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Original Research Article

Aetiological profile of fever in neonatal and paediatric population in hospital setting

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ABSTRACT

Background: Febrile illness in children is a common cause of admission to hospital globally, with significant associated morbidity and mortality. Dengue, malaria, scrub typhus, typhoid and leptospirosis have been identified as major causes of acute undifferentiated febrile illness in Thailand, Malaysia, and Nepal. Climate variation, over population and urbanization may all contribute to the emergence and reemergence of infections in tropical regions like Tamil Nadu. The objectives of this study were to describe the aetiology of fever in hospitalized neonatal and Pediatric population. A descriptive study was designed.
Methods: A prospective observational study was conducted. All children from 0 to 18 years admitted as in-patients. Sample size was calculated to be 650. Basic laboratory tests were done in all cases.
Results: Out of a total of 650 children maximum number (40.7% n=265) of patients had short duration of fever between 1 to 3 days. Majority (56%) of patients had temperature between 100.4 to 101F. Only 5 children were confirmed to have malaria. Maximum number of pus cells found was 80 to 100 in 3 children in urine examination. Total Infectious cases were 631 (97.07%).
Conclusions: Infectious aetiology was more common than non-infectious aetiology. Among all aetiologies, viral fever particularly dengue was the most common aetiology. Enteric fever was the second most common infectious cause of fever after viral fever. Short febrile illness (1 to 5 days) was the most common type of fever in children admitted in hospital. In neonates, the most common cause of fever was probable sepsis followed by dehydration fever.

Keywords: Aetiology, Dengue, Fever, Malaria, Neonates, Pediatric population, Viral fever

INTRODUCTION

Febrile illness in children is a common cause of admission to hospital globally, with significant associated morbidity and mortality.Infectious diseases are leading causes of morbidity and death in tropical countries.[1] In developing countries this is frequently compounded by low rates of immunization, untreated co-morbidities, and late presentations.[2-4] The World Health Organization (WHO) reports that each of the main infectious aetiologies (pneumonia, diarrhea, HIV/AIDS, malaria, tuberculosis and neonatal infections) causes death to the tune of 0.24 to 1.05 million per year in low income countries.[5] In resource limited settings, fever may be treated empirically or self-treated due to lack of access to diagnostic tests.[6] Dengue, malaria, scrub typhus, typhoid and leptospirosis have been identified as major causes of acute undifferentiated febrile illness in Thailand, Malaysia, and Nepal.[7-13] Climate variation, over population and urbanization may all contribute to the emergence and reemergence of infections in tropical regions like Tamil Nadu.[14] This study was conducted to describe the aetiology of fever in hospitalized neonatal and Pediatric population.

METHODS

A prospective observational study was conducted. All Children from 0 to 18 years admitted as in-patients in Kanchi Kamakoti childs trust hospital, Chennai were taken for study.

Period of study was 6 months. All children admitted to the hospital with fever of any duration, with axillary temperature of equal or more than 38°C (100.4 F) at admission or documented at home were included in study. After admission, detailed history regarding fever and associated, symptoms, general and systemic examination, history of chronic disease symptoms and findings, final diagnosis were documented.

Basic laboratory tests were done in all cases, however selection of individual test depended upon clinical condition of disease (complete blood count, CRP, urine analysis).

Additional investigations including blood culture ,urine culture, chest X-ray, Widal test, peripheral smear for malaria parasite and dengue IgM ,stool routine and culture, CSF analysis and culture, Monteux test, AFB culture, KOH mount, RA and ASO titre, HIV Elisa, salmonella typhi dot IgM, scrub typhus IgM, Leptospira IgM, HSV IgM, Hbs Ag, TORCH profile, ANA, CSF serology, Pleural and ascetic fluid examination were performed to establish the cause of fever. Only culture proven cases of enteric fever were termed as confirmed typhoid fever. Serology positive but culture negative cases were considered as probable typhoid fever.

Presence of Pyuria but negative urine culture was termed as probable urinary tract infection. Imaging like chest x ray, ultrasonography, CT scan, MRI scan were performed as clinically indicated. Written informed valid consent was taken from each parent.

Data was collected individually by proforma at the of admission in the emergency room (ER) and child was followed till discharge. Sample size was calculated to be 650. Additional investigations were also done.

Exclusion criteria

- Children who develop fever after hospitalization, Febrile post-surgical patients and out patient Department patients were excluded in the study.

Statistical analysis

Statistical analysis was done using SPSS 19.0.

RESULTS

Out of a total of 650 children, 61% (n=397) were boys and 39% (n=253) girls. Ages of all patients were between 1st day of life to 18 years.

Table 1: Distribution of study population according to various parameter.

		Number	Percent
Gender	Male	397	61.08
	Female	253	38.92
Age	Less than 1 month	20	3.077
	1 month to 1 year	169	26
	1 year to 5 year	247	38
	5 year to 10 year	149	22.92
	10 year to 18 year	65	10
Duration of stay (days)	1-5 days	449	69.077
	5-10 days	139	21.38
	10-15 days	34	5.23
	15-20 days	26	4
	20-23 days	2	0.31
Duration of fever (days)	1-3 days	265	40.77
	3-5 days	178	27.38
	5-7 days	98	15.08
	7-10 days	69	10.62
	10-15 days	21	3.23
	15-20 days	10	1.54
	20-25 days	4	0.62
	25-90 days	5	0.77
Temperature (F)	100.4-101	355	54.62
	101-102	94	14.46
	102-103	193	29.69
	103-104	8	1.23

Table 2: Distribution according to investigative findings.

		Number	Percent
Malaria	Vivax malaria	4	0.61
	Falciparum malaria	1	0.15
Urine pus cells	0 to 5	54	8.30
	5 to 10	94	14.46
	20 to 30	6	0.92
	30 to 40	20	3.07
	40 to 60	12	1.84
	60 to 80	1	0.15
	80 to 100	3	0.46
Widal	Positive	21	3.23
	Negative	41	6.30
Salmonella typhi IgM	Positive	26	4
	Negative	46	7.07
Dengue IgM	Positive	48	7.38
	Negative	96	14.76
Scrub typhus IgM	Positive	5	0.76
	Negative	16	2.46
HIV	Positive	1	0.15
	Negative	19	2.92
Gene X pert	Positive	6	0.92
	Negative	22	3.38

Duration of fever of all patients were between 1 day to 90 days. Maximum number (40.7% n=265) of patients had

short duration of fever between 1 to 3 days followed by 27.3% (n=178) who had for 3 to 5 days and 15% (n = 98) for 5 to 7 days.

Majority (56%) of patients had temperature between 100.4 to 101F followed by 30% with temperature between 102 to 103F. Only 5 children were confirmed to have malaria by peripheral smear with 4 of them having vivax and 1 having falciparum.

Maximum number 69 % (n=449) of patients had duration of stay between 1 to 5 days followed by 21.4 % (n =139) had 5 to 10 days and 5% (n=34) had 10 to 15 days.

HIV ELFA test showed positive results in 5% (n=1) child. Gene X pert test was positive in 21% (n=6) children (Table 1, 2 and 3).

Table 3: Distribution according to diagnosis.

		Number	Percent
Infectious vs non-infectious	Infectious	631	97.07
	Non-infectious	19	2.92
Viral infections	Probable viral infection	211	32.46
	Probable dengue	14	2.15
	Dengue with warning signs	27	4.15
	Severe dengue	7	1.07
Bacterial infections	Probable Enteric fever	45	6.92
	Confirmed Enteric fever	29	4.46
	Liver abscess	2	0.30
	Parapharyngeal abscess	1	0.15
	Retropharyngeal abscess	1	0.15
	Cellulitis	5	0.76
	Cervical abscess	6	0.92
	Disseminated TB	1	0.15
	Spinal TB	1	0.15
Parasitic infections	Vivax malaria	4	0.61
	Falciparum malaria	1	0.15
	Visceral leishmaniasis	1	0.15
Rickettsial infection	*Scrub typhus*	5	0.76

DISCUSSION

Febrile illness in children is a common cause of admission in hospital globally, with significant associated morbidity and mortality.[15] Similar predilection of age group as in present study was seen in a study done by Kheng et al, where 1 to 5 years was the most common age group.[16] In studies conducted in Cambodia by Kheng et al and in Sikkim by Dipmala et al, males exceeded the females with the male: female ratio of 1.3:1.[17]

Present study had a slightly higher ratio of 1.5:1. The median duration of hospital stay in children with febrile illness in present study was found to be 3 days which was less than that in the study by Abrahamsen et al.[18] Neonates had a higher likelihood of having prolonged hospitalization when compared to older children. Median duration of fever was 4 days which was similar to the study done by Kheng et al. Study in adults by Abrahamsen et al, reported the median duration of symptoms to be 15 days.[18]

In present study authors observed that infectious aetiology contributed to 97% of the cases and non-infectious etiology contributed to only 3% of the cases. This was similar to the study done by Kheng et al where infectious causes contributed to 98.6% and non-infectious causes contributed to 1.4% of the cases. However, in the adult study done by Abrahamsen et al it was observed that infectious aetiology contributed to 85% and non-infectious aetiology contributed to 15% of the cases, which was higher as compared to studies done in children in present study and Kheng et al. In present study authors observed viral infection 40% (n=259) was the most common cause of fever. Amongst a total of 259 viral infection cases, dengue fever was observed in 18.5% (n=48) of the cases, which was similar to the study done by Kheng et al where it was 16.2% (n=812). It was also similar to the observations made by Garima Mittal et al, in their studies.[19] In present study maximum number of cases, 81.4% (n=211) cases were diagnosed as probable viral fever. Hence probable viral fever was the most common infectious aetiology of fever.

CONCLUSION

Infectious aetiology was more common than non-infectious aetiology. Among all aetiologies, viral fever particularly dengue was the most common aetiology. Enteric fever was the second most common infectious cause of fever after viral fever.

Short febrile illness (1 to 5 days) was the most common type of fever in children admitted in hospital. In neonates, the most common cause of fever was probable sepsis followed by dehydration fever.

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