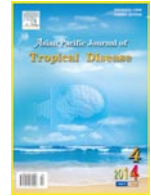




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## A study of pattern of acute febrile illnesses at COMS–TH, Bharatpur, Nepal

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### PEER REVIEW

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#### Comments

This is an important study for further amelioration of similar illnesses in future. Timely treatment of such patients will definitely bring down morbidity and mortality.  
Details on Page 300

### ABSTRACT

**Objective:** To study the pattern of acute febrile illnesses in Central Nepal regarding its underlying etiology and its clinical outcome.

**Methods:** This study is a hospital based descriptive cross-sectional study during June to November, 2011 over a period of 6 months. All the febrile illnesses data were collected from medical outpatient and inpatient registried and then analysed. There were total 2873 febrile patients, of whom 883 were inpatients whose data have been analysed.

**Results:** The majority of febrile patients were distributed in August (788/2873=27.43%) followed by July (708/2873=24.64%). The age distribution ranged from 15 to 84 years with female predisposition (M:F=1:1.5). Majority of the febrile patients were in the 15–30 years age group (292/883=33.07%) followed by elderly (>60 years, 22.88%). Most of the febrile patients admitted in medical ward were diagnosed as respiratory tract infection followed by urinary tract infection, enteric fever, acute gastroenteritis. Of intensive care unit admitted febrile patients ( $n=187$ ), sepsis with multi-organ dysfunction syndrome was the major diagnosis followed by acute meningoencephalitis. A total of 21 patients (2.37%) died of sepsis with multi-organ dysfunction syndrome followed by acute meningoencephalitis in 5 (0.56%), complicated malaria with acute respiratory distress syndrome in 1 (0.11%) and infective hepatitis with encephalopathy in 1 (0.11%).

**Conclusions:** Acute febrile illnesses mostly viral in origin involving respiratory tracts are more common during monsoon months with lots of mortalities and morbidities. They pose a major threat to the public due to their endemicity as many of them remain undiagnosed or if at all, very late. Early and planned activity of the government and non-government local bodies, epidemic preparedness against susceptible outbreaks including efficient public health awareness are the keys to minimize the hazards.

### KEYWORDS

Febrile illness, Multi-organ dysfunction syndrome, Mortality

## 1. Introduction

Acute febrile illnesses are quite common in Nepal especially during monsoon season. There are diverse underlying agents and few of them are mixed infections. Exact microbiological species isolation and prompt specific diagnosis with sophisticated tests are the limitations in developing countries like Nepal. Majority of the febrile patients are frequently treated empirically with the underlying illness remaining undiagnosed. Some specific infections causing fever, such as malaria<sup>[1]</sup> and

increasing bacterial sepsis are well quantified<sup>[2,3]</sup>, others such as a range of zoonoses and viral infections are uncounted and consequently may be underappreciated. Hence, early diagnosis and management is a challenging issue till date.

## 2. Materials and methods

This is a descriptive observational hospital based study conducted in College of Medical Sciences & Teaching

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Hospital. from June to November, 2011. The study comprised of total 883 patients admitted in medical wards and intensive care unit (ICU) over a period of 6 months. Data were collected from the medical registries including febrile proformas and then analysed. Acute febrile patients presenting in medicine outpatient department were 1990, of whom those having severe illness with high fever were admitted. Patients with acute febrile illnesses were also admitted through the emergency. Thus, the total febrile patients during this study period were 2873.

This study was approved by the ethical review committee of College of Medical Sciences–Teaching Hospital, Bharatpur, Chitwan, Nepal. All minors had written informed consent given by a parent or guardian and all adult participants provided their own written informed consent.

Any patients with acute febrile illnesses (documented axillary temperature  $\geq 37.5^\circ\text{C}$ ) with age of 15 years or more of either sex were included in the study.

Patients admitted with some other chronic or non-infectious causes (connective tissue disorder, malignancy, renal failure, hepatic failure, bone marrow hypoplasia, trauma or surgery) were excluded from the current study.

### 3. Results

The distribution of studied patients with respect to the months are shown below in Figure 1.

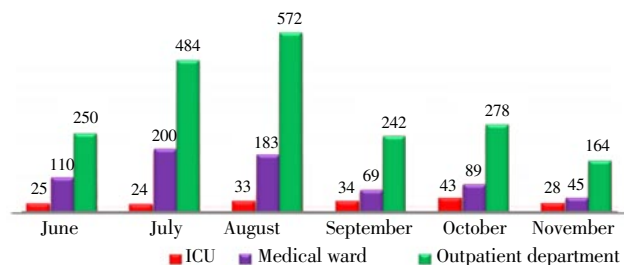


Figure 1. Distribution of the total febrile patients (n=2873).

The majority of febrile patients were distributed in August (788/2873=27.43%) followed by July (708/2873=24.64%).

The following line diagram in Figure 2 depicts the trend of acute febrile illnesses with typical peaking of infections during the months of July and August followed by second peak during late October.

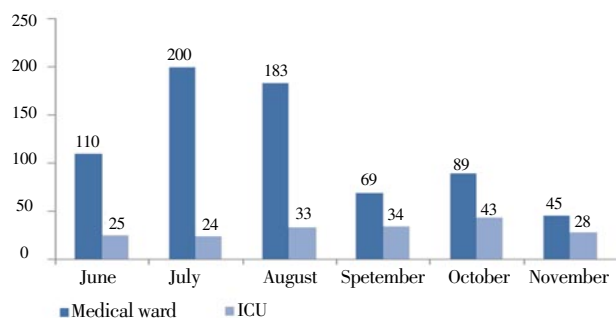


Figure 2. Line diagram showing trend of distribution of febrile patients in medical ward and ICU (n=883).

The total febrile patients in medical ward and ICU were 696 and 187 respectively.

The age distribution ranged from 15 to 84 years with female predisposition (M:F=1:1.5). Majority of the febrile patients were in the 15–30 years age group (292/883=33.07%) followed by elderly (>60 years, 22.88%) as demonstrated in Figure 3.

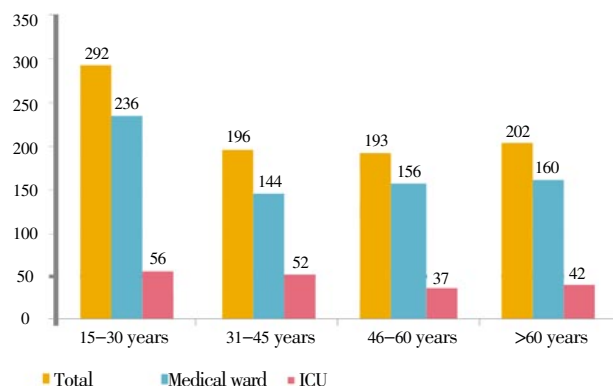


Figure 3. Age distribution (n=883).

Most of the febrile patients were from Chitwan district followed by Nawalparasi and Makwanpur.

Most of the febrile patients admitted in medical ward were diagnosed as respiratory tract infection (RTI) followed by urinary tract infection (UTI), enteric fever, acute gastroenteritis (AGE) and others as illustrated in Figure 4 below.

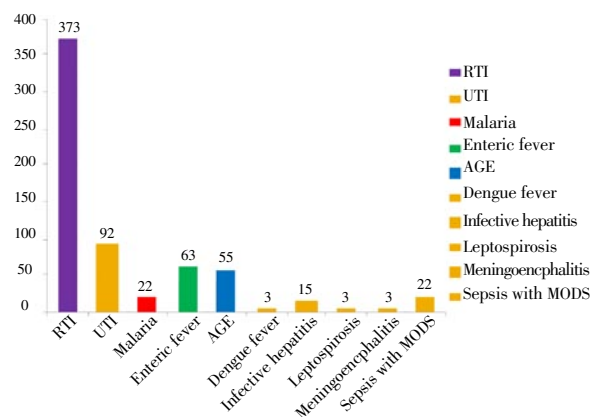


Figure 4. Distribution of febrile illnesses in medical wards (n=696). MODS: multi-organ dysfunction syndrome.

Sepsis with multi-organ dysfunction syndrome (MODS) was the major diagnosis in ICU admitted febrile patients followed by acute meningoencephalitis as shown in Figure 5. The distribution of the febrile patients with respect to the month is shown in Table 1. A total of 28 patients (3.17%) died of the febrile illness, and the majority died during the months of June to September. Out of the majority of the febrile illnesses suffering from RTI, lower RTI (community-acquired pneumonia) with acute respiratory distress syndrome (ARDS) attributed to 8 (0.91%) mortalities. The outcome of the patients is illustrated in Figure 6. About 21 patients (2.37%) died of sepsis with MODS followed by acute meningoencephalitis in 5 (0.56%), complicated malaria with ARDS in 1 (0.11%) and infective

hepatitis with encephalopathy in 1 (0.11%).

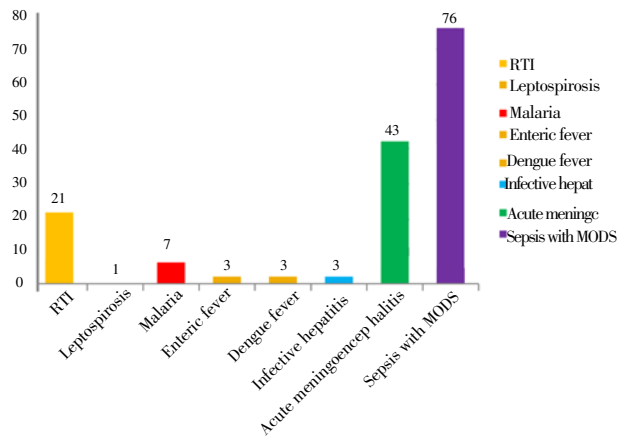


Figure 5. Distribution of febrile illnesses in ICU (n=187).

Table 1

The distribution of the febrile patients with respect to the month.

Disease category	June		July		August		September		October		November	
	Ward	ICU	Ward	ICU	Ward	ICU	Ward	ICU	Ward	ICU	Ward	ICU
RTI	66	5	136	5	107	6	31	2	33	3	20	3
Flu like illnesses	46		96		77		16		18		12	
Community acquired pneumonia	20	5	40	5	30	6	15	2	15	3	8	3
UTI	14		17		29		10		22		6	
Malaria	1		3		9	2	4	3	5	2	2	2
Enteric fever	11	1	19		13	2	8		12		4	1
AGE	13		16		14		4		8		4	
Dengue fever		1			3	1	0	1			1	
Infective hepatitis	3	1	5	1	4		3	1			2	1
Leptospirosis				1	2	1	0				1	
Acute meningoencephalitis	6		6		1	6	1	14	1	11	2	8
Sepsis with MODS	2	11	3	12	1	15	8	13	8	27	3	13
Total NO. of patients	110	25	200	24	183	33	69	34	89	43	45	28
Grand total	135		224		216		103		132		73	

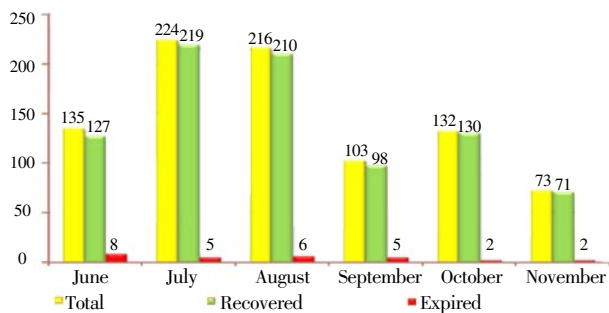


Figure 6. Outcome of the patients (n=883).

#### 4. Discussion

In Nepal, febrile illness is one of the most common reasons for seeking medical attention, but there is limited information on the pattern and frequency of specific infections. Burden of infections like viral fever, enteric fever, malaria, acute meningoencephalitis is believed to be substantial and the newly diagnosed and emerging infectious agents pose a threat to the community with lots of concern to the public and the media. In Chitwan district which lies in the Terai belt of Nepal, different types of seasonal infections like viral influenza, dengue fever and enteric fever appear in epidemic form from time to time with lots of mortalities.

Total febrile patients in our study were 2873, out of which 883 patients were admitted in medical wards and ICU from

June to November 2011. The age distribution ranged from 15 to 84 years with female predisposition (M:F=1:1.5). Majority of the febrile patients were in the 15–30 years age group (292/883=33.07%) followed by elderly (>60 years in 22.88%).

Study conducted in Patan Hospital (Nepal) by Murdoch *et al* during 2011 over the two study periods enrolled 876 (370 winter and 506 monsoon) febrile patients[4]. Most patients were from Kathmandu or the surrounding valley, with approximately 10% of the patients coming from the Terai.

Shrestha *et al.* described 2046 patients from May 2009 to December 2010, presenting with an undifferentiated febrile illness with unknown etiology[5]. The average age was 26 (range 2–96 years).

Karkey *et al.* collected and analyzed data from 3898 cases of blood culture–confirmed enteric fever from Patan Hospital in Lalitpur Sub–Metropolitan City between June 2005 and May 2009[6].

Malla *et al.* reported a total of 1469 *Salmonella typhi* and *Salmonella paratyphi* A isolates from five different hospital laboratories situated in Kathmandu during June 2002 to June 2004[7].

Most of the febrile patients admitted in medical ward were diagnosed of RTI (373, 57%) mostly viral in etiology on clinical assessment followed by UTI in 92 (14%), enteric fever in 63 (10%) and malaria in 22 (3%). There were only 3 patients (1%) diagnosed of dengue fever and leptospirosis during this study period respectively. The pattern of febrile illnesses in ICU were different with majority being referred and admitted for sepsis with MODS (76, 48%) followed by acute meningoencephalitis syndrome (43, 27%), bilateral community acquired pneumonia (21, 13%) and complicated malaria (7, 5%).

Armed Forces Research Institute of Medical Sciences and the Walter Reed/Armed Forces Research Institute of Medical Sciences Research Unit Nepal[8] initiated a febrile illness etiology study at 4 hospitals in 3 cities in Nepal during 2009 to 2010, which demonstrated 69 infections with *Salmonella typhi*, 73 *Salmonella paratyphi* A, 13 malaria, 204 leptospirosis, 15 hepatitis A, 1 hepatitis B, 1 hepatitis C, 62 brucellosis, 1 chikungunya, 47 primary dengue, 47 secondary dengue, 12 Japanese encephalitis, 7 murine typhus, 1 Thai tick typhus, 52 scrub typhus, 130 influenza A/H1N1, 6 A/H3, 167 influenza B, 2 *Bartonella henselae* and 5 *Bartonella quintana*. These were the first known reports of both Chikungunya and *Bartonella* human infections in Nepal. In addition, although only documented in Nepal since 2004, dengue infections are now being seen in the cities of Kathmandu and Pokhara located at higher altitudes further from the Indian border than initial cases.

In the study from Patan[4] of the 876 patients enrolled, enteric fever and pneumonia were the most common clinical diagnoses. Putative pathogens were identified in 323 (37%) patients, the most common was *Salmonella enterica* serotype Typhi and *Salmonella enterica* serotype Paratyphi A, *Rickettsia typhi*, *Streptococcus pneumoniae*, *Leptospira* spp. and *Orientia tsutsugamushi*.

In the prospective studies conducted in Western industrialised countries[9], a minimum incidence of 10.5 per 100 000 acute encephalitis syndrome was reported for children and 2.2 per 100 000 for adults. The minimum incidence for all ages was 6.34 per 100 000 from a tropical setting.

Majority of the patients in our study were treated empirically unless a definite diagnosis could be sought. The clinical management is often driven by syndrome-based guidelines employing empiric treatment<sup>[10]</sup>.

In our study, 28 patients (3.17%) died of the febrile illness in ICU, the majority died during the months of June to September. Totally, 21 patients (2.37%) died of sepsis with MODS followed by acute meningoencephalitis in 5 (0.56%), complicated malaria with ARDS in 1 (0.11%) and infective hepatitis with encephalopathy in 1 (0.11%).

Thus, this study demonstrates the usefulness of expanding well equipped modern laboratory facilities including microbiologic capacity in the developing world. Also, such studies reflect the trend of treatment in developing countries like Nepal mostly clinically in empirical basis due to non-availability of sophisticated and reliable diagnostic tools.

### Conflict of interest statement

We declare that we have no conflict of interest.

### Acknowledgements

We would like to share and express our sincere thanks to all the faculties of the department of medicine including the interns who assisted in collection of the data and made our job easier. The work has been supported by College of Medical Sciences–Teaching Hospital, Bharatpur, Chitwan, Nepal, Grant No.:005.

### Comments

#### Background

Acute febrile illnesses particularly seasonal mostly during monsoons from the month of June onwards are common causes of morbidity and mortality. They pose a major threat to the public due to their endemicity as many of them remain undiagnosed. Information on their pattern and frequency in Nepal is limited.

#### Research frontiers

This study was performed to determine the pattern of acute febrile illnesses occurring in monsoons during June to December, 2011 in Central Nepal, their underlying etiology and clinical outcome. The febrile episodes mostly occurred during July and August, in young and elderly people, RTI being most common with 0.91% mortality among inpatients due to lower RTI and ARDS. Sepsis with MODS was the most frequent cause of death.

#### Related reports

This study on acute febrile illnesses is similar with another study conducted in Patan Hospital, Nepal by Murdoch *et al* (2011). However, the underlying etiologies were different in prevalence and severity which was due to different geographical and climatic conditions.

#### Innovations & breakthroughs

Data regarding this topic are few from Nepal and none from

Central Nepal. With available facilities, it has been tried to investigate and treat the patients. Empirical treatment based on clinical presentation and judgement was given to those patient mostly with RTI and AGE with satisfactory outcome.

### Applications

It is significant to know the pattern and etiology of seasonal febrile illnesses that might become endemic, so that the patients are timely treated and lives saved. Early and planned activity of the government and non-government local bodies, epidemic preparedness against susceptible outbreaks and public health awareness are the keys to minimize the hazards.

### Peer review

This is an important study for further amelioration of similar illnesses in future. Timely treatment of such patients will definitely bring down morbidity and mortality.

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