification. Based on the

WHO TDR 2009 dengue guidelines, in our study, the total number of cases analysed was 74, out of which 51(68.5%) were categorized as cases of Dengue without warning signs, 18(24.3%) were Dengue with warning signs and 5 (6.80%) were cases of Severe dengue which was similar to the observation made in the study done in south Rajasthan, India.¹² The maximum numbers of cases were seen in the group >8 years of age and the least affected age group was infants which was similar to study done by Mishra et al.¹³ Gender distribution of cases showed there were 40 (54.1%) males and 34 (45.9%) females in our study which similar to study done by Moinuddin et al.¹⁴

Regarding symptoms, in our study fever was present in all the patients with headache, vomiting, and retro orbital pain being the common symptoms in dengue fever which is concordant with study done by Banerjee et al.¹⁵

In this study low platelet count, and leukopenia were observed which important clues to the diagnosis of dengue fever. Elevated liver enzymes were observed in all patients with Severe Dengue had similar high values of enzymes was noted in previous studies done in southern India.¹⁶

Our study also showed that in Severe Dengue, Vomiting (100%), Abdominal pain (60%) were most common presenting symptoms and low blood pressure (100%), hepatomegaly (60%) were common physical findings. Similarly, 80 % had leukopenia and 60% had platelet count less than 75000 mm³ among Severe Dengue cases. These finding are concordant with the study done by Pothapregada et al¹⁷ and Jairaj et al .¹⁸

In our study, more than three-fourth (77%) of patients were positive for only NS1 followed by NS1 and IgM were (17.6%) and IgM only were (5.4%) as most (77%) of the patients were presented within 3 days of fever while 12.2 % of patient presented within 4-5 days of fever and 10.8% presented after 5 days of fever. Non-Structural protein 1 antigen positive indicate high sensitivity of the test for early diagnosis of disease.as in the study of Jain et al¹² and Kumarasamy et al.¹⁹

In our study, most of the dengue cases were from Kaski district of ward no.9 followed by Tanahun, Syangja and the reason for it may be that our hospital is in Kaski district ward no.8 so more the nearby patients visited the hospital and the other reason may be that the bus park area and slum areas are more in this ward.

Among 74 cases, no mortality was observed during this study period. In our study 68 cases were in stable condition and treated on OPD basis or in ward, and 6 were admitted in ICU as had severe dengue. The overall mortality of

dengue infection is low if treated appropriately, however the mortality associated with severe dengue is high as these patients need ICU settings and ventilator support which is not available in every health care facility. The knowledge regarding its presentation, clinical and biochemical features and best management practices are the key to successfully manage these patients. Similarly, public awareness regarding preventive strategies is essential to fight against this disease

CONCLUSIONS

Children with the median age of 10 years was commonly affected by dengue. Fever, headache, vomiting, thrombocytopenia and leukopenia were common clinical-laboratory finding in dengue cases. Children with these findings in Gandaki province should be suspected of having dengue fever and managed accordingly. Our document will hopefully be useful to Nepalese government agencies to help strengthen mosquito surveillance and disease diagnosis and treatment programs.

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Conflict of interest: none

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