

Spectrum of Acute Febrile Illness in Children Presenting in Emergency of a Tertiary Care Hospital and its Clinico - Laboratorial Correlation

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Abstract

In a clinical setting, Fever is the most common sign of illness in infants and children and accounts for as many as 20% of pediatric emergency department (ED) visits. Clinical evaluation of febrile illness is guided by history and physical examination, along with judiciously selected screening test. Most of the studies have been done at ambulatory care setting with lack of proper follow up of the patients and accurate data regarding bacterial and viral aetiologies because of the difficulty in making microbiological diagnosis in ambulatory care settings. In this study all children more than 3 months and under the age of 15 years presenting to ED with fever and warranting hospitalization were included and analyzed as regards the spectrum of febrile illness and its correlation with clinical findings at presentation and laboratory investigations at and during the entire hospital stay. *Objectives:* To study the spectrum of acute febrile illnesses and develop a Clinical and laboratorial correlation in children more than 3 months and under the age of 15 years warranting ER visit and subsequent hospitalization. *Methods and Material:* It was a Prospective observational unicentric study done at Max Super Speciality Hospital, Shalimarbagh, New Delhi. Data was collected over a period September 2016 to May 2017 from 580 pediatric patients visited to ED and got admitted, as per data collection sheet after the approval by scientific and ethics committee of the institute. *Statistical Analysis Used:* The collected data was entered in the Excel spreadsheet using Microsoft Excel Software and transferred to Statistics Package for Social Sciences (SPSS) version 20, IBM Inc. for analysis. It was subjected to descriptive statistics for calculation of mean, standard deviation, frequencies and percentages. Summarized data was presented using Tables and Graphs. Shapiro Wilk test was used to check which all variables were following normal distribution. Chi-square test was used for comparison between categorical variables. Pearson's correlation coefficient (ordinal data) was calculated to measure the strength of a relationship between provisional diagnosis and final diagnosis. Level of statistical significance was set at p-value less than 0.05. *Results:* This study was done at a tertiary care hospital where yearly about 14200 patients visited to Emergency, 40% of all attendance is pediatric and among them 60% were prompt by fever. This data was also supported by the previous studies. The majority of the children who presented with fever and got admitted fall under the age group of 4-15 years which accounts or 76% of the total study population. Male outnumbered females. Male accounts for 67% (n=389) and Female accounts for 33% (n=191) among all total pediatrics hospital admissions. Out of 580 study population in presenting symptoms respiratory predominance was seen (29.1%) which was followed by fever with rash (26.8%). Most common diagnosis documented in our pediatric patients with acute febrile illness were URTI, majority of them presumably viral

rhinopharyngitis (26.4%). This was followed by Dengue and dengue like illness and chikungunya each accounts for 13.4% and 21.5% respectively. Enteric fever was the most common diagnosis documented (24.7%) in among all specific bacterial diseases. Electrolyte disturbances specially hyponatremia was observed in 58% of pediatrics patients and was invariably associated with dehydration. Dehydration accounts for 5.7% of total study population. *Conclusions:* In conclusion , Emergency services are an integrable part of any healthcare infrastructure with almost 40% of being pediatrics attendance. Fever constituted 60% (almost 2/3 rd patients) of febrile illness. Infectious diseases still accounts for the majority of ER attendance. The standard protocol of diagnosis and management if applied well, confirms the diagnosis with accuracy resulting in a favorable outcome .

Keywords: Fever Without Source (FWS); Serious Bacterial Infection (SBI); Urinary Tract Infection (UTI); Febrile Seizure (FS); Emergency Department (ED).

Introduction

Fever is the most common sign of illness in infants and children which accounts for as many as 20% of paediatric emergency department (ED) visits and the underlying conditions may range from mild self limiting illness to the most serious of bacterial and viral illness. Fever is defined as a documented temperature of 38 degree or higher per rectum. A rectal equivalent temperature is calculated by adding 0.5 degree C to the oral temperature and 0.8 degree C to the axillary temperature. A careful history and thorough physical examination is essential in the evaluation of the febrile child. Child's demographic information including Vital signs, length and weight with percentiles, nutritional status, level of physical activity, and level of arousal should be a part of evaluation. Physical examination findings that suggest serious bacterial infections in febrile children (aged 3-36 mo) include ill appearance, fever, vomiting, tachypnea with retractions, and delayed capillary refill time. Hence challenge of a emergency physician is to focus on the etiology of fever and to identify the infant or child who is at risk for serious infection.

Materials and Methods

This study was done at Max Super Speciality Hospital, Shalimarbagh, New Delhi where yearly about 14200 patients visited to Emergency. The main objective of the study was to study the spectrum of acute febrile illnesses and develop a Clinical and laboratorial correlation in children more than 3 months and under the age of 15 years warranting ER visit and subsequent hospitalization. We also aimed to study Prevalence of different types of febrile illness.

All the patients presenting to ED of Max Hospital Shalimar Bagh and meeting the Inclusion and Exclusion Criteria as mentioned below were enrolled in the study.

Inclusion Criteria

1. Fever being recorded more than 38°C
2. Fever of less than 7 days of occurrence, presented to ED and warrant subsequent hospitalization.
3. Children more than 3 months and under the age of 15 years.

Exclusion Criteria

1. Children with co-morbidities like pre-existing cardiac disease, respiratory, metabolic, gastrointestinal, neurological, immune compromised states, malignancies etc
2. Patients not willing for hospitalization .

All patients who meet the inclusion criteria and none of the exclusion criteria were enrolled in the study after taking their voluntary consent for participating in the study. Any medicines taken prior to ED visit shall also be recorded. All patients with febrile illness were evaluated by the ER physician and validated by the pediatrician on duty. Patient's Demographical information, pertinent historical and physical findings were recorded and a provisional diagnosis was made. Appropriate laboratorial investigations were ordered including complete blood cell count (CBC), CRP, urinalysis, relevant cultures of blood, cerebrospinal fluid, urine or other body fluids, and imaging modalities as advised by the attending pediatrician as per the SOP (standard operating procedure). The patient was dully followed during the entire course of hospital stay and final diagnosis

were recorded which is utilized for analysis.

Acute febrile illness is defined as a patient with fever of 38 degree or higher at presentation to ED or history of fever that persisted for 2-7 days with no localizing source. An invasive bacterial illness is defined as bacterial growth of a known pathogen in cultures of blood (bacteraemia), spinal fluid

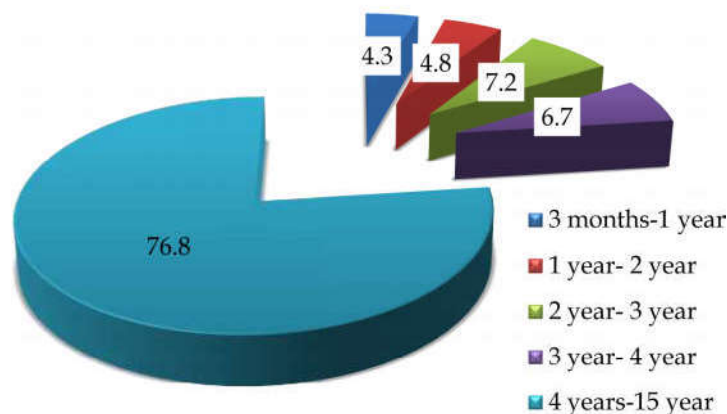
(meningitis), joint fluid (septic arthritis) or urine (urinary tract infection) with the relevant clinical signs and symptoms. Pneumonia was confirmed radiographically as per standard protocol. Viral illness were documented as diagnosis of exclusion when no focus of infection on the physical examination and cultures were sterile.

Results

Table 1: Distribution of study population according to age group and gender

	Male		Female		Total	
	N	%	N	%	N	%
3 months-1 years	16	64	9	36	25	4.3
1 year- 2 year	15	53.57	13	46.4	28	4.8
2 year- 3 year	27	64.2	15	35.7	42	7.2
3 year- 4 year	23	58.9	16	41.0	39	6.7
4 years-15 years	308	69.0	138	30.9	446	76.8
Total	389	67.0	191	32.9	580	100

Age wise distribution of study population



Distribution of study population

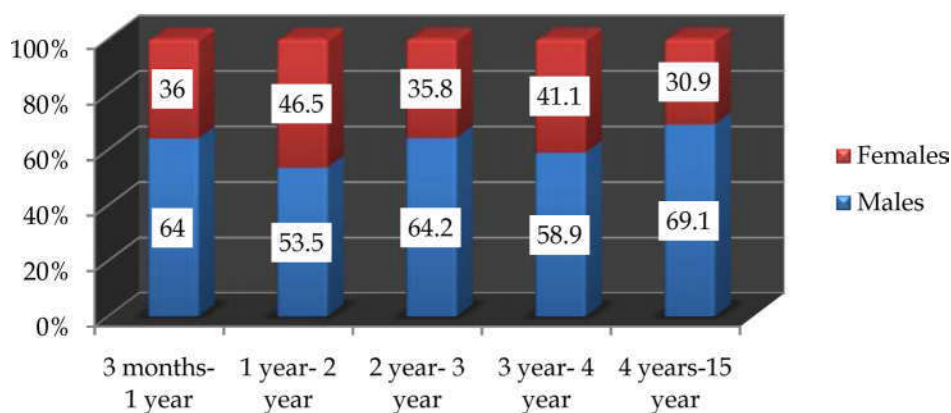


Fig. 1: Study population reflect Male outnumbered Female (67% vs 33%)

Table 2: Distribution of specific disease (viral and bacterial)

	N (514)	%
Viral (n=342), 66.5%		
Dengue And Dli	69	13.4
Chikungunya	111	21.5
Viral Rhinopharyngitis	136	26.4
Viral Gastroenteritis	22	4.2
Influenza And Fli	4	0.7
Bacterial (n= 172), 33.4%		
Sepsis	5	0.9
UTI	8	1.5
LRTI	21	4.0
Enteric Fever	127	24.7
Gastroenteritis	7	1.3
Ssti /Osteomyelitis	4	0.7

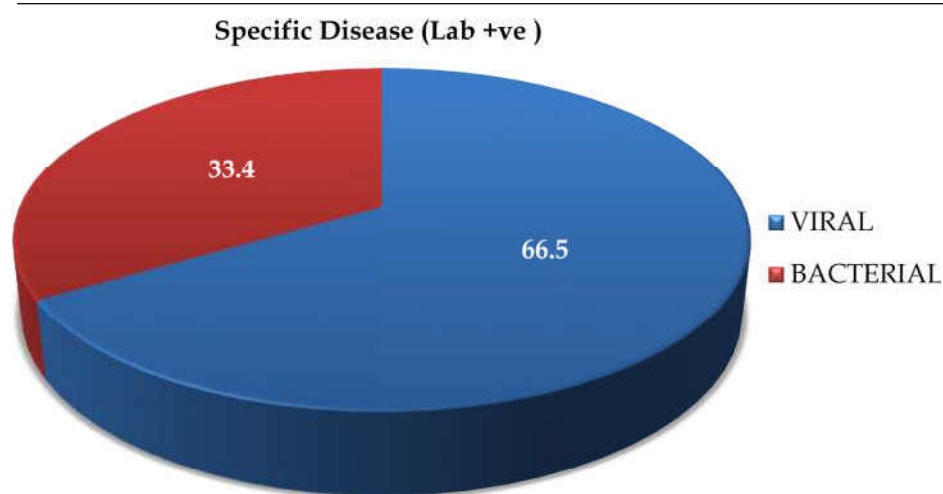


Table 3: Distribution of organism identified in blood cultures among the study population

	N	%
Salmonella. Typhi	70	40.7
E. Coli	16	9.3
E. Faecium	4	2.3
S.Pneumoniae	16	9.3
S.aureus	9	5.2

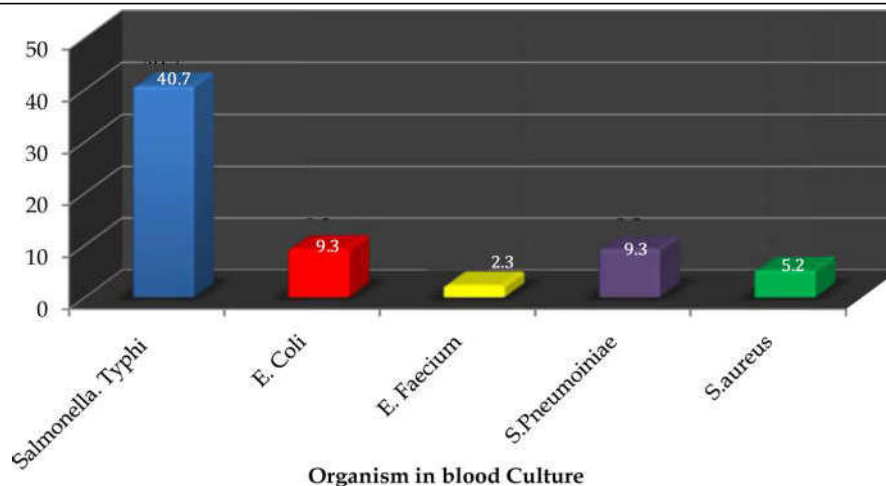


Fig. 3: Distribution of organism identified in blood cultures among the study population

Discussion

This study was done at a tertiary care hospital where yearly about 14200 patients visited to Emergency, 40% of all attendance is pediatric patients. Among them 60% encounters were prompt by fever. The majority of the children who present with fever and got admitted fall under the age group of 4-15 years which accounts for 76% of the total study population. Children less than one year of age has low frequency (4.7%) who got hospitalized. Male outnumbered females. Male accounts for 67% (n=389) and Female accounts for 33% (n=191) among all total pediatric hospital admissions. Out of 580 study population respiratory symptoms predominant (29.1%) which was followed by fever with rash (26.8%) probably can be explained by children exposed to Dengue/Chikungunya outbreak in the months of July to October. Vomiting and Gastrointestinal symptoms accounts for 21% and 5.3% respectively of total presentations. Seizure was described in only miniscule number of patients. Specific disease compromises 88.6% of total study population whereas Clinically diagnosed and miscellaneous cases accounts for 7.4% and 3.9% respectively. As regards of diagnosis of specific disease Male and Female febrile patients does not show any significant correlation (90% vs 85%). In the study population average number of days of fever was 2.49(SD 1.05) in specific disease group and 3 (SD1.24) in miscellaneous group. As per total population concern average length of stay in hospital was 3 days. Most common diagnosis documented in our pediatric patients with acute febrile illness were URTI, majority of them presumably viral rhinopharyngitis (26.4%). This was followed by Dengue and dengue like illness and chikungunya each accounts for 13.4% and 21.5% respectively. Enteric fever was the most common diagnosis documented (24.7%) in among all specific bacterial diseases. Blood culture for salmonella typhi was found to be positive in 55% cases and Typhidot came to be positive in 44% of cases. Lower respiratory tract infection, particularly pneumonia and gastroenteritis accounts for 12.2% and 4.1% respectively. Urinary tract infection (UTI) had a occurrence of 4.1% and SSTI/Osteomyelitis found to be positive in 2.3% patients. Apart from S.typhi Other isolated organisms in blood culture were E. coli (9.3%), E.facecium (2.3%). S.pneumoniae (9.3%) and S.aureus (5.2%). In laboratorial analysis TLC did not show any correlation in diagnosing a specific disease as 85.3% of specific diagnosis had normal TLC value. Raised Hepatic transaminases (SGOT/SGPT) were observed

in 50% febrile patients explainable by the fact that having dengue, chikungunya, enteric causes. Electrolyte disturbances specially hyponatremia was observed in 58% of pediatric patients and was invariably associated with dehydration. Dehydration accounts for 5.7% of total study population.

Our study had several limitations.

1. Enrollment of febrile patients in the ongoing outbreak situation (Dengue/Chikungunya) can skewed the data.
2. Short duration of the study unable to reflect the seasonal variability of diseases.
3. To derive a meaningful conclusion on the spectrum of illness a large database is required.

Conclusion

In conclusion, Emergency services are an integrable part of any healthcare infrastructure with almost 40% of being pediatric attendance. Fever constituted 60% (almost 2/3 rd patients) of febrile illness. Infectious diseases still accounts for the majority of ER attendance and the standard protocol of diagnosing and management if applied well, confirm the diagnosis with accuracy resulting in better results. Thus the recommendation would be integrate pediatric ER/triage services in any health infrastructure and standard operating procedures (SOPs) should be strictly adhere to for a favorable outcome.

Future directions for consideration include;

- A multicentric study with a long study period including adult population is recommended to document the seasonal variability of diseases and to derive a meaningful conclusion on the spectrum of disease.

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