Communicable Disease Surveillance during Gujarat, India Earthquake, 2001: A Survey

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Abstract: During Gujarat earthquake in 2001, to keep a watch on the health problems and for effective control measures, disease surveillance activities were carried out. Every day different teams were sent to the field to collect the information about the morbidity and creating awareness about personal hygiene and use of safe chlorinated water, collection of blood smear for malaria parasite, identifying the mosquito breeding places etc. During the surveillance period a total of 261 health teams visited 510 villages of Kutchh region thereby covering a total of 141686 individuals. 691 cases of diarrhoea, 703 cases of fever, 89 cases of erythematous fever and 13 cases of jaundice were reported during the functioning of surveillance cell. Few cases of measles, chickenpox and hepatitis A were reported during the surveillance period. To conclude the disease surveillance activities helped in averting the occurrence of any epidemic of communicable disease.

Keywords: Surveillance, earthquake, India.

INTRODUCTION

Following a natural disaster like earthquake, the affected population is often displaced and temporarily resettled. They may be placed in camps or become dispersed among the local population (either in towns or in rural communities). Resettlement in camps may entail high population densities, inadequate shelter, poor water supplies and sanitation, and a lack of even basic health care. In these situations, there is an increased threat of communicable disease and a high risk of epidemics [1].

Communicable diseases are a major cause of mortality and morbidity in emergencies, and particularly in complex emergencies, where collapsing health services and disease control programmes, poor access to health care, malnutrition, interrupted supplies and logistics, and poor coordination among the various agencies providing health care often coexist. The main causes of morbidity and mortality in emergencies are diarrhoeal diseases [2,3], acute respiratory infections, measles [4] and, in areas where it is endemic, malaria [5]. Other communicable diseases, such as epidemic meningococcal disease, tuberculosis, relapsing fever and typhus, have also caused large epidemics among emergency-affected populations [1,6].

The conditions leading to an epidemic are caused mostly by secondary effects and not by the primary hazard, except in the case of flooding, which can cause an increase in waterborne and vector-borne diseases. Earthquakes can trigger landslides that block rivers, causing flooding. In all these cases, excess standing water can promote the breeding of insect disease vectors, or contaminate water supplies with waste or sewage.

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The control of communicable diseases depends on a healthy environment (clean water, adequate sanitation, vector control, and shelter), immunization, and health workers trained in early diagnosis and treatment. Functioning disease surveillance systems and intact environmental health services are crucial in protecting public health [7,8] and in responding to these outbreaks when they occur in times of disaster.

Thus disease surveillance activities were carried out with the objectives to assist the local health authority and to find out the magnitude of the health problem with special reference to communicable diseases.

MATERIAL AND METHODS

A Disease Surveillance Cell (DSC) with a control room was set up to collect the data on the magnitude of communicable diseases. Every day different teams were sent to the field. The surveillance team included public health specialist, microbiologist, pathologist, laboratory technician, entomologists and pharmacist. The team collected information about the morbid conditions and collected blood smear for malaria parasite, identifying the mosquito breeding places etc. in proforma designed by the DSC. On the basis of standard definition for the recognition of diseased condition, operational definitions were developed. Following operation case definitions were used for the surveillance of diseases:

Acute Diarrhoeal Diseases including Cholera

Three of more looses or watery stools with or without vomiting, with or without dehydration in the past 24 hours.

Acute Respiratory Infection (ARI) including Pneumonia

Cough, difficulty in breathing, sore throat, running/ blocked nose, fever, ear pain.

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Fast breathing and/or chest in drawing indicates pneumonia.

Measles

Any child/person with fever and generalized maculopapular (i.e. non-vesicular) rash, cough coryza (i.e. running nose) or conjunctivitis (i.e. red eyes).

Chickenpox

Any child/person with fever and generalized papulo-vesicular rash, cough, coryza (i.e. running nose).

Jaundice

Acute illness compatible with following clinical descriptions: icterus, dark urine, anorexia, malaise, extreme fatigue and right upper abdominal quadrant pain.

Malaria

Sudden onset of fever with rigor and sensation of extreme cold followed by burning hot sensation with severe headache.

The statistical analysis was carried out using the software EpiInfo 5.

RESULTS

During the surveillance period a total of 261 health teams visited 510 villages of the Anjar, Bhachau, Bhuj, Lakhpat, Abdasa, Mandvi, Mundra, Gandhidham, Rapar and Nakhatrana talukas of Kutchh region thereby covering a total of 141686 individuals. 691 cases of diarrhoea, 703 cases of fever, 89 cases of erythematous fever and 13 cases of jaundice were reported during the functioning of surveillance cell.

Fig. (**1**) shows the distribution of the cases of diarrhoea, fever, fever with rash and jaundice over the period of 12 weeks of functioning of DSC. For the surveillance of vector borne diseases, a total of 16581 breeding sites were searched for mosquitoes during the entire surveillance period. 705 sites have shown that either adult mosquito or larvae are breeding.

Fig. (**2**) shows the percentage distribution of mosquito species. Majority of the mosquito species were Aedes (352) followed by Anopheles (236), Culex (96) and Mixed species (49). Almost half (48%) of the breeding sites were positive for Aedes species of mosquito followed by Anopheles (32%). Thus, the population is exposed to the risk of dengue fever and malaria.

1887 blood smears were collected from those having symptom of fever for examining malarial parasites. However only 19 smears were found to be positive for malarial

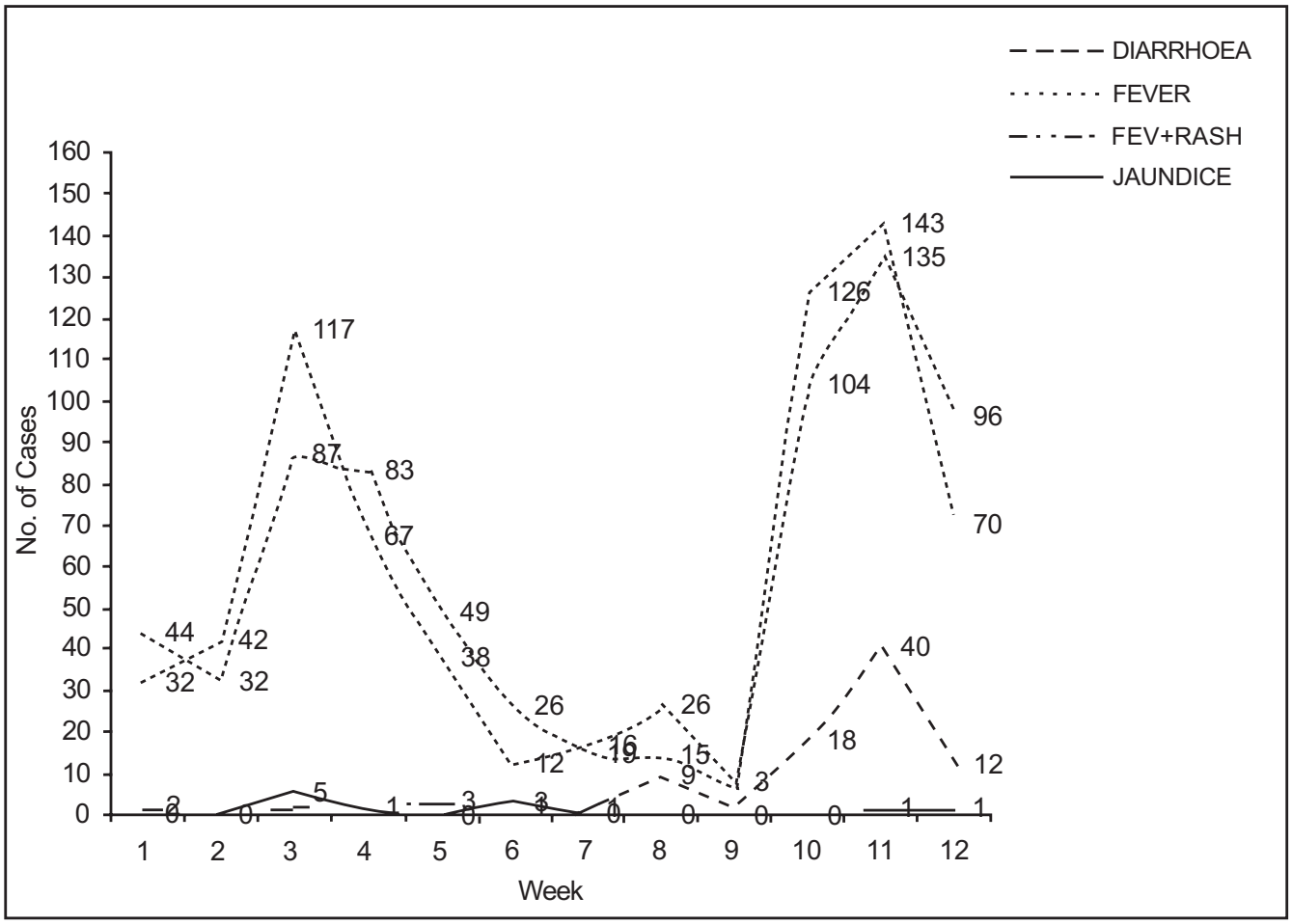

Fig. (1). Distribution of morbidities during surveillance period.

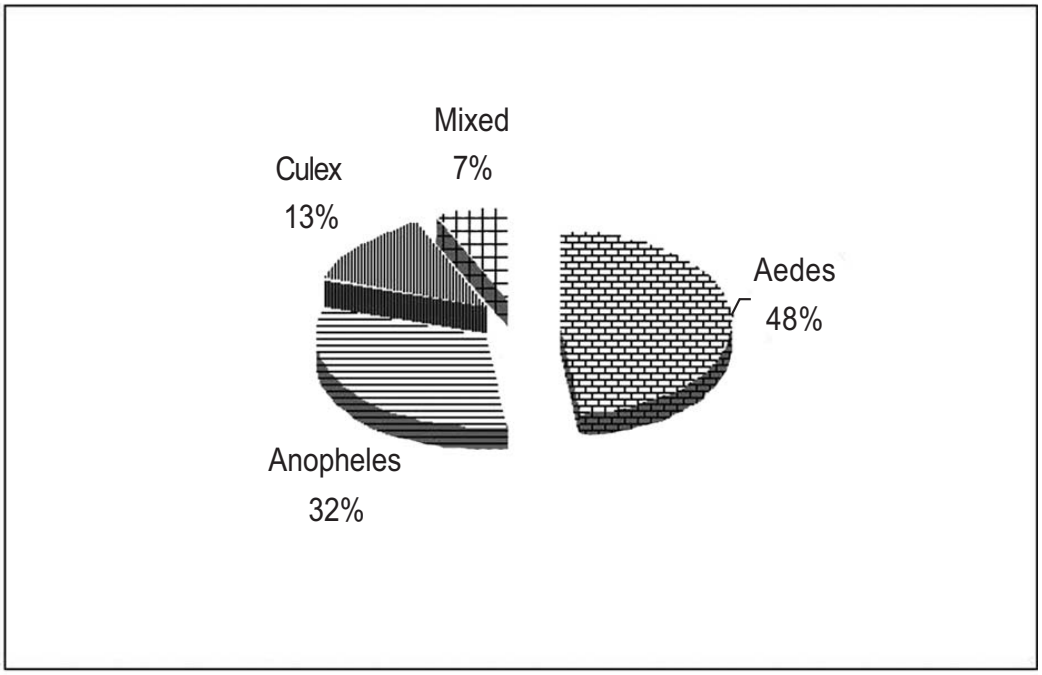

Fig. (2). Percentage distribution of various mosquito species in the breeding sites examined.

parasites. Fig. (**3**) shows the distribution of blood smear examined for malarial parasites during the surveillance period and the positive of blood smears. Only 19 cases were found to be malarial parasite positive on blood smear examination and no case of dengue fever or dengue haemorrhagic fever was encountered.

DISCUSSION

Diarrhoea and fever were the common complaints reported during the surveillance activities. Maximum number of cases of diarrhoea was reported in the 11th week when 143 cases were reported. Another peak was observed in the 3rd week when 117 cases were reported. Similarly the two peaks of fever cases were also observed in the third and eleventh week when 87 and 135 cases were reported respectively. The reasons for such bimodal peak may be due to more population coverage during the 3rd and 11th week. The cases of fever with rash had a peak at 11th week. This was the period when an outbreak of chicken pox was observed. However usual number of cases was observed throughout the surveillance period that coincided with the transmission period of measles and chickenpox. No outbreak of hepatitis A was observed during the surveillance period.

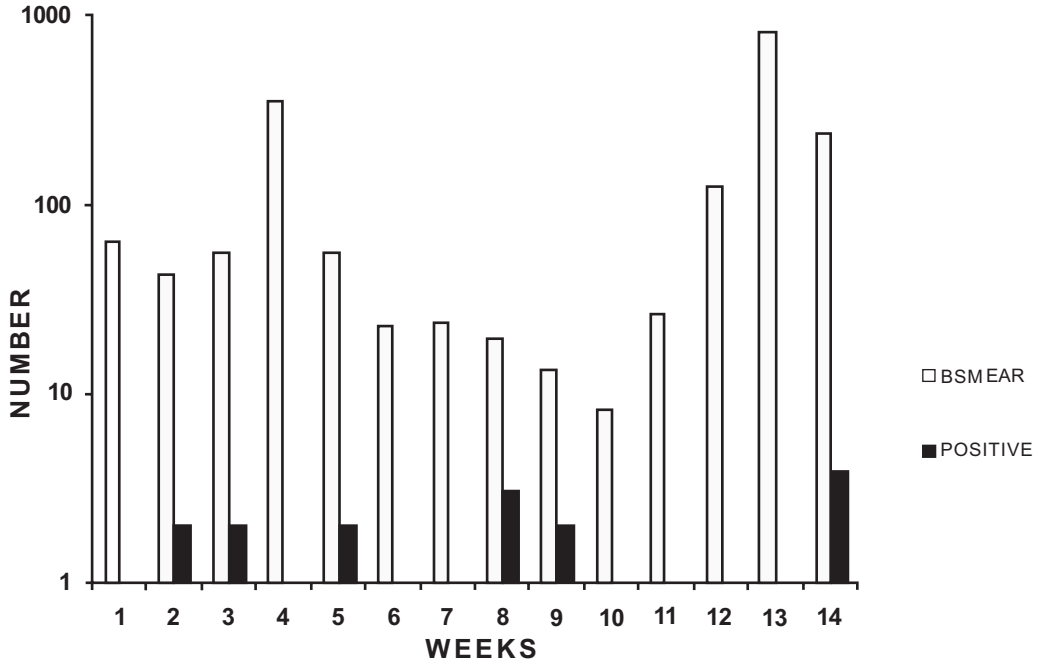

Fig. (3). Distribution of blood smear examined and their positive outcome.

Diarrhoea and fever cases showed a bimodal peak. The reasons for first peak may be better surveillance activities by both Disease Surveillance Cell and the local health authorities. This was followed by fall in the percentage prevalence. This can be attributed to better control activities such as chlorination of water, distribution of oral rehydration salts and drugs. However from the 10th week onwards the local and International agencies started winding up their surveillance centers. This would have resulted in increase in the cases of diarrhoea and fever in the 10th week resulting in a second peak. Also this period coincided with the season for gastroenteritis. This might have also attributed to a sudden increase in the number of cases. However, effect of control measures taken by DSC can be observed from the figure in terms of reduced percentage prevalence of cases of diarrhoea and fever in the 11th and 12th week. The graph for cases of erythematous fever suggests a peak in the 11th week. The period coincided with the outbreak of chickenpox in few villages of the Kutch district. Apart from this few cases of measles were also reported. However the occurrence of hepatitis A cases was usual throughout the surveillance period and did not result in any outbreak.

Overall prevalence of the morbid conditions suggested that the fever was the most prevalent condition with 0.5% prevalence. This was followed by diarrhoea, which had a prevalence of 0.493%. Erythematous fever and jaundice were the other morbid conditions reported but in very low prevalence of 0.064% and 0.009% respectively. Thus it can be said that none of the condition occurred in epidemic proportions.

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