



A REVIEW ON PRESCRIPTION PATTERN IN PATIENTS WITH DENGUE FEVER IN A TERTIARY CARE HOSPITAL

Syeda Zuleqaunnisa Begum*¹ and Almas Sultana²

¹Assistant Professor, Department of Pharmacy Practice, Deccan School of Pharmacy.

²Student, Deccan School of Pharmacy (affiliated to OU).

*Corresponding Author: Syeda Zuleqaunnisa Begum

Assistant Professor, Department of Pharmacy Practice, Deccan School of Pharmacy.

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ABSTRACT

Dengue fever is spread by the female Aedes mosquito that has been infected with dengue fever virus, of which there are five strains. As many as 80% of people infected with dengue virus have no symptoms or mild fever whereas others develop more severe symptoms of dengue fever. For those who are symptomatic, the symptoms start 4 to 7 days after being bitten from an infected mosquito and involve high fevers, headache behind the eyes, nausea, vomiting, skin rash, muscle and joint pain. In a small number of patients, as the fever resolves, the clinical course proceeds to the potentially dangerous dengue hemorrhagic fever with bleeding, severe abdominal pain, vomiting that contains blood, respiratory distress and organ impairment. This is a critical stage of the illness and without medical care the complications can cause death. **Methodology:** In the following study done in a tertiary care hospital The rationality of the drug use was assessed and the treatment regimen was studied for dengue fever. The main objective of the study method was to find the current trends in treatment of dengue along with the success rate of the proposed method. It was found to be satisfactory as the patients were found to be cured in a period of minimum 5 days to 2 weeks maximum. As pharmacist plays a significant role in a patient's life, patient counselling and education services helped them to understand their disease and the therapy. A better patient compliance was observed

KEYWORDS: Dengue fever, dengue hemorrhagic fever, analgesic, prescription pattern, vector-borne.

INTRODUCTION

It is a mosquito-borne single positive-stranded RNA virus of the family Flaviviridae; genus Flavivirus. Five serotypes of the virus have been found, all of which can cause the full spectrum of disease. Until a few hundred years ago, dengue virus was transmitted in sylvatic cycles in Africa and Asia between mosquitoes of the genus Aedes and non-human primates with rare emergences into human populations. The global spread of dengue virus, however, has followed its emergence from sylvatic cycles and the primary life cycle now exclusively involves transmission between humans and Aedes mosquitoes. Vertical transmission from mosquito to mosquito has also been observed in some vector species.

Types

All four serotypes can cause the full spectrum of disease from a subclinical infection to a mild self-limiting disease, the dengue fever (DF) and a severe disease that may be fatal, the dengue haemorrhagic fever/dengue shock syndrome (DHF/DSS). The WHO 2009 classification divides dengue fever into two groups:

uncomplicated and severe¹, though the 1997 WHO classification is still widely used². The 1997 classification divided dengue into undifferentiated fever, dengue fever (DF), and dengue haemorrhagic fever (DHF).^[1]

- **Undifferentiated Fever** – it is the most common manifestation of dengue with about 87% of patients infected were either asymptomatic or mildly symptomatic and demonstrates silent transmission.
- **Classic Dengue Fever** – in this type conditions like fever, headache, muscle and joint pain, nausea, vomiting and rashes are present.
- **Dengue Hemorrhagic Fever** – skin hemorrhages like petechiae, purpura, ecchymoses are seen. Gingival bleeding, nasal bleeding, gastro-intestinal bleeding, hematuria and increased menstrual flow can also be present.

Four main characteristic manifestations of dengue illness are

- i) Continuous high fever lasting 2-7 days;

- ii) Haemorrhagic tendency as shown by a positive tourniquet test, petechiae or epistaxis;
- iii) Thrombocytopenia (platelet count <100,000/mm³); and
- iv) Evidence of plasma leakage manifested by haemoconcentration (an increase in haematocrit 20% above average for age, sex and population), pleural effusion and ascites, etc.

❖ Grades of DHF

1. Grade 1 – fever and nonspecific constitutional symptoms with positive tourniquet test is only hemorrhagic manifestation.
2. Grade 2 – it includes spontaneous bleeding with grade 1 manifestations.
3. Grade 3 – it includes signs of circulatory failure (rapid/weak pulse, narrow pulse pressure, hypotension, cold/clammy skin).
4. Grade 4 – profound shock undetectable pulse and BP).

❖ Danger Signs in DHF

1. Abdominal pain – intense and sustained
2. Persistent vomiting
3. Abrupt change from fever to hypothermia with sweating and prostration
4. Restlessness or somnolence

- **Dengue Shock Syndrome** – It shows the criteria of DHF with circulatory failure which is evidenced by rapid and weak pulse, narrow pulse pressure (<20 mmHg) or hypotension, cold and clammy skin and altered mental status. Frank shock is direct evidence of circulatory failure.

Epidemiology

Worldwide: Dengue was classified by The World Health Organisation (WHO) in 2012, as the most important mosquito-borne viral disease in the world. Dengue is also the world's most rapidly spreading and geographically widespread mosquito-borne disease. WHO has reported that there has been a marked rise of annual dengue cases since the 1950's. Dengue epidemics are observed to be larger, more frequent and associated with more severe disease than they were in the past?

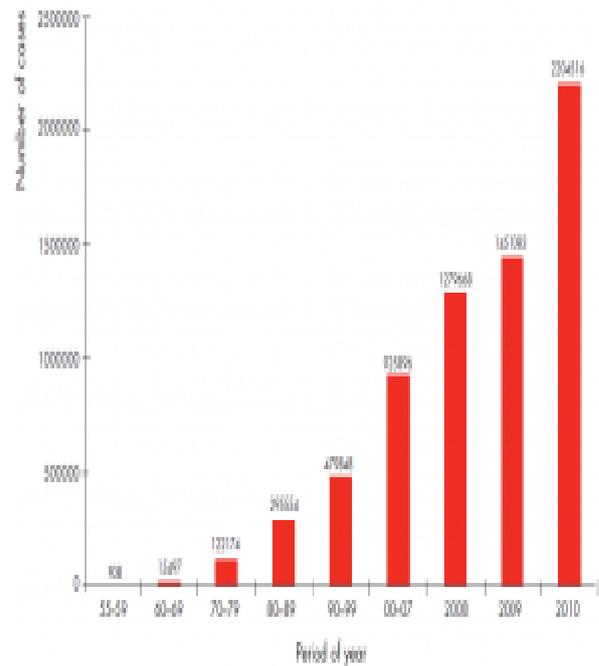


Figure 1: Number of Dengue Cases Reported by WHO from 1995-2010.

India: The epidemiology of dengue fevers in the Indian subcontinent has been very complex and has substantially changed over almost past six decades in terms of prevalent strains, affected geographical locations and severity of disease. The very first report of existence of dengue fevers in India was way back in 1946. The re-emergence of an epidemic strain of DV type-3 in Delhi in 2003 and its persistence in subsequent years marked a changing trend in DV circulation in this part of India. Occasional reports of circulation of DV-4 are also seen, though it is not the predominant type in India.

Contraction of Dengue Fever: The vector-borne dengue virus infection is contracted from the bite of a striped *Aedes aegypti* and *Aedes albopictus* mosquito that has previously bitten an infected person. The mosquito flourishes during rainy seasons but can breed in water-filled flower pots, plastic bags, and cans year-round. One mosquito bite can cause the disease.

The virus is not contagious and cannot be spread directly from person to person. It is mosquito-borne, so there must be a person-to-mosquito-to-another-person pathway. A mosquito bites a dengue infected person and becomes infected with dengue. That mosquito then bites another person and passes the dengue virus infection to that person. The full life cycle of the virus involves the *Aedes* mosquito as the vector (transmitter) and the human as the source of infection.

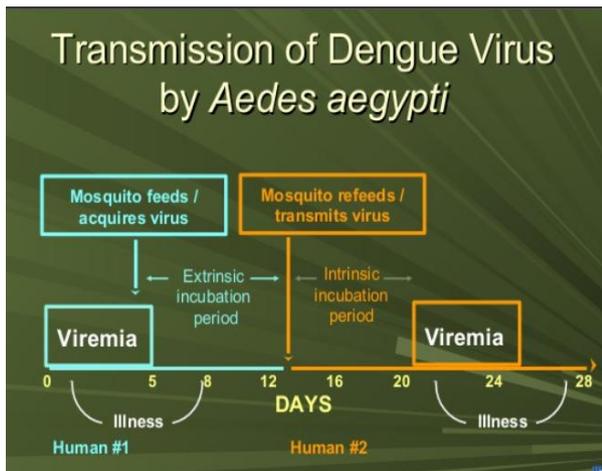


Figure 2: Transmission by *Aedes aegypti*.

Incubation Period: After being bitten by a mosquito carrying the virus, the incubation period for dengue fever ranges from three to 15 (usually five to eight) days before the signs and symptoms of dengue appear in stages.

Symptoms: Many people, especially children and teens, may experience no signs or symptoms during a mild case of dengue fever. When symptoms do occur, they usually begin four to seven days after you are bitten by an infected mosquito.

Dengue fever causes a high fever — 104 F degrees — and at least two of the following symptoms:

- Headache
- Muscle, bone and joint pain
- Nausea
- Vomiting
- Pain behind the eyes
- Swollen glands
- Rash

Most people recover within a week or so. In some cases, symptoms worsen and can become life-threatening. Blood vessels often become damaged and leaky. And the number of clot-forming cells (platelets) in your bloodstream drops. This can cause a severe form of dengue fever, called dengue hemorrhagic fever, severe dengue or dengue shock syndrome. Typically, people infected are asymptomatic (80%) or have mild symptoms such as uncomplicated fever. Dengue fever starts with non-specific flu-like symptoms of chills, headache, pain in the back of the eyes that may worsen upon moving the eyes, appetite loss, feeling unwell (malaise), and low backache. Painful aching in the legs and joints occurs during the first hours of illness. The temperature rises quickly as high as 104 F (40 C), with relatively low heart rate (bradycardia) and low blood pressure (hypotension). The eyes become reddened. A flushing or pale pink rash comes over the face and then disappears. The lymph nodes in the neck and groin are often swollen.

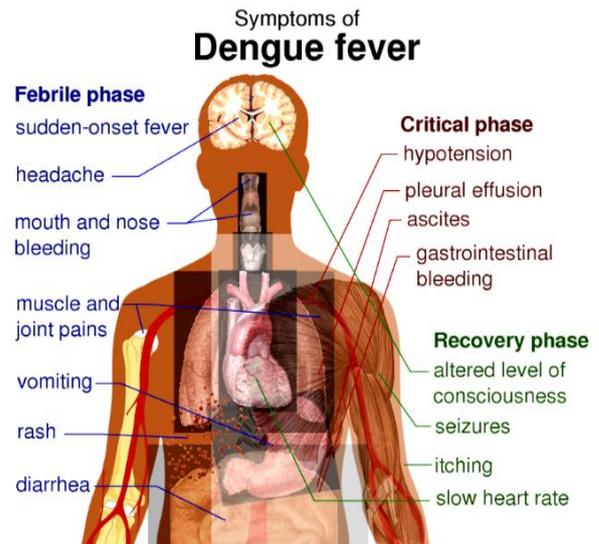


Figure 3: Signs and symptoms.

Sometimes, symptoms are mild and can be mistaken for those of the flu or another viral infection. Younger children and people who have never had the infection before tending to have milder cases than older children and adults. However, serious problems can develop. These include dengue hemorrhagic fever, a rare complication characterized by high fever, damage to lymph and blood vessels, bleeding from the nose and gums, enlargement of the liver, and failure of the circulatory system. The symptoms may progress to massive bleeding, shock, and death. This is called dengue shock syndrome (DSS).

People with weakened immune systems as well as those with a second or subsequent dengue infection are believed to be at greater risk for developing dengue hemorrhagic fever.

Approximately 2.5–3.5 billion of the world's population is at risk of contracting dengue (TDR, 2009, WHO, 2012a). Estimates of the number of new infections range from 50 to 230 million annually (Sanofi, 2009, WHO, 2012a) of which approximately a quarter are sufficiently debilitating to require medical attention (reviewed by Shepard et al., 2004). Approximately 3–6% of clinical cases progress from an acute but uncomplicated febrile form of the disease to dengue hemorrhagic fever or dengue shock syndrome (Shepard et al., 2004, WHO, 2012a). This manifestation of the disease may be fatal. The death toll based on official estimates is approximately 12,500 (WHO, 2012a), but is likely substantially higher as the majority of cases are not officially reported.

Incubation Period: After being bitten by a mosquito carrying the virus, the incubation period for dengue fever ranges from three to 15 (usually five to eight) days before the signs and symptoms of dengue appear in stages.

Diagnosis: Doctors can diagnose dengue infection with a blood test to check for the virus or antibodies to it. If you become sick after traveling to a tropical area, let your doctor know. This will allow your doctor to evaluate the possibility that your symptoms were caused by a dengue infection.

Laboratory criteria for the diagnosis of dengue include one or more of the following, which are used to detect the virus, viral nucleic acid, antibodies or antigens, or a combination thereof:

- Demonstration of a fourfold or greater change in reciprocal immunoglobulin G (IgG) or IgM antibody titers to 1 or more dengue virus antigens in paired serum samples
- Detection of viral genomic sequences in autopsy tissue, serum, or cerebral spinal fluid (CSF) samples via reverse-transcriptase polymerase chain reaction (RT-PCR) assay: RT-PCR provides earlier and more specific diagnosis.
- Less frequently, isolation of the dengue virus from serum, plasma, leukocytes, or autopsy samples

During the early phase of the disease (first 4-5 days), virus can be detected in serum, plasma, circulating blood cells, and tissues. Virus isolation, nucleic acid detection, and antigen detection are more useful to diagnose infection. At the end of the acute phase of illness, serology becomes the method of choice.

The following laboratory tests should also be performed in the workup of patients with possible dengue:

- Complete blood cell (CBC) count
- Metabolic panel
- Serum protein and albumin levels
- Liver panel
- Coagulation panel with or without disseminated intravascular coagulation (DIC) panel

Characteristic laboratory findings in dengue are as follows:

- Thrombocytopenia (platelet count $< 100 \times 10^9/L$)
- Leukopenia
- Mild to moderate elevation of aspartate aminotransferase and alanine aminotransferase values

In patients with severe dengue, the following may be present:

- Increased hematocrit level secondary to plasma extravasation and/or third-space fluid loss
- Hypoproteinaemia
- Prolonged prothrombin time
- Prolonged activated partial thromboplastin time
- Decreased fibrinogen
- Increased amount of fibrin split products

Guaiac testing for occult blood in the stool should be performed on all patients in whom dengue virus infection is suspected. Urinalysis identifies hematuria.

Imaging studies include the following:

- Chest radiography
- Head computed tomography (CT) scanning without contrast: To detect intracranial bleeding or cerebral edema due to severe dengue
- Ultrasonography: To detect fluid in the chest and abdominal cavities, pericardial effusion, and a thickened gallbladder wall in patients with severe dengue

Preventive Measures

The best way to prevent the disease is to prevent bites by infected mosquitoes, particularly if you are living in or traveling to a tropical area. This involves protecting yourself and making efforts to keep the mosquito population down.

To protect yourself

- Preventing mosquitoes from accessing egg-laying habitats by environmental management and modification;
- Disposing of solid waste properly and removing artificial man-made habitats;
- Covering, emptying and cleaning of domestic water storage containers on a weekly basis;
- Applying appropriate insecticides to water storage outdoor containers;
- Using of personal household protection such as window screens, long-sleeved clothes, insecticide treated materials, coils and vaporizers;
- Improving community participation and mobilization for sustained vector control;
- Applying insecticides as space spraying during outbreaks as one of the emergency vector-control measures;
- Stay in air-conditioned or well-screened housing. The mosquitoes that carry the dengue viruses are most active from dawn to dusk, but they can also bite at night.
- Wear protective clothing. When you go into mosquito-infested areas, wear a long-sleeved shirt, long pants, socks and shoes.
- Use mosquito repellent. Permethrin can be applied to your clothing, shoes, camping gear and bed netting. You can also buy clothing made with permethrin already in it. For your skin, use a repellent containing at least a 10 percent concentration of DEET.
- Reduce mosquito habitat. The mosquitoes that carry the dengue virus typically live in and around houses, breeding in standing water that can collect in such things as used automobile tires. You can help lower mosquito populations by eliminating habitats where they lay their eggs. At least once a week, empty and clean containers that hold standing water, such as planting containers, animal dishes and flower vases.

Keep standing water containers covered between cleanings.

AIM AND OBJECTIVE

- To read, analyse and understand the prescribing pattern of anti-dengue drugs in patients with dengue.
- To analyse the demographic information of the patient.
- To analyse the pattern of use of major drug classes given for dengue fever
- To know the current use of drugs for dengue and their rational use.
- To identify and analyse the prescription with poly pharmacy.
- To educate patients about the importance of drugs.

METHODOLOGY

Plan of work

- Literature review
- Designing the data collection form
- To understand the management
- To study the outcomes of the treatment
- Patient counselling

List of Drugs

Table 1: List of Drugs.

S. no.	Name of Drug	Dosage Form	Class
1	Inj. monocef	Injection	Antibiotic
2	Tab. dolo	Oral	Analgesic /NSAIDs
3	Inj. falcigo	Injection	Antimalarial
4	IVF. Normal saline	IVF	Normal Saline
5	IVF. Ringers lactate soln	IVF	Normal Saline
6	Inj. Pantop	Injection	Proton pump inhibitor
7	Inj. Zofer	Injection	Antiemetic
8	Tab Carpill	Oral	Other
9	Tab Zerodol	oral	NASIDs/analgesic
10	Tab woyosolone	Oral	Corticosteroids
11	Tab Parasafe	Oral	Analgesic
12	Inj. Eprine	IVF	Antibiotic
13	Syrup sucral	Oral	Ulcer protectives
14	Inj. tranexa	Injection	Antifibrinolytics
15	Inj. piptaz	IVF	Antibacterial
16	inj. PCM	IVF	Analgesic, Antipyretic
17	Tab. sporolac	Oral	Antiemetics
18	ORS Rebalance	Oral	Electrolytes
19	Inj. dexamethasone	injection	Corticosteroids
20	Inj. Optineuron	Injection	Hematinics
21	Tab. Doxy T	Oral	Antibacterials
22	Inj. Buscopan	Iv	Anticholinergics
23	Tab. Meftal	oral	NSAIDs
24	Dextrose Normal Saline	IV	Normal Saline
25	ultracet	oral	Analgesic

RESULT

A study of 30 Patients was conducted with dengue fever as determined by respective diagnosis test and symptoms.

- Reporting of the collected data
- **Study site**

Inpatient ward of General Medicine Department, Owaisi Group of Hospitals.

➤ **Study Design**

- Observational, non interventional study
- Patient selection was random

➤ **Study Criteria**

Inclusion Criteria

- Patients of age 1-100 years.
- Patients (in-patient) of both genders.

Exclusion Criteria

- Pregnant women
- **Study Period:** 2 months
- **Sample Size:** 30 Patients
- **Statistical Analysis:** Ms Excel, Ms Word.

Results Based on Sex



Figure 4: Results based on sex ratio.

Table 2: Results Based on Sex.

Category	No. of patients	Percentage of patients
Male	17	56.66
Female	13	43.33

The total percentage of male and female in 30 patients was found to be 56.66% and 43.33% respectively.

Results based on age groups

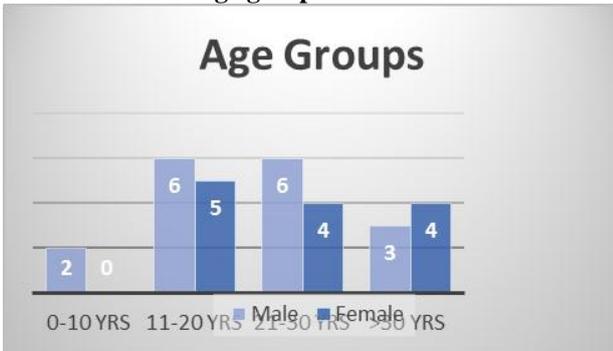


Figure 5 results based on age group.

Patients with age group 0-100 were included in the study. the patients age group fall in four categories i.e. class interval of 0-10yrs, 11-20yrs, 21-30yrs and above 30yrs of age. The highest percentage of patients were seen in the 2nd category and the lowest in the 1st category.

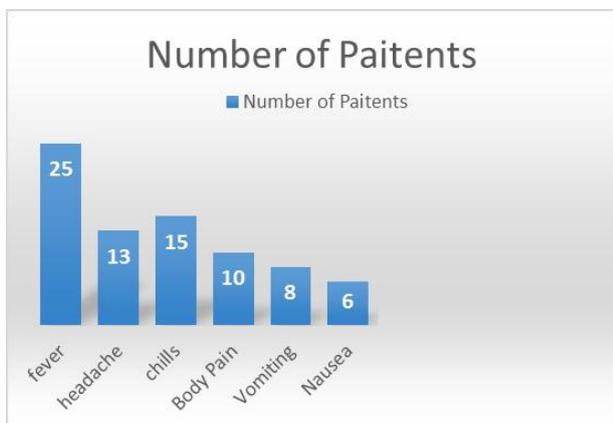


Figure 6: Results based on symptoms of dengue.

Table 3: Symptoms in dengue patients.

SYMPTOMS	NO. OF PATIENTS	PERCENTAGE
FEVER	25	83.33
HEADACHE	13	43.33
CHILLS	15	50
BODY PAIN	10	33.33
VOMITING	8	26.67
NAUSEA	6	20

The results shows that the number of patients with symptoms like fever, body pain, headache, chills, vomiting and nausea were found to be in the order fever (25), Chill (15), headache (13), body pain (10), vomiting (8), nausea (6)

Results based on drugs use

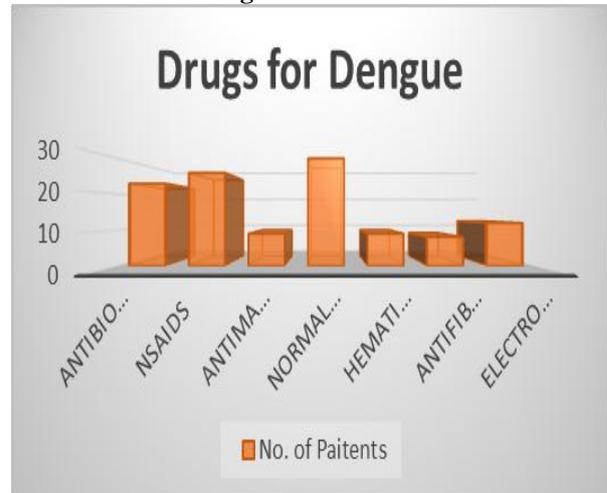


Figure 7: Drugs used in Dengue.

Table 4: Percentage of Drugs Used In Dengue Treatment.

Prescribed drug	Number of Patients	Percentage of Patients
Antibiotics	23	76.66
NSAIDs	26	86.66
Antimalarial	9	30
Normal Saline	30	100
Haematinics	9	30
Antifibrinolytics	8	26.66
Electrolytes	12	40

The drugs used in the treatment of Dengue Fever are Antibiotics, NSAIDs, Antimalarials, Normal Saline, Hematinics, Antifibrinolytics and Electrolytes.

This chart shows that the most widely used drugs in the treatment of Dengue is Normal Saline (30), NSAIDs (26), Antibiotics (23), Electrolytes (12), Antimalarials (9), Hematinics (9), and Antifibrinolytics (8).

Results showing the usage of other drugs

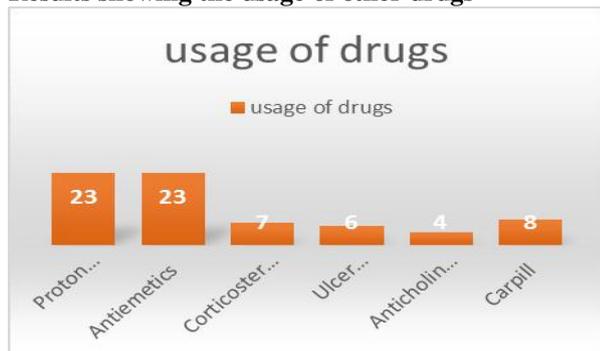


Figure 8: results of other drugs in dengue.

Table 5 percentage of other drugs used in dengue.

Name of Drugs	No. of Patients	Percentage of Patients
Proton pump inhibitors	23	76.67
Antiemetics	23	76.67
Corticosteroids	7	23.33
Ulcer Protectives	6	20
Anticholinergics	4	13.33
Carpill	8	26.67

The other drugs used in the treatment of Dengue are Proton Pump Inhibitors, Antiemetics, Corticosteroids, Ulcer Protectives, Anticholinergics and Carpill.

DISCUSSION

The present study was conducted to find out prescribing pattern of drugs used in treatment of dengue fever in a tertiary care hospital. Total of 30 patient case sheets were analysed during a study period of two months. Various results based on age group, gender, symptoms and drugs used were found and analysed.

The results show that the number of male patients (56.66) diagnosed with dengue were more than the females (43.33). The age group mainly affected was in the range of 11-20 years followed by the 21-30 years group though with a very less difference between them.

In the study it was noticed that the drugs belonging to the category NSAIDs (dolo, zerodol, paracetamol, parasafe) and Antibiotics (monocef, eprine, piptaz, doxy T) were predominantly used along with crystalloids like Normal Saline, DNS and RL for treatment as the symptoms of fever, pain and chills were commonly observed in patients.

Other drugs like proton pump inhibitors, Antiemetics, corticosteroids, ulcer protectives and Anticholinergics were also used but in significantly less in number compared to the others.

CONCLUSION

Dengue is a common disease in sub-tropical and tropical areas due to the natural conditions that help in breeding of mosquitoes that act as carriers for the dengue virus. The aim of this study was to produce the rational

prescriber and to give the prescription pattern of drugs used and current recommendations and guidelines. This study shows that the crystalloids are most commonly used in treatment to replenish the body fluids lost in disease condition. There are no specific antiviral drugs that are used in the treatment rather a combination of antibacterial, analgesics and antipyretics are used. The most common drug prescribed was NSAIDs followed by antibacterial.

The rationality of the drug use was assessed, and the treatment was found to be satisfactory as the patients were found to be cured in a period of minimum 5 days to 2 weeks maximum. As pharmacist plays a significant role in a patient's life, patient counselling and education services helped them to understand their disease and the therapy. A better patient compliance was observed.

The study can be carried out in a larger group of patients to further identify treatment benefits and treatment related ADR's in a larger population.

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