minimal course of treatment with antidepressant drugs, yet the outcome of our unrecognised patients was worse.

Failure to recognise depression seemed to be related to general practitioners' basic knowledge of diagnosing depression and not only to their skills in interviewing or their attitudes towards patients with emotional disorder.

The work reported here was funded by the Medical Research Council. We owe an immense debt to the cooperating general practitioners, their staff, and the patients.

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(Accepted 7 March 1985)

My Student Elective

An eyewitness in Bhopal

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I flew to Bhopal from Delhi on Sunday 2 December 1984 to begin my elective, which I had arranged to spend in the paediatric department at Hamidia Hospital. In the next two weeks 1337 children were admitted to the department. Of these 119 died and Bhopal became a household name. As the only outsider I was in a unique position to observe the reaction of the city and its medical resources to the world's worst industrial disaster. This report recounts my impressions of how the hospital and staff coped with the disaster and describes some of the clinical features of the toxic gas poisoning.

I spent the first night of my stay with Dr Bhandari, the professor of paediatrics. At about 1.30 am I was woken by the repeated ringing of the doorbell followed by the entry of several people who were coughing violently. At the same time I noticed a sweetish smell, my eyes were mysteriously stinging and watering, and my throat felt raw. I heard the distant sound of a siren, but this being my first night in Bhopal I thought nothing of the incident and went back to sleep. When I woke the next morning I heard that there had been a major gas leak from the Union Carbide insecticide plant about a mile from the hospital, but the nature of the gas was not yet known. At first the

local news reports knew little more than we could deduce from seeing the numbers of affected people who had flooded into the hospital grounds. The earliest reports suggested that about 30 people had died. With each subsequent news report we listened with disbelief as further details about the horrifying story began to emerge. Even after the first full day we were unable to believe the estimate from the BBC World Service of 2000 dead—later even this proved to be conservative.

The dead and dying arrived by the truckload, others came by rickshaw or were carried by relatives. For some the effort of the journey itself proved too much, and they died soon after arrival. Many families were split up during the initial panic, everywhere there were people looking for missing relatives. There were long queues of people trying to identify relatives in the mortuary. From an early stage when the mortuary was full, other unidentified bodies were laid out on a nearby lawn and under hastily erected shelters.

Facilities overwhelmed

The facilities in the hospital and the manpower became increasingly overstretched as the enormity of the disaster became apparent. The doctors were quite overwhelmed. I felt even more helpless; having arrived only the day before I had been unable to see inside the hospital or be introduced to the staff, and was unable to speak the language. For the first few days I was frustrated that I was not able to do more to help. Without a doctor to interpret for me there

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was little that I could do on my own. I joined up with a group of other medical students to help administer eye drops, give injections, set up drips, and distribute food. Doctors worked around the clock giving repeated injections; there was no time to sterilise needles between patients. The doctors were unable to spend much time to help any one child, dividing their time between the ill and the dying. Later on I was able to examine the children as they arrived and suggest treatment. I also helped to ventilate dying children and attempt cardiac massage.

Many hundreds of victims died within the first few hours of the gas leak, death being caused by respiratory failure resulting from the severe pulmonary oedema. The main complaints of those who survived were of a sensation of intense heat, burning eyes, blindness, vomiting, choking, coughing, breathlessness, and a feeling of suffocation. At first the precise toxic effects of the gas were not known so treatment was symptomatic—with antibiotic eye-drops, oxygen inhalation, and intravenous frusemide, steroids, and aminophylline to relieve respiratory distress.

The most severely affected children were attended to in the intensive treatment room, which was about 20 feet square and supplied with only one sink and an electric socket. Rows of infants and older children on drips filled the couches, while others lay on the floor or were held by their parents while they received treatment. Two or three children would be receiving oxygen through nasal cannulae delivered from the same gas cylinder. Most of these children admitted to the intensive treatment room died of respiratory failure within the next few days.

The wide corridors of the hospital were packed with victims, several members of each family requiring urgent treatment. The luckier ones had a bed—for the whole family. By the Wednesday these families who had been camping in the ward corridors were being moved out to tents erected nearby by the army. Relief agencies provided food for the victims—milk, bananas, and biscuits. By the Thursday the initial rush of people coming in had slowed though the death toll was still rising: the official figure now exceeded 2000.

Of the 119 deaths in the paediatric department from 3-14 December, 106 occurred in the first four days after exposure. The cause of death in most cases was cardiac arrest associated with respiratory failure. On examination these children with toxic lung damage were breathless and hyperventilating but not cyanosed. Many had audible wheezes and grunts, and widespread rhonchi and crepitations were heard with the stethoscope. The children were treated with intravenous frusemide and steroids to help reduce the severe pulmonary oedema, and aminophylline to relieve the wheezing. After about a week about 15 children a day were still being admitted to the wards, mainly with respiratory complaints—cough, breathlessness, and respiratory infections. The eye problems, which had caused widespread distress in the first few days, had been due to the direct chemical irritation, causing painful watering eyes, local oedema, and photophobia. The irritant gas had caused superficial ulceration, which led to temporary corneal opacity in some cases. Prophylactic neomycin eye drops helped to

keep the rate of infection low, and atropine drops were also given to prevent the formation of posterior synechiae, though it caused further problems of blurred vision and occasionally induced acute glaucoma. Fortunately, the corneal ulceration was superficial and generally healed without scarring. The mobile preventative ophthalmology units played an important role in the follow up of the eye complications in the community. Some children also showed signs of convulsions, hemiparesis, and coma.

On 8 December a German toxicologist, Dr Daunderer, visited Bhopal and reinforced the views held by the head of the forensic medicine department, Dr Heereshchandra, that the effects of the methyl isocyanate gas were mediated via its breakdown into cyanide and other toxic amines. If this were the case there was a specific antidote, sodium thiosulphate. The drug was thought to be harmless, but its efficacy was not proved so its widespread use in the treatment of the victims was vetoed. Sodium thiosulphate was administered to a few patients, some of whom showed marked improvement, but by the time a controlled trial had been started it was too late to expect any effect from an immediate antidote.

Tragedy attracted world attention

For the next few weeks the world's attention focused on Bhopal. Rajiv Gandhi and Mother Teresa came to visit the city, meeting the gas victims in hospital and also in the affected slums around the plant. Newspaper and television reporters arrived from all over the world within a day or two of the tragedy. Everyone was anxious to send back pictures of the carnage in the slum areas, record the death throes of babies in the paediatric wards, and recount the tragic stories of so many left widowed or orphaned by the gas. Some television teams would film patients in the wards, regardless of whether they had been affected by the gas or not.

The next few weeks were spent trying to cope with the immediate toxic effects of the methyl isocyanate gas and later to predict the medium and long term complications likely to arise. The most likely problems expected are thought to be respiratory, especially pulmonary fibrosis, though doctors are also anxious to follow up any neurological, ophthalmological, and intellectual sequelae that may emerge. Another fear is the effect of the gas on early pregnancy. Methyl isocyanate exposure was blamed for a marked increase in the rate of premature labour and abortions on the night of the gas leak and in the subsequent few weeks.

I had expected the experiences of my elective period to include a range of the usual childhood diseases—polio, tuberculosis, and diphtheria. Instead it was as if I had arrived during the filming of a disaster film—except it was real.

I am grateful to the following for allowing me access to their departments: Dr N R Bhandari, professor of paediatrics; Dr L P Mishra, professor of medicine; and Dr Mittal, department of ophthalmology.

(Accepted 2 May 1985)

What is the current state of knowledge of ecological illness or total allergy syndrome? Is there an immune basis to this condition?

Chemicals as well as pollens can cause sensitivity. This has been discussed by the World Health Organisation and its conclusion was that this is a considerable health problem and that we know little about it.¹ Many patients feel "dis-eased," complaining of lethargy, myalgia, aching joints, abdominal symptoms, depression, fluctuating weight, etc. They are often referred to a psychiatrist because no tests show abnormal results. These are obviously a heterogeneous group which we now know contains patients with food allergy, the postviral syndrome, those with chemical sensitivity, and some with primary or secondary psychological problems, or indeed a mixture of all these. The pioneering work of Randolph has delineated a group of these patients who are sensitive to chemicals and gas fumes and when these are

removed from their environment improvement can be remarkable. The term "total allergy syndrome" is valueless. These are patients with multiple sensitivities, so called "universal reactors," as described above, who are difficult to treat, and in whom immunological abnormalities have been found.² Their symptoms are not all in the mind, and in environmental units as seen in the United States many of these patients return to normal health. We know little of what causes this syndrome but environmental factors are clearly important. Much work needs to be done before we have a clear understanding as to what is happening in possibly a considerable proportion of the population.—J BROSTOFF, reader in clinical immunology, London.

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