

Mental health of survivors of 1984 Bhopal disaster: A continuing challenge

ABSTRACT

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Bhopal disaster is an important milestone in Indian Industrial Psychiatry. The disaster was not only the biggest industrial disaster but also one in which complex forces have joined hands to deny the mental health needs of the population. Though the biggest general population epidemiological study over 5 years was carried out to understand the mental health impact of the disaster, the findings of this study did not get reflected in mental health care for the population. Furthermore, the needed longitudinal studies and evaluation of the interventions were not undertaken. There was no sharing of information with the survivors about the impact of the disaster on their health and well-being and sharing of skills for self-care. A result of these factors is the extreme degree of dissatisfaction in the population. Looking back, it would have met the needs of the Bhopal population, if the mental health services were community based and reaching the population, rather than the clinic-based approaches, there was a wide range of services, especially rehabilitation, continuous research into the changing mental health needs of the population and the effectiveness of interventions and most importantly, there was a continuous dialogue with the population and sharing of information with the general population. These are the tasks for the immediate future to reorganize the focus of mental health initiatives in Bhopal. Many lessons can be learnt from the Bhopal disaster and the continuing tragedy for the population.

Keywords: Bhopal Disaster; Mental Health; Services

Bhopal disaster is an important milestone in Indian Industrial Psychiatry. 2014 is an important year in the calendar of disaster mental health. It marks the centenary of the World War 1, the 30 years of the Bhopal disaster in Madhya Pradesh, 30 years after the Sikh riots in Delhi, two decades after the Killari earthquake of Maharashtra, 19 years after the Dabwali fire in Haryana, 15 years after the Orissa supercyclone, 13 years after the Kutch earthquake in Gujarat, 12 years after the Gujarat riots, and 10 years after the tsunami. All of these disasters, man-made and natural, have influenced the understanding of mental health of the populations and the development of mental health care for the surviving populations.

The current review focuses on the Bhopal gas disaster of December 1984 and identifies the lessons learnt

during the last three decades. The scope of the review is to cover the four phases of research/service delivery (December 1984–February 1985, March 1985–1994, 1995–2010, and 2010–), and identify the continuing mental health needs of the population and the lessons learnt during the last three decades.

THE DISASTER

Bhopal gas leak disaster is the biggest industrial disaster in human history. On the night of 2/3 December 1984, about 40 tons of methyl isocyanate (MIC) from tank 610 of Union Carbide India Limited (UCIL) factory at Bhopal, in Central India, leaked into the surrounding environment. This leak of an “extremely hazardous chemical” which occurred over a short span of few hours killing >2000 people, covered the city of Bhopal in a cloud of poisonous gas. The Union Carbide factory at Bhopal was part of India’s response to the severe food shortages in 1960’s. In 1969, Union Carbide set up the pesticide plant at Bhopal (UCIL). Bhopal city is located in the central part of India. Bhopal is the capital city of the state of Madhya Pradesh. In 1984, the population of Bhopal was about 700,000. The city was chosen, for setting up of the pesticide plant, on the basis of its central

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location in the country, railway services connecting the city to rest of India and the availability of a large natural lake to provide adequate water supply. The chemical plant was located only about 2 km from the railway station and not far from the residential quarters. Until 1979, the factory was importing MIC from the parent company. After 1979, MIC was manufactured at the Bhopal factory. MIC is one of the many intermediates used in the production of the powerful pesticide Sevin. MIC is a dangerous chemical. It is lighter than water and very hygroscopic. It is also twice as heavy as air and as a result, in a free environment, it remains close to the ground. The factory employed about 800 workers. Ironically, only in 1983, the Indian Government had (1-year prior to the disaster) extended the plant's license for 7 years after a promise that the plant would secure from its parent company the technology to handle "emergency situations like toxic gas release, sometimes accompanied with fire, endangering the safety of the community."^{1,2} There are reports that 4 months before the tragedy, the US multinational had decided to dismantle its Bhopal installations to relocate in Brazil and Indonesia.³

On the night of December 2/3 1984, about 40 tons of MIC in tank number 610 leaked into the atmosphere. The gas spread and covered about 7 km radius of the plant and directly affected about 200,000 population. More than 2000 (about 1% of directly exposed) died on the night of the disaster. The disaster was the result of a combination of factors. The cause is thought to be due to the entry of water into tank with MIC or the spontaneous polymerization (in the absence of inhibitors) of the liquid of MIC, which had been in storage for over a month, a longer period than normal.² In addition to this, (i) The gauges measuring the temperature and pressures were not functioning properly; (ii) the refrigeration unit for keeping the tank of MIC cool had been shut off for sometime; (iii) the gas scrubber had been shut off for maintenance; and (iv) the flare tower, which could have burned off the escaping MIC, was not functional.^{4,5} Thus, the disaster was the result of a combination of a number of factors of negligence and poor operational procedures. Though the estimated number of persons who died immediately was around 2000, in the following years it is estimated to have killed >25,000 persons. In addition, at least 200,000 population who were exposed to the gas leak and survived are experiencing a wide variety of health problems and disabilities.

The major milestones in the legal responsibility were the passing of the Bhopal Gas Relief Act in 1985 and the settlement of government of India and the company for the 1-time compensation of \$470 million. However, the legal battles for the rights and relief to the survivors continued to occupy public space.⁶⁻⁸ In addition, the issues of the health damage to the population, legal liability of

the company and the continuing need of the affected population continued to be active issues in India and internationally.^{9,10} August 2012, Supreme Court judgment relating to health needs of the population is a milestone. This judgment both recognized the rights of the survivors and directed for implementation of specific measures to provide health care to the survivors.

The 30 anniversary, in December 2014, focused on all aspects of the disaster as reflected in the 13 part series of articles in the Statesman newspaper¹¹ covering deficiencies in response with regard to law, health, factory regulation, rehabilitation, compensation, and human rights.

MENTAL HEALTH RESEARCH

The Indian Council of Medical Research (ICMR) New Delhi, responded immediately to the disaster by giving importance to understand the health effects on a priority basis. The council brought together a large group of health researchers from different parts of India to study a wide variety of health effects-ranging from the immediate effects on the eye, the lungs, the gastrointestinal system, the gynecological problems and mental health effects. These research efforts were part of a larger national initiative to understand the various aspects of the Bhopal disaster on the people, the environment, and the legal aspects of the chemical industry.

Bhopal disaster is the first disaster in India to be studied systematically for the mental health effects. Earlier reports on the mental health impact of disasters were descriptive and related to the cyclones in Andhra Pradesh and circus tragedy in Bengaluru.¹² Rao and Zubair¹³ reported that the majority (77.5%) of the studied patients affected from cyclone in Andhra Pradesh were suffering from neurotic disorder. The mental health research of the Bhopal disaster can be considered under four periods of time.

First period (December 1984–February 1985)

The direct involvement of the psychiatrists/neurologists at the field level did not occur till about 8 weeks after the disaster. This delay was in spite of the recognition of the importance of mental health effects of the disaster within the first fortnight of the disaster. By coincidence, the Fourth Advisory Committee on Mental Health of ICMR was meeting on December 12–14, 1984. The experts in the meeting recognized the need of the affected population as follows:

"The recent developments at Bhopal involving the exposure of "normal" human beings to substances toxic to all the exposed and fatal to many, raises a number of mental health needs. The service needs and research can be viewed

both in the short-term and long-term perspectives. The acute needs are the understanding and provision of care for confusional states, reactive psychoses, anxiety-depression reactions and grief reactions. Long-term needs arise from the following areas, namely: (i) Psychological reactions to the acute and chronic disabilities, (ii) psychological problems of the exposed subjects, currently not affected, to the uncertainties of the future, (iii) effects of broken social units on children and adults, and (iv) psychological problems related to rehabilitation.”^[14]

However, in spite of this early recognition of the need for mental health interventions there was a delay of 8 weeks before mental health professionals were involved. An important reason for this was the absence of mental health professionals in the state of Madhya Pradesh and the city of Bhopal in 1984. At that point of time, none of the five medical colleges had a psychiatrist on the staff.

Second period (March 2015–1994)

During this period of 10 years, there were a large number of studies, both as part of the general health surveys and specific mental health studies.^[15-19]

As part of the general health studies, Andersson *et al.*^[20] reported the first community survey within 2 weeks of the disaster, in eight exposed areas and two nonexposed clusters of households with a 2 months follow-up. Though the focus of the survey was eye and lung problems, the study authors noted that the pupillary reflex was normal and they conclude “the fact that this reflex was normal in all groups cannot be taken as evidence that neurotoxicity did not occur.” Misra and Misra *et al.*^[21,22] report on 33 adult patients treated during the acute phase at the medical college hospital. They found that symptoms of severe cough and dyspnea were followed by fainting in 55% of the patients. The duration of unconsciousness ranged from 30 min to 3 days. One patient, who had suffered from prolonged unconsciousness, had myoclonic jerks localized to the right upper extremity and generalized hyperreflexia, suggestive of encephalopathy. Three patients who had prolonged unconsciousness and brisk deep tendon jerks and extensor plantar response. Mild to moderate headache (55%), giddiness (46%), burning sensation in hands and feet (9%) and hypoanesthesia (3%) were also reported. At the 3 months follow-up of this group of patients, depression and irritability were the commonly reported symptoms. Gupta *et al.*^[23] studied systematically 687 affected persons of various age groups and from different affected areas, 2 months after the disaster and another 592 persons after the 4 months period. These studies included “behavioral studies.” The behavioral studies were carried out in 350 adults.

“The gas exposed groups, especially the females had poor scores in the auditory memory tests. The exposed male group showed significant low visual memory as compared to controls and females.”

Cullinan *et al.*^[24] carried out an epidemiological study of a representative gas-exposed population, 9 years after the disaster, in January 1994. They studied 474 subjects and a control group. Of this sample, 76 were subjected to detailed neurological testing which included vestibular and peripheral sensory function and tests for short-term memory. In this study, a high proportion of subjects reported a wide variety of neuropsychiatric symptoms such as abnormal smell, abnormal taste, faintness, headache, difficulty to stay awake and abnormal balance. Headache was reported by 80% of the subjects when compared to 50% in the control population. Neurological examination showed that a high proportion was judged to have clinical evidence of central, peripheral or vestibular neurological disease. The mean short-term memory scores were lowest among those heavily exposed (1.0 vs. 3.0). There was some evidence of impaired extrapyramidal functions. There was also abnormal vertical drawing test among the exposed. In this group, the psychological symptoms reported were fatigue (88%), anxiety (65%), difficulty in concentration (64%). Difficulty in decision-making was reported in 80% as compared to 35% in the control population. Irritability was reported by 33% when compared to none in the control group. There was a consistent gradient across the separate exposure groups for all symptoms except depression. Approximately, 25% reported symptoms of depression.

Specific mental health studies started following the initial 1-week exploratory visit of, in the 1st week of February 1985, by Dr. Srinivasa Murthy, of the National Institute of Mental Health and NeuroSciences (NIMHANS), Bengaluru, and Professor Sethi, of K.G. Medical College (KGMC), Lucknow. The team visited Bhopal and examined the general population and patients attending the general health facilities. They also interacted with the medical personnel to understand the magnitude and nature of the mental health problems in the affected population. Their observations, following a week's work, were based on clinical and unstructured interviews. These initial observations led to an estimate of the magnitude of mental health needs of the population at 50% of those in the community and of about 20-30% of those attending medical facilities.^[25]

Immediately following these observations, during February-April 1985, a psychiatric team from KGMC, Lucknow carried out systematic studies. As a first step, 10 general medical clinics in the disaster-affected area

were chosen. A team consisting of a psychiatrist, a clinical psychologist, and a social worker visited one clinic a day, by rotation in a randomized fashion, on three occasions and screened all the newly registered adult patients with the help of a psychiatric screening questionnaire namely, self-reporting questionnaire (SRQ). Subjects identified as probable psychiatric patients were then evaluated in detail by the psychiatrist with the help of a standardized psychiatric interview, the Present State Examination (PSE). Clinical diagnosis was based on the International Classification of Diseases (9th revision) (ICD-9) (WHO, 1975). During a period of 3 months (February–May 1985), of the 855 patients screened at the 10 clinics, on the basis of their SRQ scores, 259 were identified as having a potential mental disorder. Of these potentially mentally ill people, 44 could not be evaluated, and 215 were assessed using the PSE. The confirmed number of psychiatric patients was 193, yielding a prevalence rate of 22.6%. Most of the patients were females (8.11%) under 45 years of age (74%). The main diagnostic categories were anxiety neurosis (25%), depressive neurosis (37%), adjustment reaction with prolonged depression (20%), and adjustment reaction with predominant disturbance of emotions (16%). Cases of psychosis were rare, and they were not related to the disaster.^[26]

During the same period, in the 3rd month of the postdisaster period, neurological studies were carried out.^[27] This was a survey of the gas-affected patients admitted to the various hospitals in the Bhopal city. A total of 129 adults and 47 children were studied for neurological problems. Evidence of involvement of the central nervous system was present in three patients in the form of stroke, encephalopathy and cerebellar ataxia. Involvement of the peripheral nervous system was observed in six patients. Vertigo and hearing loss occurred in four patients. Many patients reported transitory symptoms like loss of consciousness (50%), muscle weakness, tremors, vertigo, ataxia and easy fatigability. Most of these symptoms cleared up after varying periods of time. Of the 47 gas affected children, loss of consciousness at some time or other occurred in half of the patients. Fits occurred during the course of the illness in three children. Mental regression was observed in one child who had commenced speaking in sentences but stopped talking after the disaster. There were no abnormalities in the neurological examination in all of the children. An important observation by the doctors who had examined the children during the early phase of illness was generalized hypotonia and weakness. Two children were noted to be “floppy” with weakness of limb movements and had difficulty in getting up from the ground. Of the 3 patients who had central nervous system involvement, the patient with stroke died. His autopsy showed intense congestion and petechial hemorrhages

of the gray and white matter with frank hemorrhage in the circle of Willis area, perhaps indicating the sustained microvascular damage by the circulating MIC.

General population “longitudinal epidemiological study of mental health effects” was initiated by the ICMR, New Delhi.^[18] This was part of the total medical research involving the Bhopal gas affected population, the Bhopal Gas Disaster Research Centre. Two mental health studies and one training intervention were taken up, during 1985–1994 period. The objectives of the epidemiological study was to (i) Study the prevalence of psychiatric disorders in MIC exposed and nonexposed areas; (ii) study the factors associated with psychiatric disorders; (iii) study the course and outcome of disease in identified cases (at first survey) and (iv) carry out annual (2nd, 3rd, 4th and 5th year) prevalence surveys on independently drawn samples. Verghese *et al.*^[28] screening tool was used for initial screening, followed by psychiatrists/psychologists administering PSE to arrive at the diagnosis.^[29] A random sample of 700 families from each area, that is, severely exposed area, mildly exposed area and control area, were surveyed, for each rotational survey independently. The mental health item sheet of Verghese *et al.*^[28] was administered to the head of the family as well as information on the same schedule, regarding other adult member of the family (aged 16+) was collected. If any member of the family was rated positive on three or more items, that individual was further examined in detail. A semi-structured proforma regarding psychiatric history, personal history, premorbid personality etc., was also completed. Subjects diagnosed as having psychiatric problems were assessed using the PSE and they were referred to psychiatrist of Hamidia Hospital, Bhopal for further medical care. The prevalence rate of psychiatric morbidity was about 4 times higher in the exposed area in comparison to nonexposed area. The result showed that exposure to MIC gas was an important factor for the emergence of psychiatric disorders. Prevalence rate of psychiatric disorders was higher among those persons who were present in their houses in the night of gas leakage. The prevalence rate in the severely exposed area was 139.2/1000 and in the mildly exposed area 80.8/1000, whereas, in nonexposed area it was 26.8/1000. Similarly, the people, who were sleeping outside their houses, had higher prevalence rate of psychiatric morbidity (145.8/1000) in comparison to those people who were inside the house (108.5/1000).

Among the demographic variables income, was an important factor. It was observed that in the initial survey people belonging to lower income group (per capita income less than Rs. 50/-/month) had highest prevalence rate of psychiatric disorders (269.2/1000), whereas, prevalence rate in the middle-income group was comparatively lower (122.9/1000).

The psychiatric morbidity in relation to religion it was found that the prevalence rate was higher among the Muslim community in comparison to Hindus. The prevalence rate of psychiatric disorders during almost every rotational survey has been higher among Muslims than Hindus. This trend was also appeared in the nonexposed area. Prevalence of psychiatric disorders was higher in the females compared to males. The similar condition has been observed in exposed and nonexposed areas and also during the rotational surveys.

All the persons diagnosed with psychiatric disorders were yearly followed-up to ascertain, any change in the mental status of patients (whether the patient had a remission of symptoms for a period of at least 30 days since the initial evaluation? Treatment status and pattern of course?). There were 474 cases of psychiatric disorders identified during the initial survey. Among them 279 cases in the severely exposed area, 148 in the mildly exposed area and 47 in the nonexposed area. In the first follow-up, there were 230 patients actually followed-up, remaining 47 patients had either migrated or died. Majority of these patients (89.6%) were still in episode of illness. 3.9% patients were also in the episode of symptom, but they were not in a continuous state. About 6.5% patients were not in the episode of symptoms. Seven patients out of 230 were rated symptom-free. During first, second, third and fourth follow-up the percentage of patients in continuous illness were 89.6, 66.8, 56.8 and 47.4 respectively. On the other hand, rate of recovery gradually increased from 3.04% to 38.9%. Remission of symptoms were not present in the majority of patients during the first follow-up, and it gradually comes down in the fourth follow-up. It is interesting to mention here that the majority of patients (58.3%) took treatment for psychiatric disorders from the general physician during the first follow-up. Whereas 37.4% patients did not take treatment from any source at the time of follow-up. During second, third and fourth follow-up, it was 51.7%, 49.5%, 53.1% respectively. The rate of recovery also increased gradually in the mildly exposed area and in nonexposed area. In the mildly exposed area, it increases from 7.6% to 44.4% and in nonexposed area it is from 14.3% to 36.6%. Significantly point to note is the nearly half of the patients, continuing to be ill at the end of 5 years of follow-up.

A “pilot psychiatric study of children (0–15 years) affected by MIC in Bhopal,” with aim to compare the frequency and types of psychiatric disorders and intellectual levels of children (0–16 years) of 100 families (having at least one child between 0 and 16 years) randomly selected from one area severely affected by MIC in Bhopal and 100 families (having at least one child between 0 and 16 years) from the control area was carried out. The rate of psychiatric disorders in exposed area was 12.66% when compared to 2.4% in the control area.

Another activity of this period was the “training of medical officers in mental health care in the Bhopal city” to address the need for urgent mental health care in the city. One of the challenges faced by the team of psychiatrists was the provision of psychiatric services to the affected population. For a total population of 700,000 and the affected population of about 200,000, there was no psychiatric help available in the city. The basic aim of the training was to enhance the sensitivity of the medical officers to the emotional needs of individuals and to provide the skills to recognize, diagnose, treat and refer (when required) the mental health problems.^[30] The period of initial training was 6 working days. The training was practical utilizing case studies and group discussions, along with audio-visual, audio taped material of the affected population with maximum learner involvement. A manual was prepared for this training on the basis of experience of training on the basis of experience of training primary care physicians medical officers at NIMHANS, Bengaluru. The manual in its draft form was used for the training. A revised manual incorporating the experience of the training and the needs of the medical officers was prepared subsequently and distributed to all the doctors working with the gas affected population.^[14] The comments of the participants in the posttraining evaluation supported the usefulness of the training. Most of them felt that with the training, they were more capable of treating psychiatric illness and other patients having medical problems as well. Some doctors expressed that earlier, they used to give the patients only symptomatic treatment, but after the training they were able to think and diagnosed the condition in terms of a psychological approach. Some doctors mentioned that earlier to the training, they were not aware of any psychiatric problems and were of the opinion that the patients were malingering and giving vague symptoms to evoke a sympathetic response and get more medicines.

Third period (1995–2010)

This period was a period of limited mental health studies and mental health interventions. The important development of this period was the setting up of the Department of Psychiatry, as part of the Bhopal Memorial Hospital and Research Centre (BMHRC) in 2000, providing mental health care to survivors. One qualitative study of the mental health needs of the population was also carried out during this period.^[31] This study explored qualitatively the state of mental health of survivors in 2003 and the adequacy of mental health services provided to them. Twenty-six people suffering from various mental health needs were the subject of detailed interviews. The salient findings of this study were the following:

“Based on the interviews with victims (survivors) themselves, as well as with professionals, it highlights the

fact that despite the continuing suffering of the victims, no systematic effort has been made to tackle the mental health problems that were generated as an impact of the gas leak.”

Fourth period (2010–2014)

Following the court judgment of June 2010, and the high dissatisfaction expressed by the survivors, there was a revival of the health care and research. There was a higher level of compensation to survivor family members of the dead persons, to those with chronic kidney diseases and cancer diagnoses. The National Institute for Research in Environmental Health (NIREH) was set up in Bhopal. The mental health studies of NIREH, focused on understanding of the continuing mental health needs of the population and developing a training program and manual for training in mental health for the general medical officers of Bhopal.

The first effort was a follow-up assessment for the health status of the psychiatric patients of the 1985–1994 was completed that showed the chronicity of the mental disorders in the majority of the patients and the limited mental health care patients had received. In another study of treatment utilization of the psychiatric patients, cared for during 2010 at BMHRC. This analysis of the routine clinical records pointed to the limited utilization of the available mental health care, and the problems patients had in utilizing the services.^[32] The third effort, was with 500 families in one area, to understand the prevalence of mental disorders in 2012. This study was a two-stage screening for mental disorders and showed about 20% had potential mental disorders and the rates were much higher in those living in socioeconomically difficult life situations and with medical conditions.^[33] The fourth activity was to develop a mental health manual for the medical officers involving the psychiatrists of Bhopal city. The final activity, during this period, was to carry out five training programs of 3 days each (for groups of 6–15 medical officers) of the Gas Rahat Health Department and the doctors working in the mini units of BMHRC. A revised mental health manual to address the continuing mental health needs has been developed.

A striking positive development in the mental health care situation in the city, during the last three decades, have been the increase in the mental health professionals both in the Government and private sectors along with in-patient care facilities at Gandhi Medical College, All India Institute of Medical Sciences, Bhopal, all the three private medical colleges in the city, BMHRC, Bhopal, BEML and in the private sector.

Continuing mental health needs of the population, in 2014, are: (i) People with postdisaster anxiety-depression, posttraumatic stress disorder, adjustment disorder

conditions, directly related to the disaster of 1984; (ii) people with psychiatric disorders, attributable to the various life changes, family and occupational status, resulting directly (e.g., unemployment due to poor health condition) and indirectly (e.g., loss of head of the family in disaster) from the disaster experiences; (iii) people with chronic physical conditions like chronic obstructive pulmonary disease, diabetes, hypertension, cancer, with associated psychiatric disorders such as depression, adjustment disorders; and (iv) people with psychiatric disorders, not directly related to the disaster.

DISCUSSION

During the last three decades, in the country, there have been many positive developments in the area of disaster mental health. The most important is the way in which mental health care has become an essential part of the disaster interventions. Unlike in Bhopal, where mental health was thought of after 8 weeks, now the mental health team reach the disaster populations along with relief teams. The interventions developed during the Marathwada earthquake,^[34–36] (1993), the Orissa Supercyclone^[37,38] (1999), the Gujarat-Kutch earthquake^[39,40] (2001), the Gujarat riots^[41] (2002), tsunami^[42] (2004), Uttarakhand (2013) in terms of manuals, evaluation reports have been very important contributions.^[43–45]

The National Disaster Management Authority^[46] has outlined psycho-social care as follows:

“Psycho-social support in the context of disasters refers to comprehensive interventions aimed at addressing a wide range of psycho-social problems arising in the aftermath of a disaster. Psycho-social support and mental health services should be considered as a continuum of the interventions in disaster situations. Psycho-social support will comprise of general interventions related to the larger issues of relief work needs, social relationships and harmony to promote or protect psycho-social well-being of the survivors. Mental health services will comprise of interventions aimed at prevention or treatment of psychological symptoms or disorders. These interventions help individuals, families and groups to restore social cohesion and infrastructure along with maintaining their independence and dignity.”

The Bhopal disaster is of importance from mental health point for a number of reasons. First, it is one of the largest man-made disasters in a developing country. Second, the disaster effects were a combination of both the substances inhaled and the psychological effects of living through a disaster experience. Third, no formal mental health infrastructure was available to provide postdisaster mental

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health care. Fourthly, a number of innovative approaches were developed to provide mental health care, especially suitable for use in developing countries. Fifthly, this disaster was the subject of intensive health research in a prospective manner for the first 5 years. This research included mental health aspects of the disaster on the population.

During the last three decades, there have been many lapses in the assessment of disability, compensation provided (coverage, amount), and the rehabilitation activities, leaving majority of the population dissatisfied. There has been no continuous research to understand the changing morbidity, adequacy of the care provided and efficacy of the different interventions.

In the area of services, inadequacy of the programs to provide longitudinal mental health care to all people with mental disorders, not linking of primary health care with mental health care, lack of rehabilitation, no public mental health education, self-care, use of psycho-social interventions. Poor coordination with voluntary organizations has resulted in significant mistrust.

Looking back, it would have met the needs of the Bhopal population, if the mental health services were community based and reaching the population, rather than the clinic-based approaches, there was a wide range of services, especially rehabilitation, continuous research into the changing mental health needs of the population and the effectiveness of interventions and most importantly, there was a continuous dialog with the population and sharing of information with the general population. These are the tasks for the immediate future to reorganize the focus of mental health initiatives in Bhopal.

The following lessons can be drawn from the last three decades of mental health initiatives in Bhopal:

- Firstly, disaster is a risk to the surviving population as populations exposed to disasters develop higher rates of mental disorders
- Secondly, the disaster situation provides an opportunity to enhance the recognition of mental health needs of the population and stimulate mental health services
- Thirdly, there is a need for the full range of mental health care, both hospital-based care and community-based mental health care, with good linkages of the two for continuous, coordinated care
- Fourthly, there is a need for integrating mental health care as part of general medical care and specialist medical care
- Fifthly, the complex needs of the survivors of disasters require linkage of mental health care with other sectors like welfare, labor, law to meet the full needs of the

population

- Sixthly, there is a need for continuous dialog with the survivors, to both understand their perceptions and needs, as well as for wide use of “self-care” measures for mental health
- Seventhly, there is need for rebuilding of the community, towards strengthening of the community supports and minimize the polarization of the population by compensation, migration and thus decrease the community support to the chronically ill persons, the disabled, the elderly and other vulnerable groups
- Eighthly, there is a need for continuous research to understand the distribution of the psychiatric problems and to evaluate the effectiveness of the interventions.

CONCLUSION

Disasters are a challenge in every country, for the affected populations as well as the mental health professionals. However, they represent special challenges and opportunities in developing countries. Bhopal disaster is a milestone in understanding the mental health aspects of disasters. The research has shown the high physical and mental morbidity in the general population and the continuing need for longitudinal health studies. Using a public health approach in priority setting, identification of interventions and training of existing personnel, utilizing the community resources the needs of the population can be addressed. Such situations offer industrial psychiatry both challenges and opportunities for innovation.

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