

Aftermath of disastrous gas leak: doctors say thousands of survivors may never fully recover

CHAITANYA KALBAG, one of Reuter's New Delhi-based correspondents, has returned to Bhopal to assess the long-term effects of December's poison gas leak on the city and its population. Kalbag, aged 28, and a former award-winning writer with "India Today" magazine, covered the original disaster story.

Hundreds of people stand outside the drab, white bungalow, clutching yellow X-ray folders and medical prescriptions, in a line stretching down the driveway.

A chorus of dry coughs punctuates the slow progress of emaciated men, ragged children, and ghost-like Moslem women covered from head-to-toe in veils and black robes, towards the verandah.

Half a kilometre to the east looms the reason for the setting up of this makeshift "hospital" in this central India city of Bhopal - the pesticide factory owned by the Indian subsidiary of the United States Union Carbide Company where a poison gas leak last December killed 2500 people.

Opposite the factory sprawls the shantytown of Jaiprakash Nagar where more than 800 people died among the huts built with canvas and wood from packing cases. Dozens of huts of owners who died or have fled stand empty.

Nearly four months after the world's worst industrial disaster, the survivors are struggling to rebuild their lives, scarred by the lethal methyl isocyanate (MIC) gas that burst from a storage tank at the pesticide factory on December 3.

Gas victims trek in every day for medicine, X-rays, and urine and blood tests. It has become the centre of their lives since it was set up on January 13. There are always more victims needing attention than beds, and they rest on makeshift beds made of piles of red hospital blankets laid between the iron cots.

"Most of them stay for about two weeks and go away when they feel better," says Dr Shrinath Aggarwal. "But they have to return when the effects of the medicine wear off."

Dr M. M. Nanda, who is in charge of the hospital, says that about 600 people are treated in outpatient clinics every day. "More

victims and they all complain of major respiratory problems," he adds. "They cannot walk even 100 metres without running out of breath. We can only continue medication and hope they will improve."

In the hospital's female ward a woman sits cross-legged, dressed in a white sari, her face drawn in agony as she is racked by a bout of coughing.

Bibi Jan, aged 30, says two of her five children died in the gas leak. "I have been in three hospitals since then and there is no improvement. I don't know who will look after my other children if I die," she says, with tears in her eyes.

The gas acted more slowly on other victims. In the next room a thin, dark boy lies fighting for breath as his parents stand by.

Gopal Khushwaha, aged 14, suddenly developed severe lung pains, his eyes reddened, and he could not walk. "Our lives have been destroyed by the gas," says his father, Chhotelal.

The disaster has also disrupted the lives of survivors who do not go to hospital. In Jaiprakash Nagar's dusty, fly-infested lanes, several men sit gloomily on the doorsteps of their huts as women and children wander listlessly under the fierce afternoon sun.

"I used to lift about 50kg of luggage at the railway station before the gas leak," says a porter, Latif Khan, his cheeks covered with stubble. "Not now. So I sit at home, selling firewood."

Arvind Gupta, unable to return to his job as a construction worker, now sells ice on a nearby pavement. "My 11 year old daughter Mamta was in hospital three times but she has only got worse. She is at home now and only God can save her," pointing to a little girl who lies covered with a blanket in the small one-roomed hut.

Most victims still suffer from

and cataracts, severe respiratory trouble, chronic loss of appetite, and severe damage to their windpipes and gastro-intestinal tracts. They have not been able to return to their old jobs as railway porters, construction workers or push-cart operators because their severely damaged lungs cannot cope with heavy manual work.

"We have already spent more than 10 million rupees (\$1.75 million) on medical relief," says Dr M. N. Nagu, health services director of Madhya Pradesh state. "But hospitals have registered about 177,000 gas victims, and we do not know how many of them will be restored to normal health."

The state's Health Secretary, Dr Ishwar Dass, says great anxiety is caused by about 3000 pregnant women. Doctors estimate about 500 of them were in the first three months of their pregnancies - the formative stage in which the foetus can suffer maximum damage - when the leak occurred.

"A team of gynaecologists is carefully monitoring them to see if poisoned blood got past the placental barrier to cause genetic damage or lack of oxygen," Dr Dass says.

Dr Abha Sahu, head of a new polyclinic near the pesticide factory, says that doctors face unforeseen problems with the mainly illiterate victims.

"We advise badly affected pregnant women to go in for abortions. Most of them refuse although they may already have other children," she adds.

In the first weeks after the disaster, the victims were reported to have died as their lungs filled with fluids after they inhaled the methyl isocyanate gas. Now doctors say the deaths, and injuries to more than 177,000 people, may have been caused by cyanide released into their blood when they inhaled the gas.

Survivors have received injec-

antidote for cyanide poisoning. In the clinic's other room an array of equipment, including a blood-gas analyser and a urine spectrophotometer, monitors samples collected from the victims.

The results so far show that most of them have been rescued from a slow death, doctors say. "Sodium thiosulphate treatment has made a dramatic difference," claims Dr Suresh Bala Varma.

The drug is reacting with cyanide deposits in the body to produce a harmless compound called thiocyanate that was discharged in the victims' urine. "Even better results have emerged from our monitoring of blood samples," Dr Varma adds. "Before treatment most victims had alarmingly low oxygen levels in their arterial blood - between 30 and 50 per cent compared with the normal 90 per cent."

"Now, the oxygen content is slowly rising. At the same time, sodium thiosulphate is also bringing down the ratio of carbon dioxide in victims' blood, which pre-treatment tests showed had shot up to twice the safe level."

Each victim was given a daily injection of sodium thiosulphate for six days. The treatment is then spaced out to bi-weekly and weekly administrations.

"Our tests show that the gas victims' blood was not being sufficiently oxygenated," she says. "People who could not walk even a few paces without stopping exhausted are showing signs of improvement."

But Dr Varma says that little hope is held out of repairing the tissue of the victims' lungs, damaged when they sucked in methyl isocyanate as they fled from the poison gas on the night of the disaster.

Dr Dass says the fight to save the lives of the survivors has been hindered by a lack of information on the reactions triggered by methyl isocyanate in the body. Other doctors agree.

Dr Dass says that two days after the gas leaked on December 3, Union Carbide doctors said methyl isocyanate poisoning produced lung damage and acute respiratory distress and had recommended treatment with oxygen, cortisone steroids to revive tissue, and bronco-dilators to re-open blocked lung passages.

"Most victims did not improve



Doctors treating gas leak victims under canvas at the time of the disaster. Officials now say they do not know how many will be restored to normal health.

"It was only when people continued to die days after the leak that we realised that something else was causing damage in victims' bodies."

The first suggestion of cyanide poisoning came from Dr Heresh Chandra, head of the department of forensic medicine and toxicology at Bhopal's Gandhi Medical College. His team performed autopsies on more than 300 gas victims. "Even autopsy surgeons were affected by methyl isocyanate trapped inside the bodies," Dr Chandra says.

"Every victim had unnaturally cherry-red coloured blood, and the bodies themselves were pink and showed no signs of cyanosis - the blueness commonly associated with death. They were signs that clearly pointed to cyanide poisoning."

His suspicions were reinforced when survivors exhibited every symptom of chronic cyanide poisoning listed in toxicology manuals - dizziness, weakness, lung congestion, conjunctivitis, and weight and appetite loss.

survivors with sodium thiosulphate started only in mid-February, two months after the gas leak.

Dr S. Sriramachari, director-general of the Indian Council of Medical Research, says that in the absence of precise clinical data on methyl isocyanate, the only clues available were found in Union Carbide's technical literature.

A manual on the lethal chemical issued by the company says that thermal decomposition, which occurred when water accidentally leaked into a methyl isocyanate storage tank at the factory, "may produce hydrogen cyanide, nitrogen oxides, carbon monoxide, and/or carbon dioxide."

"We still do not know how methyl isocyanate is stored inside the body, where it is stored, and how it keeps refilling the 'cyanogen pool' leading to fresh respiratory attacks. We are conducting tests to find out."

Dr Varma says that about 2000 survivors have been treated with sodium thiosulphate over the past

not guarantee a permanent cure. Dr Dass says that Madhya Pradesh state estimates that about 10,000 people have permanent respiratory problems which will need long-term treatment.

The chairman of Union Carbide, Warren Anderson, said last month that sabotage, or serious safety lapses by the Indian subsidiary, could not be ruled out in the leak.

Indian authorities have rejected Mr Anderson's remarks, saying they appear designed to reduce the United States company's liabilities.

Union Carbide faces dozens of lawsuits in United States courts claiming compensation worth billions of dollars for the gas victims. The lawsuits are scheduled to come up for a pre-trial hearing in a New York court on April 16.

India has said it is prepared to go in for an out-of-court settlement if Union Carbide offers good compensation. The Madhya Pradesh law secretary, Abdul Qureshi, says that law just passed by the Indian Parliament could aid an out-of-

The law allows the Indian Government to take over all litigation on behalf of the gas victims and supervise the speedy distribution of compensation.

Mr Qureshi says more than 2000 local lawsuits had been filed in Bhopal against Union Carbide's Indian subsidiary. "Over 200,000 gas victims have registered with us for free legal aid," he adds.

"The only way Union Carbide can buy peace is to quickly finalise the compensation issue directly with the Indian Government. That is the only way the survivors can start piecing together their shattered lives."