Risk factors for mortality amongst dengue inpatients in a tertiary care hospital in North India

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Introduction

- Dengue fever emerged from Africa almost 500 – 600 years ago & reached Asia in 1780's.
- In recent decade it has become the 2nd most prevalent mosquito borne infection after malaria.
- Dengue virus can lead to a spectrum of diseases ranging from sub clinical infection to DF & most severe forms like DHF & DSS.
- The fatality rate due to DSS may be reduced to as low as < 0.2% with careful management.
- Understanding the risk factors for progression to severe dengue & death is essential in determining triage & management algorithms.

Aims and objectives

- To compare the demographic, clinical and laboratory features of fatal and non fatal dengue patients admitted to a tertiary care institution.

- To identify possible predictors of mortality due to dengue fever, on admission.

Materials and Methods

- Study period : Oct – Nov 2013
- Study design: Cross-sectional study
- Study population : Clinically confirmed dengue patients admitted in CMC Ludhiana in the study period.
  - Case records of 306 patients who were admitted in the hospital during the dengue outbreak

Methods

- Case definition: The 2009 WHO classification was used for dengue case classification & for determining levels of severity. Severe dengue has been defined by the presence of severe plasma leakage leading to shock or fluid accumulation with respiratory distress; and/or severe bleeding, as evaluated by the clinician; and/or severe organ involvement .
- Lab diagnosis: Diagnosis of dengue infection was confirmed by detection of Dengue specific IGG, IGM and NS1 tests. Other relevant lab tests were also done.

Methods

- Information of various demographic parameters, medical history, clinical findings, results of laboratory tests as well as details of treatment & patient outcomes were obtained from the medical records of the hospital.
- Confidentiality and subject anonymity was ensured throughout the investigation.
- Written informed consent was not obtained because the study primarily relied on secondary data.

Statistical analysis

- The data was entered in Microsoft excel spreadsheet
- Analyzed in Epi-Info software.
- Apart from percentages, Odds Ratio & their 95% CI was calculated.

Results

Table 1 : Distribution of demographic characteristics & co morbidities in cases and controls

	DEATH [N= 40]	SURVIVAL [N =266]	Total n=306	OR [95 % CI]	P VALUE
1] AGE					
< 14	16 (18.4%)	71 (81.6%)	87	2.7 (1.19-6.31)	0.0083
15 – 49	14 (7.6%)	170 (92.3%)	184	1 (Reference)	
> 50	10 (28.6%)	25 (71.4%)	35	4.86 (1.77-13.26)	0.0012
2] AREA					
RURAL	5 (7.6%)	61 (92.4%)	66	1	
URBAN	35 (14.6%)	205 (85.4%)	240	2.08 (0.74 -6.34)	0.1347
3] GENDER					
MALE	21 (10.3%)	182 (89.6)	203	1	
FEMALE	19 (18.4%)	84 (81.5)	103	1.96 (0.95-4.04)	0.0469
4] CO MORBIDITIES					
DM	6 (28.6%)	15 (71.4)	21	2.95 (0.95-8.86)	0.0646
HTN	7 (36.8%)	12 (63.1)	19	4.49 (1.47 -13.41)	0.0048

Fig 1: Age Distribution of Death & Survival

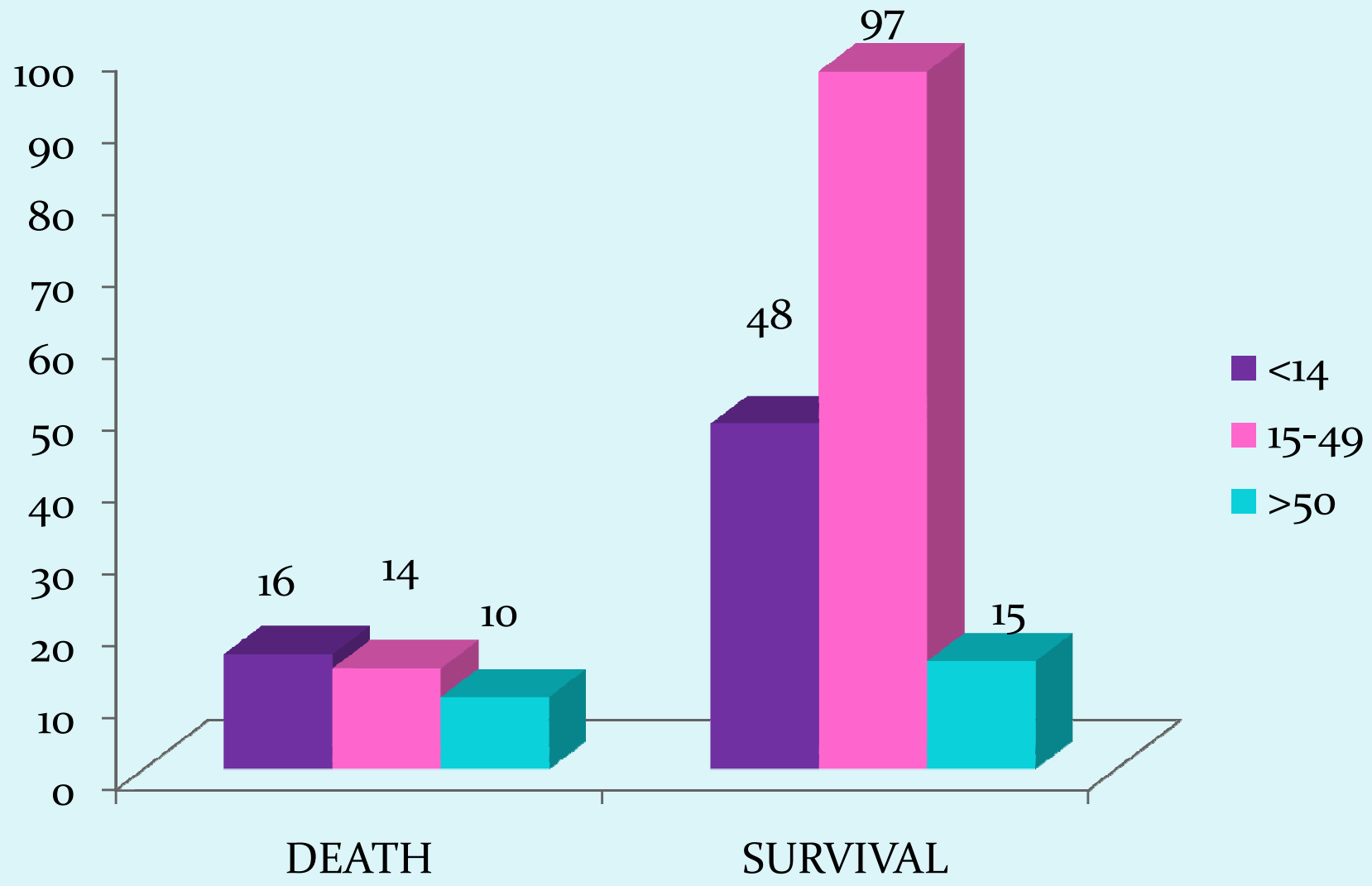


Fig 2-Area/Sex wise Distribution of Death & Survival

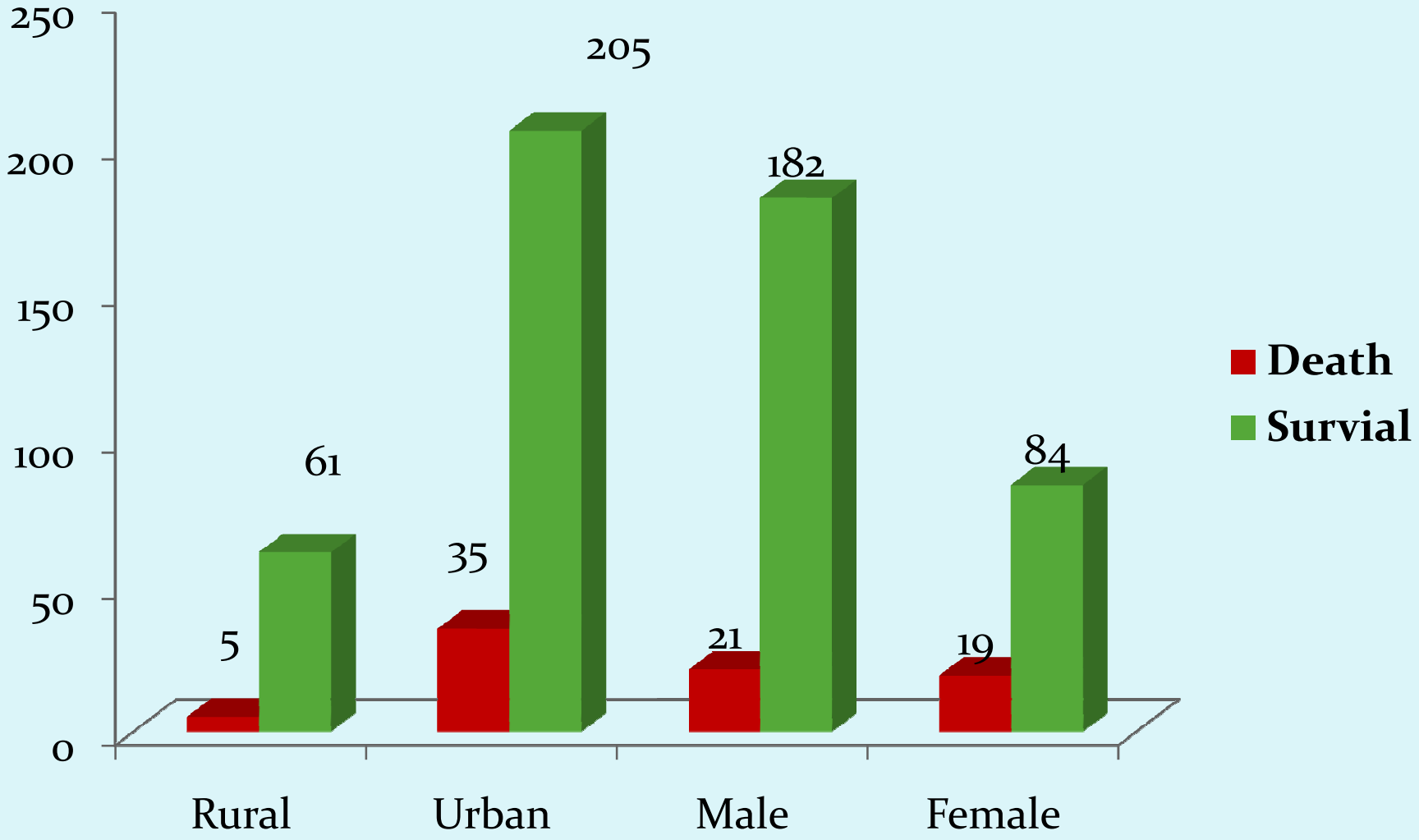


Table 2 : Clinical Features

	DEATH [N= 40]	SURVIVAL [N =266]	Total n=306	OR [95 % CI]
1] FEVER	40 (13.1%)	265 (86.8)	305	
2] VOMITING	15 (15.7%)	80 (84.2%)	95	1.40 (0.66-2.93)
3] DIARRHOEA	8 (50.0%)	8 (50.0%)	16	8.06 (2.53-25.75)
4] MYALGIA	1 (4.0%)	24 (96.0%)	25	0.26 (0.01-1.88)
5] RASHES	0 (0.0)	9 (100%/)	9	-
6] PRURITIS	1 (50.0%)	1 (50.0%)	2	-

Table 3 : Duration of hospital stay

	DEATH [N= 40]	SURVIVAL [N =266]	Total n=306	OR [95 % CI]	P VALUE
1] < 5 days	30 (17.9%)	137 (82.0)	167	2.82 (1.26-6.46)	0.0053911
2] >= 5 days	10 (7.1%)	129 (92.8)	139		

Table 4 : Lab Investigations

	DEATH [N= 40]	SURVIVAL [N =266]	Total n=306	OR [95 % CI]	P VALUE
1] WBC > 10,000	25 (47.1%)	28 (52.8%)	53	14.17 (6.30-24)	0.0000000
2] PCV > 45%	6 (9.3%)	58 (90.6%)	64	0.63(0.23-1.68)	0.3238503
3] Platelet count < 50,000	20 (11.3%)	156 (88.6)	176	0.71 (0.34-1.44)	0.3023281
4] SGOT > 1000	9 (56.2%)	7 (43.7)	16	10.74 (3.36-34.92)	0.0000271
5] SGPT > 1000	8 (57.1%)	6 (42.8%)	14	10.83(3.15-38.09)	0.0000726
6] Sr. Albumin < 3.5 gm/dl	12 (38.7%)	19 (61.2)	31	5.57(2.27-13.64)	0.0001163

Table 5 : Disease Classification

	DEATH [N= 40]	SURVIVAL [N =266]	OR [95 % CI]
1] Dengue fever	7 (4.7%)	138 (95.2%)	1 (Ref)
2] DHF	6 (10.0%)	54 (90.0%)	2.19 (0.62-7.69)
3] Severe Dengue	7 (25.9%)	20 (74.1%)	6.90 (1.92-25.05)
4] DSS	20 (55.6%)	16 (44.4%)	24.64 (8.22-76.99)
5] Probable Dengue	0	38	

Table-6 WHO warning signs

	DEATH [N= 40]	SURVIVAL [N =266]	Total n=306	OR [95 % CI]	P VALUE
1] PAIN ABDOMEN	11 (18.3%)	49 (81.6)	60	1.68 (0.73-3.80)	0.1775
2] BLEEDING	4 (11.4%)	31 (88.5)	35	0.84 (0.24-2.70)	0.5049
3] CLINICAL FLUID ACCUMULATION	7 (70.0%)	3 (3.75%)	10	18.60 (4.06-96.15)	0.0000355

Table 7 : Tests

	DEATH [N= 40]	SURVIVAL [N =266]	TOTAL N=306
1] NS-1 Positive	24/29 (82.8%)	117/236 (49.6%)	136
2] IgM Positive	3/18 (16.7%)	109/151 (72.2%)	117
3] IgG Positive	1/15 (6.7%)	11/66 (16.7%)	18
4] No Tests done	6 (60.0 %)	4 (40.0%)	10

Conclusions

- 16 patients under 14 yrs of age died of suspected dengue.
  - 3 out of these 16 patients were admitted to ICU.
- More dengue cases are from urban areas.
- Most common co morbidities associated with both cases & controls are DM & HTN.
- Most common associated symptom was fever followed by vomiting & diarrhea.
- Duration of hospital stay were shorter in cases than controls suggesting that the clinical condition of the cases on admission were worse than that of the controls.

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- In evaluating individual lab parameters, mortality due to dengue infection was associated with high WBC count, low platelet count & deranged liver function.
- Early signs of severity, such as low platelet counts of 50,000—1,00,000 had a lower chance for dying, suggesting that this early finding may contribute to the diagnosis & lead to prompt treatment.
- Severe plasma leakage leading to shock appear to be a significant risk factor for cases.
- Altered mental status also associated with mortality.

Suggestions

- All clinically suspected cases of dengue must be confirmed by ELISA tests.
- The fatality rate due to DSS may be reduced with careful management.
- There should be increased notification of the disease.



THANK YOU