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Clinical Manifestations, Laboratory Profile And Outcome Of Dengue Fever In Children In A Tertiary Care Hospital In Odisha- A Prospective Observational Study

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ABSTRACT

Background. In India, dengue epidemics are becoming more frequent (WHO, 2008). The majority of dengue viral infections are self-limiting, but complications may cause high morbidity and mortality.

Aims and Objectives: To study the clinical manifestations, laboratory profile and outcome of Dengue fever in children less than 14 years of age and to determine the seasonal trend of the disease during our study period.

Materials and Methods: It was descriptive Longitudinal Hospital base study. The study was conducted on total number of 150 dengue positive patients, admitted in the department of Paediatrics of IMS & SUM hospital. A systematic sampling method was used for the purpose of this study using the formula for calculating sampling interval (sampling frame/sample size. A total 1178 number of the patient admitted with suspected dengue like fever during the study period, out of which dengue positive found 150 cases(either positive NS1 antigen or positive IgM antibody by ELISA).

Results: The incidence of dengue fever was 12.7%. Age distribution among study population we have found maximum number of the patients belonged to 10 to <14 years of age group i.e. 71(49.3%), followed by 52(34.7%) patients who belonged to 5 to 10 years of age group and 24(16.0%) patients were between 1 to 5 years of age group respectively. Most of the dengue cases were found at the months of august to December i.e. 127(84.7%) cases, mostly during monsoons and sometime stretching till mid of December. Out of 150 cases ELISA for NS1 positive 126(84.0%), and negative found 24(16.0%) cases. Dengue with/without warning sign was 79(52.7%) & Severe Dengue was found 21(14.0%) cases respectively. Fever was the common symptoms among all the patients (150). Petechiae/rash-73.3%, Bleeding Manifestation-73.3%, Altered sensorium / Drowsiness- 10.7%,Out of 150 cases 31(20.6%) cases had rise in SGPT, out of which 23(15.3%) cases had rise in SGPT from 50-200 IU/L. 6(4.0%) cases had rise in SGPT from 200-1000IU/L.We have found SGPT level was very high (200-1000IU/L) & (>1000IU/L) in severe dengue cases compare to non severe dengue case. i.e. 9.5% each. It was statistically significant different between the groups. p value was 0.0008.On USG findings out of 150 patients, we found that 36 (24.0%) had ascites. And 4(2.6%) patients had GB wall edema. Out of 150 cases 2(1.3%) cases died from severe dengue cases (D.H.F & D.S.S.) and another 148(98.7%) cases survived.

Conclusion: Dengue fever is a cause of great apprehension among paediatric age group fever, and is also cause of fear among parents. Vomiting,skin bleeding, altered sensorium, hepatomegaly, and fever defervescences after a period of fever strongly suggest a diagnosis of severe Dengue. Raised SGOT, hepatomegaly, pleural effusion and shock are few of the certain symptoms that can help distinguish between severe and non-severe dengue. Early detection, precise assessment, and proper treatment have all helped to reduce morbidity and mortality

Keywords: *Bleeding, dengue fever, multi-organ failure, shock*

1. INTRODUCTION

Dengue is a mosquito-borne viral disease that has rapidly spread to all regions of WHO in recent years. Dengue is caused by a virus of the Flaviviridae family and there are four distinct, but closely related, serotypes of the virus that cause dengue (DENV-1, DENV-2, DENV-3 and DENV-4. Study on the prevalence of dengue estimates that 3.9 billion people are at risk of infection with dengue viruses. Despite a risk of infection existing in 129 countries [1], 70% of the actual burden is in Asia [2]. The number of dengue cases reported to WHO increased over 8 fold over the last two decades, from 505,430 cases in 2000, to over 2.4 million in 2010, and 5.2 million in 2019. Reported deaths between the year 2000 and 2015 increased from 960 to 4032, affecting mostly younger age group.. The total number of cases seemingly decreased during years 2020 and 2021, as well as for reported deaths. However, the data is not yet complete and COVID-19 pandemic might have also hampered case reporting in several countries.While majority of dengue cases are asymptomatic or show mild symptoms, it can manifest as a severe, flu-like illness that affects infants, young children and adults. Symptoms usually last for 2–7 days, after an incubation period of 4–10 days after the bite from an infected mosquito [3]. The World Health Organization classifies dengue into 2 major categories: dengue (with / without warning signs) and severe dengue. The sub-classification of dengue with or without warning signs is designed to help health practitioners triage patients for hospital admission, ensuring close observation, and to minimize the risk of developing the more severe dengue[4] .Warning signs that doctors should look for include: severe abdominal pain/persistent vomiting/rapid breathing/bleeding gums or nose /fatigue/restlessness/liver enlargement/blood in vomit or stool. Previous infection with DENV increases the risk of the individual developing severe dengue. Before day 5 of illness, during the febrile period, dengue infections may be diagnosed by virus isolation in cell culture, by detection of viral RNA by nucleic acid amplification tests (NAAT), or by detection of viral antigens by ELISA or rapid tests [5].NS1 antigen detection kits now becoming commercially available can be used in laboratories with limited equipment and yield results within a few hours. Rapid dengue antigen detection tests can be used in field settings and provide results in less than an hour. An estimated 500,000 people with severe dengue infection require hospitalization annually and 90% of them are children 20% and with timely intervention [6]. Bhubaneswar has not experienced any major epidemics of dengue fever in the past, but since 2012 has seen unprecedented rise in dengue fever cases due to rapid urbanization, population migration and increased number of construction sites, open drains and lack of proper public health measures. This study was undertaken to evaluate clinical profile and outcome of dengue fever in children at a tertiary care hospital in odisha.

2. MATERIALS & METHODS

Place of Study: Department of Paediatrics, IMS & SUM hospital. **Study Design:** Descriptive Longitudinal Hospital base study. **Study Period:** October 2020 up to October 2022.**Study Population and patient's selection:** The study was conducted on a total number of 150 serologically confirmed (NS 1, IgM positive alone or both IgM and IgG) dengue patients admitted in the department of Paediatrics ward at IMS & SUM hospital.

Inclusion Criteria:

- Serologically confirmed (NS 1, IgM positive alone or both IgM and IgG) dengue fever patients admitted to the department of paediatrics at IMS & SUM hospital.
- All cases in the paediatric age group (<14years) to be included irrespective of sex.
- Informed consent from the entire patient was taken before undergoing the study.
-

Exclusion Criteria:

- NS1, IgM negative dengue like illnesses.
- Children aged >14 years of age.
- The cases positive for enteric fever, malaria, leptospirosis and other infective etymologies by appropriate investigation.
- Those patients who refuse to be included in the study.

Sampling Technique

A total 1178 number of the patient admitted with suspected dengue like fever during the study period, out of which patients positive for dengue were 150 cases. So our final sample size was 150.

Specimen Collection and Processing: Specimen collection and processing was performed of those patients, who were suffering from suspected dengue like fever:

Method of blood collection:

After collecting the blood it was divided in two different vials: EDTA & Clot. The blood which was collected in EDTA vial

was used for the investigation of Complete Haemogram. And the blood which was collected in clot vial was centrifuged and after separating the serum was used for rapid test of Dengue and Dengue ELISA tests.

One blood sample was collected from each of the patients for dengue serology.

Test Done:

- **Complete blood count:** Complete blood counts were done with an auto analyzer in the Central laboratory using about 1 ml of blood collected each from the clients into the EDTA vial
- **Dengue NS1** Ag Microlisa is a solid phase enzyme linked immunosorbent assay (ELISA) based on the "Direct Sandwich" principle..
- **Dengue Virus IgM ELISA Test:** The is a solid phase enzyme-linked immunosorbent assay (ELISA): Samples are diluted with Sample Diluent and additionally incubated with IgG-RF-Sorbent, containing hyper-immune anti-human IgG-class antibody to eliminate competitive inhibition from specific IgG and to remove rheumatoid factors. Microtiter wells as a solid phase are coated with Dengue - 2 Virus antigens. Absorbance at 450 nm is read using an ELISA microtiter plate reader.

Ethical Consideration

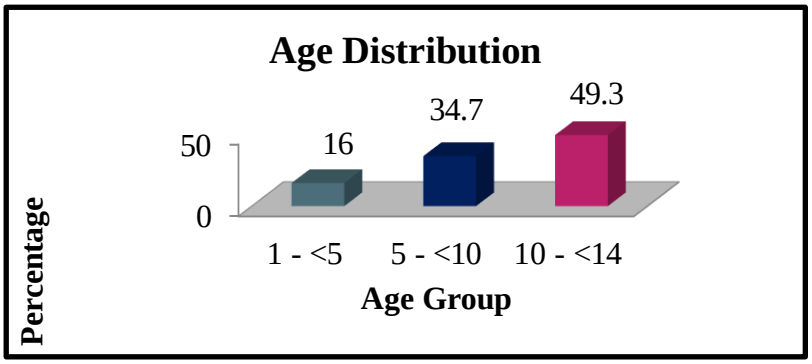
Approval for the study was obtained from the IMS & SUM hospital. ethical committee and informed consent was obtained from the clients after adequate information with respect to the purpose of the study, objectives, procedure, risk/discomfort and potential cost/benefit.

3. RESULTS & OBSERVATIONS

Table:1. Incidence of dengue fever.

Total no of Dengue like fever cases	No of dengue fever	Percentage
1178	150	12.7

Figure.1: Age distribution among study population (n=150)



During the study period total number of Dengue like fever cases were admitted 1178 out of which 150 cases had dengue positive. The incidence of dengue fever was 12.7%. **(Table:1)** As per Age distribution Maximum number of the patients were belongs to 10 to <14 years of age group i.e. 71(49.3%) and 24(16.0%) patients were 1 to ,5 years of age group respectively.(**Figure.1)**

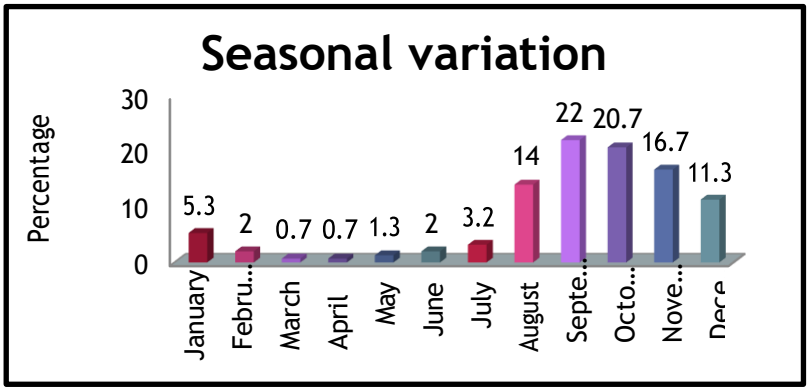
Table.2: Sex distribution among study population (n=150)

Sex Distribution		
	No. of patients	Percentage
Male	94	62.7

Female	56	37.3
Total	150	100.0

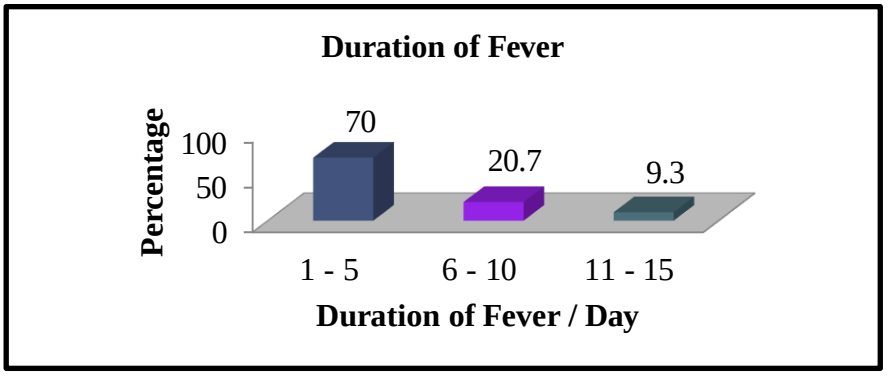
Male patients were predominantly higher than female patients 94(62.7%) vs. 56 (37.3%) respectively. **(Table no:2).**

Figure: 2. Seasonal variation (n=150)



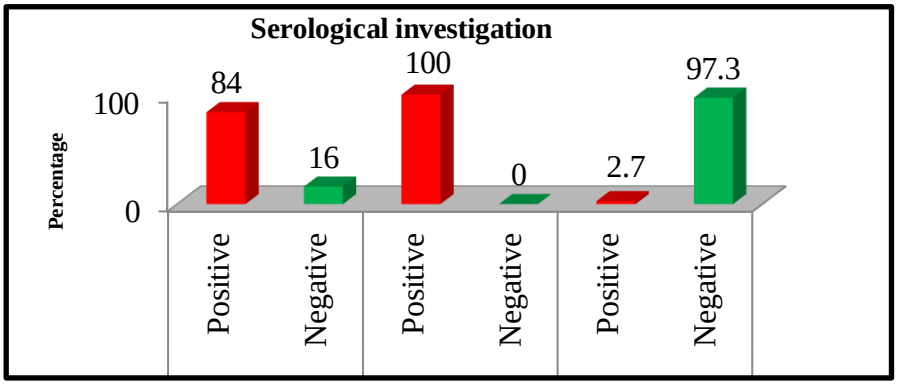
Most of the dengue cases were found at the months of august to December i.e. 127(84.7%) cases, which implies the peak is seen mostly during monsoon season, sometimes stretching till mid-December. **(Figure: 2)**

Figure.3: Duration of fever among study Population.



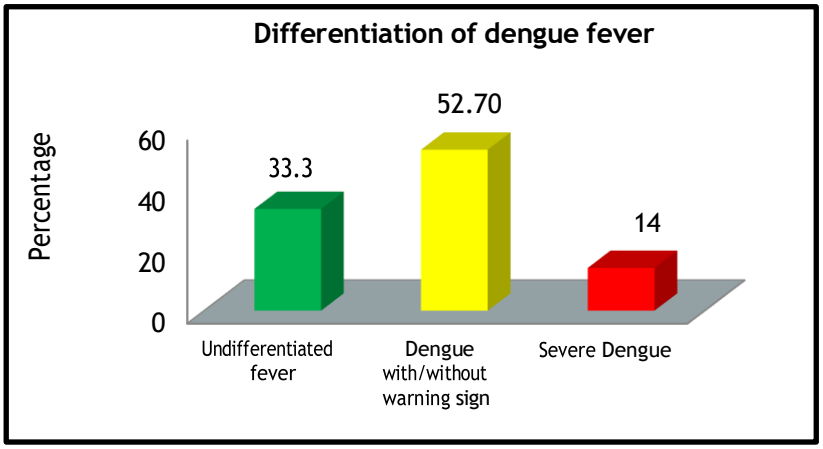
Maximum number 105 (70.0%) patients were suffering from fever from 1-5 days and only 9.3% (14) patients were suffering from >10 days of fever respectively. **(Figure.3)**

Figure.4: Serological investigation for isolated dengue virus by ELISA (n=150)



Out of 150 cases ELISA for NS1 positive 126(84.0%), and negative found 24(16.0%) cases. Whereas 100% Positive found in Dengue IgM. ELISA for Dengue IgM was more sensitive than NS1.

Figure: 5. Differentiation of dengue fever (n=150)



Out of 150 dengue positive cases, we have found undifferentiated fever was 50(33.3%), Dengue with/without warning sign was 79(52.7%) & Severe Dengue was found 21(14.0%) cases respectively.

Table.3: Clinical sign & symptoms (n=150)

Sign & Symptom	No of patients	%	Non severe dengue (n=129)	%	Severe Dengue (n=21)	%
Fever	150	100.0	129	100.0	21	100.0
Headache	141	94.0	122	94.6	19	90.5
Nausea/vomiting	129	86.0	112	86.8	17	80.9
Pain abdomen	124	82.7	108	83.7	16	76.2
Decreased appetite	127	84.7	110	85.3	17	80.9
Petechiae/rash	110	73.3	95	73.6	15	71.4
Bleeding Manifestation	110	73.3	95	73.6	15	71.4
Myalgia	124	82.7	105	81.4	19	90.5
Retro orbital pain	106	70.7	91	70.5	15	71.4
Hepatomegaly	78	52.0	61	47.3	17	80.9
Shock	21	14.0	0	0.0	21	100.0
Third space loss	46	30.7	28	21.7	18	85.7
Altered sensorium / Drowsiness	16	10.7	0	0.0	16	76.2
Respiratory distress/Breathlessness	10	6.7	0	0.0	10	47.6
Torniquet test positive	16	10.7	6	4.7	10	47.6

Fever was the common symptoms among all the patients (150). Out of 150 cases Headache present-94.0%, Nausea/vomiting-86.0%, Pain abdomen-82.7%,Petechiae/rash-73.3%, Bleeding Manifestation-73.3%, Myalgia-82.7%, Retro orbital pain-

70.7%, Shock was-14.0%, Third space loss-30.7%, Altered sensorium / Drowsiness- 10.7%, Respiratory distress /Breathlessness-6.7% & Torniquet test positive was 10.7% cases respectively. Out of which129 Non severe dengue cases 94.6% patients had Headache, Pain abdomen was-83.7%, Decreased appetite was-85.3%, Petechiae/rash & Bleeding Manifestation were-73.6 & Torniquet test positive was found 4.7% cases.

Table:4. Total Leukocytes count among study population.

Total Leukocytes count	Total No of cases(n=150)		Non severe dengue (n=129)		Severe Dengue (n=21)	
	No of cases	%	No of cases	%	No of cases	%
Leukopenia (<4000 cells/mm^2)	59	39.3	54	41.8	5	23.8
Leucocytosis(>11000 cells/mm^2)	17	11.3	7	5.4	10	47.6
Normal (4000-11000 cells/mm^2)	74	49.4	68	52.7	6	28.6
Total	150	100.0	129	100.0	21	100.0
Statistical inferences	Chi-square- 31.998 P value- <0.0001					

Out of 150 dengue positive cases 59(39.3%) cases had Leukopenia, 17(11.3%) cases had Leucocytosis and 74(49.4%) cases had Normal Leukocytes count. In Non-severe dengue cases 54(41.8%) had Leukopenia, 7(5.4%) cases had Leucocytosis and 68(52.7%) cases had Normal Leukocytes count against 5(23.8%) cases had Leukopenia, 10(47.6%) cases had Leucocytosis and only 6(28.6%) cases had Normal Leukocytes count form severe dengue cases respectively. It was statistical significant different between the groups. P value was <0.0001. **(Table:4)**

Table:5. Liver enzyme of SGPT.

Rise in SGPT(IU/L)	Total No of cases(n=150)		Non severe dengue (n=129)		Severe Dengue (n=21)	
	No of cases	%	No of cases	%	No of cases	%
50 – 200 IU/L	23	15.3	22	17.1	1	4.8
200 – 1000 IU/L	6	4.0	4	3.1	2	9.5
>1000 IU/L	2	1.3	0	0.0	2	9.5
Total	31	20.6	26	20.2	5	23.8
Statistical inferences	Chi-square- 14.0726 P value- 0.0008					

Out of 150 cases 31(20.6%) cases had rise in SGPT, out of which 23(15.3%) cases had rise in SGPT from 50-200 IU/L and in 2 cases had rise in SGPT above 1000 IU/L. We have found SGPT level was very high (200-1000IU/L) & (>1000IU/L) in severe dengue cases compare to non-severe dengue case. i.e. 9.5% each. It was statistical significant different between the groups. p value was 0.0008. **(Table:5)**

Table:6. Liver enzyme of SGOT.

Rise in SGOT(IU/L)	Total No of cases(n=150)		Non severe dengue (n=129)		Severe Dengue (n=21)	
	No of cases	%	No of cases	%	No of cases	%
50 – 200 IU/L	39	26.0	33	25.6	6	28.6
200 – 1000 IU/L	14	9.3	8	6.2	6	28.6
>1000 IU/L	4	2.7	0	0.0	4	19.0
Total	57	38.0	41	31.8	16	76.2
Statistical inferences	Chi-square- 14.8744 P value- 0.0005					

Out of 150 cases 57(38%) cases had rise in SGOT, out of which 39(26.0%) cases had rise in SGOT from 50-200 IU/L And 4(2.7%) cases had rise in SGPT above 1000 IU/L. We have found SGOT level was very high in severe dengue cases compare to non-severe dengue case. It was statistical significant different between the groups. p value was 0.0005. **(Table: 6)**

Table:7. Total Platelet Count.

Platelet Count (lack/cumm)	Total No of cases(n=150)		Non severe dengue (n=129)		Severe Dengue (n=21)	
	No of cases	%	No of cases	%	No of cases	%
>1 lack /cumm	44	29.3	43	33.3	1	4.8
1 lack to 50000/ cumm	78	52.0	74	57.4	4	19.0
<50000 /cumm	28	18.7	12	9.3	16	76.2

Total	150	100.0	129	100.0	21	100.0
Statistical inferences	Chi-square- 53.4112 P value- <0.0001					

Out of 150 dengue positive cases, 44(29.3%) cases had platelet count >1 lack/cumm. 78(52.0%) cases had platelet count 1 lack to 50000/ cumm and 28(18.7%) cases had low platelet count (<50000/cumm).Out of 129 non severe dengue cases platelet count <50000/cumm platelet count had 12(9.3%) cases and in severe dengue cases <50000/cumm platelet count had 16(76.2%) cases respectively. Here we found most of cases had low platelet count in severe dengue cases compare to non-severe dengue cases. It was statistical significant different between the groups. p value was <0.0001.

Table:8. Hematocrit Value.

Hematocrit Value(%)	**Total No of cases(n=150)**		**Non severe dengue (n=129)**		**Severe Dengue (n=21)**	
	No of cases	%	No of cases	%	No of cases	%
≥36.3%	58	38.7	44	34.1	14	66.7
<36.3 %	92	61.3	85	65.9	7	33.3
Total	150	100.0	129	100.0	21	100.0
Statistical inferences	Chi-square- 8.0724 P value- 0.004					

Out of 150 dengue positive cases Hematocrit Value was higher (≥36.3%) had 58(38.7%) cases, and remaining 92(61.3%) cases had Hematocrit Value <36.3%. Out of 129 Non severe dengue cases Haematocrit Value was ≥36.3% had 44(34.1%) cases vs. Haematocrit Value was ≥36.3% had 14(66.7%) cases in severe dengue cases.. It was statistical significant different between the groups. p value was 0.004.

Table:9. Chest X-Ray findings.

Plural Effusion	**Total No of cases(n=150)**		**Non severe dengue (n=129)**		**Severe Dengue (n=21)**	
	No of cases	%	No of cases	%	No of cases	%
Right	21	14.0	16	12	5	23.8

				.4		
Left	11	7.3	7	5.4	4	19.0
Right + Left	17	11.4	5	3.9	12	57.1
Total	49	32.7	28	21.7	21	100.0
Statistical inferences	Chi-square- 8.6387 P value- 0.01					

Out of a total of 150 patients, we found that 49 (32.7%) had evidence of Plural Effusion on chest x-ray. We found that right site Plural Effusion affected 21 (14.0%), left site Plural Effusion affected 11 (7.3%), and both sites affected 17 (11.4%) of the cases. However, all severe dengue cases (100%) and 28 (21.7%) of non severe dengue cases (Plural Effusion) had this complication. It was statistical significant different between the groups. p value was 0.01.

Table:10. USG findings.

USG findings	Total No of cases(n =150)		Non severe dengue (n=129)		Severe Dengue (n=21)	
	No of cases	%	No of cases	%	No of cases	%
Ascites	36	24.0	22	17.5	14	66.6
GB wall edema	4	2.6	0	0.0	4	33.3
Total	40	26.6	22	17.5	21	100
Statistical inferences	Chi-square- 5.432 P value- 0.019					

On USG findings out of 150 patients, we found that 36 (24.0%) had ascites. And 4(2.6%) patients had GB wall oedema.

In sever dengue cases 66.6% had ascites and GB wall oedema was in 33.3% cases, whereas only 22(17.5%) cases had ascites in 129 non severe dengue cases. It was statistical significant different between the groups. p value was 0.019.

Table: 11. Associated infection and need for ICU admission

Variables	Total No of cases(n= 150)		Non severe dengue (n=129)		Severe Dengue (n=21)	
	No of cases	%	No of cases	%	No of cases	%
Bacterial Infection	22	14.7	8	6.2	14	66.7
Pneumonia	4	2.7	0	0.0	4	19.0
UTI	9	6.0	6	4.7	3	14.3
Need for ICU	21	14.0	0	0.0	21	100.0
Mechanical Ventilation	2	1.3	0	0.0	2	9.5
Statistical inferences			Chi-square- 19.276 P value- 0.0006			

Most of the severe dengue cases had Bacterial Infection, Pneumonia & UTI i.e. 14(66.7%),4(19.0%) & 3(14.3%). and 100% cases were need for ICU admission, in between 2 cases were need for Mechanical Ventilation. On the other hands only 6.2% and 4.7% cases had Bacterial Infection and UTI among non-severe dengue cases. It was statistical significant different between the groups. p value was 0.0006.

Table:12. Treatment given

Treatment given	Total No of cases(n =150)		Non severe dengue (n=129)		Severe Dengue (n=21)	
	No of cases	%	No of cases	%	No of cases	%
Antipyretics	150	100.0	129	100.0	21	100.0
Intravenous Fluid	111	74.0	91	70.0	20	95.2
PRBC Transfusion	6	4.0	0	0.0	6	28.6

Platelet Transfusion	12	8.0	0	0.0	12	57.2
Dopamine	5	3.3	0	0.0	5	23.8
Adrenaline	2	1.3	0	0.0	2	9.5

Every single patient had taken antipyretics. To treat the 21 severe dengue cases, 95.2% of patients received intravenous fluids and only 28.6% required platelet transfusions. Whereas out of 129 cases 70.0% patients received only intravenous fluids and other symptomatic care. **(Table: 12.)**

Table: 13. Outcome

Outcome	Total No of cases(n=150)		Non severe dengue (n=129)		Severe Dengue (n=21)	
	No of cases	%	No of cases	%	No of cases	%
Survive	148	98.7	129	100.0	19	90.5
Death	2	1.3	0	0.0	2	9.5
Total	150	100	129	100	21	100

Out of 150 cases 2(1.3%) cases had died from severe dengue cases (D.H.F & D.S.S.) and another 148(98.7%) cases had survived.

4. DISCUSSION

Dengue is an important arboviral infection in tropical countries. The global incidence of dengue fever has increased dramatically in recent decades. [7] There are very few studies based on the revised new dengue classification. **Incidence of dengue fever:** In this study, a total 1178 number of the patient admitted with suspected dengue like fever, out of which dengue positive found in 150 cases. **The incidence of dengue fever was 12.7%. Paulson W et al.**[8] reported that dengue is widespread in the northern states of India and the highest prevalence is observed in Delhi (5.6%), followed by Dadra & Nagar Haveli (3.3%) and Chandigarh (3.1%). **Age:** In this study, Maximum number of the patients were belongs to 10 to <14 years of age group i.e. 71(49.3%), followed by 52(34.7%) patients were belongs to 5 to ,10 years of age group and 24(16.0%) patients were 1 to ,5 years of age group respectively. Age distribution among severity of the disease we found 130 cases had dengue fever, out of which 24(18.5%) cases were belongs to 1 - <5 years of age group, 44(33.8%) cases were 5 -<10 years of age group and 62(47.7%) cases were belongs to 10 -<14 years of age group. Out of 18 Dengue haemorrhagic fever 8 (44.4%) cases were belong to 10 - <14 years of age group, and 10(55.6%) cases were 5 -<10 years of age group. and two Dengue shock syndrome case was found 10-<14 years of age group respectively. It was statistically not significant, p value was 0.187. This is comparable with **Krishnasamy K et al**[9] that among the paediatric age group, positivity was significantly high in 6-12 year age group followed by 13-18 year age group. By clinical evaluation, showed in their study that Dengue fever was seen in 43 cases, eighteen cases had haemorrhagic manifestations. **Duration of fever:** We found 130 cases of dengue fever, out of which 90 (69.2%) patients were suffering from fever for 0-5 days and 12(9.2%) cases had fever > 10 days. Out of 18 **patients with dengue** haemorrhagic fever, 15 (83.3%) had fever during 0-5 days, and 3(16.7%) case had fever during 6-10 days. On the other hand, 2(100%) cases had dengue shock syndrome, and they had fever during 10 days, respectively. It was statistically significant; the p value was 0.0002. **Narayanan et al** [10] reported average duration of fever was 4.9 days. It was lesser in DSS (4.8 days) and statistically not significant (P=0.34).**Severity of Dengue fever:** In this study, Out of 150 dengue positive cases, we have found undifferentiated fever was 50(33.3%), Dengue with/without warning sign was 79(52.7%) & Severe Dengue was found 21(14.0%) cases respectively. **Kabilan et al.**[11] (Chennai 2001) reported on DF (65.5%), DHF (11.2%), DSS (23.8%). **Ratageri et al.**[12] (Hubli 2003) reported on DF (18%), DHF (60%), DSS (22%). **Narayanan et al.** (Chennai 2001) reported on DF (72.78%), DHF (18.6%), DSS (8.4%). **Kalyanarooj et al.**[13] (Indonesia) reported DF (including DFB) (53%), DHF (including DSS) (47%).**Serological investigation:** In this study, out of 150 cases ELISA for NS1 positive 126(84.0%), and negative found 24(16.0%) cases. Whereas 100% Positive found in Dengue IgM. ELISA for Dengue IgM was more sensitive than NS1. Similar studies were done by **Ratho et al**[14] 2005, an outbreak of dengue fever was investigated in a periurban slum area of Chandigarh, India, during September to December,

2002. Of 218 acute phase sera tested, 58 samples were positive for dengue specific IgM antibody. Thus, the presence of dengue specific IgM antibodies in acute phase serum samples comprised the total of 76 (35%; 76/218) acute dengue confirmed cases Amongst them, the presence of dengue specific IgG antibodies in 55 patients (72.4%) further categorized the cases in to secondary dengue infection. According to **Shu** et al[15], capture IgM and IgG ELISA has become the most powerful assay for serodiagnosis due to its high sensitivity, specificity and simplicity. **Seasonal variation:** In this study, Most of the dengue cases were found at the months of august to December i.e. 127(84.7%) cases, mostly during monsoons. Study conducted by **Wongkoon S et al**.,[16] reported During the winter time and rainy times of the year, more Ae. aegypti larvae were found in each home than Ae. albopictus larvae. The rainy season saw a rise in the average number of Aedes larvae discovered in a home compared to the winter and summer months. The occurrence of dengue fever in Sisaket was significantly correlated with both relative humidity at a lag of one month and rainy days in the present month.**Clinical sign & symptoms:** Fever was the common symptoms among all the patients (150). Out of 150 cases Headache present-94.0%, Petechiae/rash-73.3%, Bleeding Manifestation-73.3%, Retro orbital pain-70.7%, Shock was-14.0%, Third space loss-30.7%, Altered sensorium / Drowsiness- 10.7%, cases respectively. **Headache: Narayanan et al**[65] found, 28.8%, **Kalyanarooj et al**, found 77%, **Ratageri et a**l, found 22% we have found 100%.**Hepatomegaly: Aggarwal et al,**[17] found 72%, **Narayanan et al** found 52.5%, & we have found 53.7%.**Tourniquet test:** found positive **Aggarwal et al**, 26.7%, **Gomber et al**,[18] found 25%, **Narayanan et al**, found23.7%, **Kalyanarooj et al,** 52%, & we have found 21.3%. **Shock: Aggarwal et al,**reported 33%. In **Narayanan et al** it was 8.4%, we have found 5.3% **Third space loss**: **Kalyanarooj et al**, reported 84% in DHF. **Narayanan et al**,reported low percentage of third space loss were less no of cases with DHF and DSS. We have found 72.2% in DHF and No cases of third space lose in DSS. **Total Leukocytes count:**In this study, Out of 150 dengue positive cases 59(39.3%) cases had Leukopenia, 17(11.3%) cases had Leukocytosis and 74(49.4%) cases had Normal Leukocytes count, out of which 54(41.8%) cases had Leukopenia, 7(5.4%) cases had Leukocytosis and 68(52.7%) cases had Normal Leukocytes count form Non severe dengue cases. On the other hands 5(23.8%) cases had Leukopenia, 10(47.6%) cases had Leukocytosis and only 6(28.6%) cases had Normal Leukocytes count form severe dengue cases respectively. It was statistical significant different between the groups. p value was <0.0001. **Sharma NL et al.,**[19] found Normal leukocyte count was observed in 44% of cases with 43.5% among non-severe and 47.83% in severe dengue cases. Leukopenia was seen in 36% of cases and leukocytosis in 20% of cases. **Liver enzyme Investigations:**In this study, Out of 150 cases 31(20.6%) cases had rise in SGPT, out of which 23(15.3%) cases had rise in SGPT from 50-200 IU/L. 6(4.0%) cases had rise in SGPT from 200-1000IU/L. And 2 cases had rise in SGPT above 1000 IU/L. We have found SGPT level was very high (200-1000IU/L) & (>1000IU/L) in severe dengue cases compare to non-severe dengue case. i.e. 9.5% each. We have found SGOT level was very high in severe dengue cases compare to non-severe dengue case. It was statistical significant different between the groups. p value was <0.05. **Sharma NL et al.,**[19] found In liver enzymatic profile, SGOT was raised in 22.5% of cases with 78.26% rise seen among severe dengue cases and 15.25% in Non severe cases. SGPT was raised in only 12.5% of cases with 13.04% in severe dengue cases and 12.43% in non-severe cases. Significant P value was observed in both SGOT (P value: 0.002) and SGPT (P value: 1000 IU/L was observed in 5 cases of severe dengue and SGPT >1000 IU/L was observed in 2 cases of severe dengue. **Total Platelet Count:**In this study, Out of 150 dengue positive cases, 44(29.3%) cases had platelet count >1 lack/cumm. 78(52.0%) cases had platelet count 1 lack to 50000/ cumm and 28(18.7%) cases had low platelet count (<50000/cumm). Out of 129 non severe dengue cases platelet count >1 lack /cumm had 43(33.3%) cases, 74(57.4%) cases had platelet count1 lack to 50000/ comm. and <50000/cumm platelet count had 12(9.3%) cases respectively. On the other hand out of 21 cases of severe dengue platelet count >1 lack /cumm had 1(4.8%) cases, 4(19.0%) cases had platelet count1 lack to 50000/ comm. and <50000/cumm platelet count had 16(76.2%) cases respectively. Here we found most of cases had low platelet count in severe dengue cases compare to non-severe dengue cases. It was statistical significant different between the groups. p value was <0.0001. **Similar finding of Mishra S et al**.,[20] reported 27.83% presented with thrombocytopenia (platelet < 100000). 69.23% of severe dengue cases had thrombocytopenia whereas only 21.42% of nonsevere dengue cases had thrombocytopenia.Thrombocytopenia was seen to be more relevant in those with severe dengue.**Hematocrit Value:** In this study, Out of 150 dengue positive cases Hematocrit Value was higher (≥36.3%) had 58(38.7%) cases, and remaining 92(61.3%) cases had Hematocrit Value <36.3%. whereas out of 129 Non severe dengue cases Hematocrit Value was ≥36.3% had 44(34.1%) cases and 85(65.9%) cases had Hematocrit Value <36.3%. On the other hand severe dengue cases Hematocrit Value was ≥36.3% had 14(66.7%) cases and 7(33.3%) cases had Hematocrit Value <36.3% respectively. It was statistical significant different between the groups. p value was 0.004. **Sharma NL et al.,** found Raised haematocrit ≥36.3% was seen in 55% of total cases with 30.43% in severe and 58.2% in non-severe dengue cases. Statistical significance (P value:< 0.001) for thrombocytopenia and haematocrit (P value: 0.012) was seen in severe dengue cases than in non-severe dengue cases.**Chest X-Ray findings:** we found that 49 (32.7%) had evidence of Plural Effusion on chest x-ray. We found that right site Plural Effusion affected 21 (14.0%), left site Plural Effusion affected 11 (7.3%), and both sites affected 17 (11.4%) of the cases. However, all severe dengue cases (100%) and 28 (21.7%) of non severe dengue cases (Plural Effusion) had this complication. It was statistical significant different between the groups. p value was 0.01. **Sharma NL et al.** found Pleural effusion was detected in 29.5% of cases with 20.34% among non-severe dengue and 100% in severe dengue cases. 12% of cases had right sided effusion with 17.4% in severe and 11.3% among non-severe cases. Statistical significance (P valve: 0.0002) was observed in cases of severe dengue cases to non-severe dengue cases. Another study of **Mishra S et al**.]25.77% of the cases were detected to have pleural effusion by chest X-ray. Right sided effusion (15.46%) was most commonly seen

followed by bilateral effusion (6.18%). Among the severe dengue cases, the majority, 38.46%, presented with bilateral effusion. **USG findings:** On USG findings out of 150 patients, we found that 36 (24.0%) had ascites. And 4(2.6%) patients had GB wall edema. Out of 21 sever dengue cases who had ascites 66.6% and GB wall edema 33.3%, whereas only 22(17.5%) cases had ascites in 129 non severe dengue cases. It was statistical significant different between the groups. p value was 0.019. similar study of **Mishra S et al**. found Ultrasound of the abdomen detected hepatomegaly in 52.75% of the cases, which is the most common finding followed by ascites (25.77%) and gall bladder wall edema (2.06%).

In USG of the chest shows right pleural effusion (15.46%) which was similar to the previous study of **R. Joshi and V. Baid**.[21].**Associated infection and need for ICU admission:** In this study, Most of the severe dengue cases had Bacterial Infection , Pneumonia & UTI i.e. 14(66.7%),4(19.0%) & 3(14.3%). and 100% cases were need for ICU admission, in between 2 cases were need for Mechanical Ventilation. On the other hands only 6.2% and 4.7% cases had Bacterial Infection and UTI among non-severe dengue cases. It was statistical significant different between the groups. p value was 0.0006. **Chen CM et al**,[22] found bacterial infection 55.9%, Dengue with Pneumonia 28.2% cases, and urinary tract infection was 23.2 % cases. **Treatment:** Every single patient had taken antipyretics. To treat the 21 severe dengue cases, 95.2% of patients received intravenous fluids; 28.6% required platelet transfusions; 57.2% required PRBC transfusions; and 23.8% and 9.5% respectively had Dopamine and adrenaline treatment. Whereas out of 129 cases 70.0% patients received only intravenous fluids and other symptomatic care. **Sharma NL et al.** were managed with paracetomol, I.V. fluids, and whole blood and platelet transfusions as per WHO standard guidelines. 70% of cases received intra venous fluids and majority 78.26% were of severe dengue cases and 68.93% were of non-severe dengue cases. 56.52% of cases received platelet transfusion, all of severe dengue cases. Whole blood transfusion in 3.5% of cases, all were of severe dengue cases. Two children received dopamine and both were of severe dengue **Outcome:** In this study, Out of 150 cases 2(1.3%) cases had died from severe dengue cases (D.H.F & D.S.S.) and another 148(98.7%) cases had survived. According to **Halstead et al**,[23] mortality due to dengue in Asian countries is 0.5%-3.5% Mortality in our study is 1.3 % and is comparable with Narayanan et al.[]

5. CONCLUSION

Dengue fever is a cause of great apprehension among paediatric age group fever, and is also cause of fear among parents. Vomiting, hematemesis, skin bleeding, altered sensorium, hepatomegaly, and fever dffervescences after a period of fever strongly suggest a diagnosis of severe Dengue, particularly in an endemic situation. The disease tends to spike during the monsoons. In spite of thrombocytopenia being an alarming factor for severity, there is no place for prophylactic platelet transfusion. Early detection, precise assessment, and proper treatment have all helped to reduce mortality. In our study we have covered all the probable laboratory, imaging and clinical parameters needed to help establish severity of the fever. Parental health education about fever defervescence and early referral may help avoid dengue mortality. There are few symptoms or indicators that can consistently distinguish Non severe dengue (DF), and Severe dengue (DHF, and DSS). Raised SGOT, hepatomegaly, pleural effusion and shock are few of the certain symptoms that can help distinguish between severe and non-severe dengue.

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