

Original Article

Assessing the preparedness and strategies in the management of Dengue disaster in the hospitals

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Dengue is fast emerging viral pandemic and incidence has increased over 30-fold the last 50 years. Severe manifestations of dengue outbreaks have always created panic and public have always expected urgent action from healthcare organizations. At such times, it becomes essential to have preparedness and flexibility in the administrative structure to manage such crisis as quickly as possible. The present study was conducted with objectives to assess the preparedness and strategies in the management of dengue cases in Hospitals. A total of 1475 suspected patients were admitted and screened in the Emergency OPD for dengue in 4 months and 250 were confirmed positive. A separate area was designated for giving immediate and transitory medical care. 'May I help you' counter was established at emergency entry for information and instructions to people. One doctor and two nurses were attached for the average load of 50 patients each admitted. Social workers were instructed to get to the each patient individually, counsel them and to answer their queries. They also made daily census. A technician was posted specifically for sampling of suspected patients. Around 200 more trolleys were introduced and trolley men were instructed to conduct frequent hospital rounds and get back the trolleys, as soon as the patient is shifted to ward. Central stores and pharmacy were activated to make necessary logistics and drugs available as per load. Blood and blood components were made readily available to those who needed them. Voluntary donors, doctors and staff members were mobilized.

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Key words : Infrastructure, logistics, management, manpower, medication, strategies.

Dengue is fast emerging pandemic-prone viral disease. The incidence has increased 30-fold over the last 50 years¹. Dengue outbreaks, when associated with severe manifestations always create panic and people expect urgent action from government authorities especially the healthcare organizations.

From hospital point of view, a contingency plan dealing with emergency hospitalization of large number of cases needs to be prepared for making the most effective use of hospital and treatment facilities with its limited resources². So, the main focus of this article is to assess the preparedness and strategies in the management of dengue cases in Hospitals.

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MATERIALS AND METHODS

It is a descriptive study conducted in one of the tertiary level multispecialty hospital of North India, catering to population of Punjab, Haryana, HP, J&K, UP along with Chandigarh itself. The hospital is a 700 bedded hospital with an annual OPD of 4.5 lakhs and IPD of about 40,000 and emergency load of 80,000.

This was a short-term study (October-December 2012). Consent was obtained from the authorities. The physical space, entry and exit system, location, registration area, lobby/corridor, waiting area, examination rooms, observational beds, emergency X-ray room and laboratory, treatment rooms, nurse's station, staff rest rooms, stores, police post and public relations office were observed. In addition, the patient/attendant load, patient flow, and medical staff practice were observed.

The Emergency has three entrances manned by security guards. These open into a spacious, well lit lobby. There are separate emergency wards for medicine and surgery (total 34 beds), and 32 observational beds. The radiology department, two operating theatres, a blood bank, an attendant waiting room and laboratory are also attached to the Emergency. There is one overflow ward attached with emergency to cater the load, but there is no separate isola-

tion facility. On an average, 150-200 patients are admitted daily (average occupancy of 200-250%) and almost twice those numbers of attendants accompany them (Table 1). At any one time, there is one consultant, two senior residents, four nursing staff and four supporting staff members present.

In the month of August, 2012 increased number of patients' started pouring in, with the complaints of acute febrile illness, headache, and rash, myalgia, arthralgia, retro-orbital or ocular pain. The patients were screened, investigated and a formal diagnosis of dengue was established. The diagnosis was established using the NS1 and Immunoglobulins investigations methods.

The need to screen all patients with suspected symptoms and to keep them under direct observation, not to be kept in isolation, was established. The flow of patients and their attendants was not systematic and their movement was uncontrolled and there was a sudden rise in the EMOPD occupancy of up to 300%. Two or three or even more attendants usually accompanied one patient. The corridor was overcrowded, leaving little space for movement of patients, nurses and doctors.

The patients were started with symptomatic treatment, while some of the patients required platelets infusion also. It was observed that on an average it took a week (6-7 days) for the fever to get down along with relapse of other problems. As the patient inflow was much more than the exit of patients, shortly afterwards, the occupancy rate touched around 500% and at that time it became very much essential to arrange the facilities at the early possible.

RESULTS

A total of 1475 suspected patients were screened for dengue in 4 months. Out of total, 250 were confirmed positive cases of dengue (Fig 1). There was also a continuous rise in the number of suspected and positive dengue cases reporting to the hospital as compared to last three years (Table 2). In the present year (2012) also, the largest proportion of serologically positive cases have been recorded in the months of September to November.

GMCH EMOPD has a core type of design. The following possible changes were made as for the effective management of emergency cases:

(1) Space allocation: The EMOPD has 21 beds (plus another fixed 16 trolleys), with additional 60-70 trolleys, leaving little scope for further expansion.

So, a specific area was designated for giving immediate and transitory medical care to patients, until they can be transferred to a ward, which included:

- Lobby area of the Medicine Emergency (Space I)
- Lobby area of the surgery Emergency (Space II)
- Area in the emergency in front of the Registration counter (Space III)
- Waiting area at the entry emergency (Space IV)

Table 1 — Hospital statistics from Government Medical College and Hospital (GMCH), Chandigarh

Variable (Service)	N
Total no. of hospital beds	700
Total no. of doctors in hospital	168
Doctors in EMOPD at one time	2 (12-hourly shift)
Total no. of nurses in hospital	368
Nurses in EMOPD at one time	4 (6-hourly shift, 12-hourly at night)
Total no. of monthly admissions	3637
Average daily admissions	122
Daily census of indoor patients	562
Maximum on any one day	598
Minimum on any one day	504
Average length of stay (days)	9
Bed occupancy ratio (%)	82.0%
Medical emergency (%)	99.1
Average daily OPD	1800
Total monthly emergency OPD	2783 (11.1% of new patients in hospital)
Total monthly deaths	266
Emergency OPD deaths	238

Reference : EMOPD a Monthly Statistical Report (November 2012), MRD, GMCH 32, Chandigarh, India

Table 2 — The rise in requirement of Blood and Blood components during the dengue

Month	Voluntary donors	Plateletpheresis procedures	Platelets units issued	Camps organized
July	1077	6	132	7
August	1430	7	201	10
September	1217	46	713	14
October	1508	167	1382	21
November	867	44	411	11
December	1146	8	193	13

(2) Function: A range of resources and services were needed to deliver good clinical services and this was done without undue disturbance and cost.

Human Resources :

- Initially, two to three attendants used to accompany a patient along with their baggage. This had led to undue space occupancy and overcrowding. 'May I help you' counter was established at the entry of EMOPD to provide information and instructions to people. A systematic

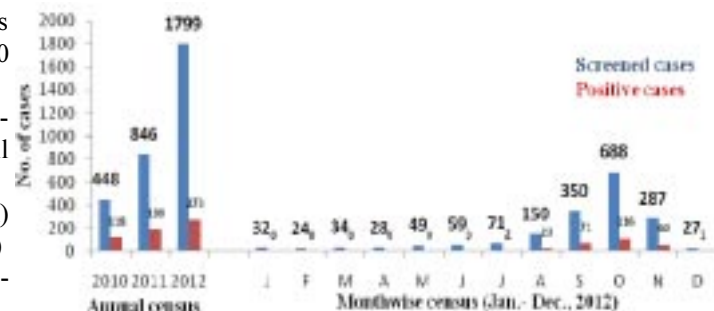


Fig 1 — No of Patients screened and positive for Dengue

patient flow control mechanism was developed and a screening system for patients' attendants was also initiated. Only one attendant (at the most two, in case of serious emergency) was allowed into the EMOPD area. This helped to accommodate more patients in the limited emergency area.

- Patients arriving in EMOPD were first examined thoroughly to rule out the chance of dengue. Doctors were deputed to the first level of care to help in triage and emergency management.

As the patient load was much more, and at one time there used to be 150-200 dengue suspected or diagnosed patients, besides the emergency cases, two doctors and four staff nurses were specifically deputed to manage the dengue cases, while, on routine duty doctors used to manage the emergency services otherwise. One doctor and two nurses were attached for the load of 50 patients each admitted.

One senior most faculty was posted in the Emergency for the overall supervision and management of the emergency functioning.

- As the patient relatives sometimes used to get panicky, stressed and aggressive for their wards, led to undue arguments with doctors and staff on duty, two social workers were specifically deputed to pacify them and answer their queries. Social workers were instructed to get to the each patient individually, develop a repo with them, counsel them, and answer their any query or confusion. They also made daily census with the help of staff nurse on duty and sent the report to authorities.

- Patients/relatives reporting to emergency block for works viz. file clearance, pass issuance etc. were channelized through other routes. Systems were activated to speed up the registration process by inducting more persons, installing more registration counters.

Trolleys :

The trolleys were one of the important requirements during the management. Earlier, there used to be 150 trolleys in the emergency besides normal beds. But with the surge in the number of cases and on an average 7-10 days stay, it led to the crisis of trolleys in the hospital.

Initially, trolleys were mobilized from the different Hospital wards, but the requirement was not fulfilled. Later, the trolleys from the central store followed by 50 more trolleys were purchased.

Trolley men were told to conduct the hospital rounds more frequently and get the trolleys back to emergency, as soon as the patient is shifted to ward.

Laboratory Facilities:

- Availability of quick and reliable laboratory investigation facilities is vital for the early diagnosis of acute infectious diseases and allows initiation of prompt treat-

ment and control measures. A technician was posted specifically for the sampling of suspected patients.

- Streamlining of the laboratory reporting system was done. The diagnosis was done using NS1 and Immunoglobulin methods. Earlier, the sample testing was once a week due to lesser load (NS1 was done on Tuesday and Immunoglobulin on Friday). With the rise in patient load, sampling was asked to be done on daily basis for early diagnosis and management. The NS1 was found to significant for first week of dengue, while the latter used to be significant after one week or so.

- The most important laboratory investigation is that of serial haematocrit levels and full blood counts. These investigations should be easily accessible from the health centre. Results should be available within two hours in severe cases of dengue.

Central Stores :

Intravenous fluids such as crystalloids, colloids and I/V sets were made available as per emergency requirement.

Pharmacy:

The adequate stocks of antipyretics and oral rehydration salts were maintained. Additional drugs (vitamin K1, Ca gluconate, NaHCO₃, glucose, furosemide, KCl solution, vasopressor, and inotropes) for management of severe cases were also made available as per load.

Communication:

Facilities for easy communication, especially between secondary and tertiary levels of care and laboratories, including consultation by telephone were updated.

Blood Bank :

- Blood and blood components were made readily available to those who needed them. The daily assessment regarding the number of patients, their platelet counts and blood groups was done. Platelet count was repeated twice a day i.e. morning (8:00AM) and evening (4:00PM).

- The patients with platelet count of 50,000 or less were taken in to account for anytime need of platelets.
- Voluntary donors were mobilized.
- Patient relatives, doctors, staff members and students of the hospital were motivated for blood donation.
- Manpower was specifically rescheduled to manage the workload effectively.
- The patients with platelet count 10,000 or with bleeding problems were given the required transfusion.
- There was a corresponding increase in the demand and issue of blood and blood components (Table 2).

DISCUSSION

Dengue virus infection is known to be endemic in India³. Our study highlights the vulnerability of Emergency blocks (in India) for earlier management of diseases even

in centers of excellence⁴. The situation in smaller hospitals can only be expected to be worse. Currently, there is a worldwide focus on improvement of quality of care in EMOPDs. So, a set of standard guidelines should be evolved for various levels of hospitals in India for handling infectious diseases and pasted in the EMOPD.

The study also emphasizes that not only healthcare systems have to be strengthened, but there is a need of combined approach from Government, Society and local board of health, and other providers to develop protocols and policies, which can respond to these kinds of events and would be able to handle future contingencies. The initial work up done by various authorities like MC, society and boards can be well imagined from the continuous annual rise in influx of dengue patients. From the Health care organization point of view, the hospitals itself can bear a load up to a limited threshold with its defined resources viz. manpower, material and infrastructure, so, under a new accreditation standard, EMOPDs and all departments must be prepared to handle an influx, or the risk of an influx, of infectious patients.

The major role of dengue management lies with public health bodies. There are no approved vaccines for the dengue virus⁵. Prevention thus depends on control of and protection from the bites of the mosquito that transmits it^{6,7}. The primary method of controlling *A. aegypti* is by eliminating its habitats⁸. This is done by emptying containers of water or by adding insecticides or biological control agents to these areas, reducing open collections of water through environmental modifications, is the preferred method of control⁸. People can prevent mosquito bites by wearing clothing that fully covers the skin, using mosquito netting while resting, and/or the application of insect repellent (DEET being the most effective)⁹.

The World Health Organization recommends an Integrated Vector Control program consisting of five elements: (1) Advocacy, social mobilization and legislation to ensure that public health bodies and communities are strengthened, (2) collaboration between the health and other sectors (public and private), (3) an integrated approach to disease control to maximize use of resources, (4) evidence-based decision making to ensure any interventions are targeted appropriately and (5) capacity-building to ensure an adequate response to the local situation⁸.

There are no specific antiviral drugs for dengue, however maintaining proper fluid balance is important¹⁰. Treatment depends on the symptoms, varying from oral rehydration therapy at home with close follow-up, Paracetamol (acetaminophen) is used for fever and discomfort, to hospital admission with administration of intravenous fluids and/or blood transfusion¹¹ (patients presenting with unstable vital signs in the face of a decreasing hematocrit, and Packed red blood cells or whole blood are recommended, while platelets and fresh frozen plasma are usu-

ally not¹². In the present study also, the treatment strategies opted were as per the treatment protocol of WHO and NVBDCP.

Print and electronic media need to be informed on day to day activities for control of dengue to build public trust. It is done by communicating openly and honestly, providing accurate and specific information about what people can do to make themselves and their community safer. This gives people a sense of control over their own health and safety, which in turn allows them to react to the risk with more reasoned responses¹³.

Surveillance is an essential part of hospital control of infectious diseases. Many countries have tried to incorporate surveillance in their emergency medical services, and the role of national government in strengthening infectious disease control in an emergency has been debated¹⁴. In India an Integrated Disease Surveillance Project (IDSP) has been implemented in many states to focus on early detection and control of spread of infectious diseases.

Hospital staff, doctors and nurses should be trained (short course/seminar) to diagnose cases of DHF, to recognize shock, and to provide proper management using WHO criteria and guidelines. Laboratory workers should be trained to do Haematocrit, CBCs and platelet counts or estimation by examination of peripheral blood smears and coagulogram. They should also be trained to collect blood specimens for serological diagnosis and/or virus isolation.

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