

**A Preliminary Study of Psychological Aftereffects of Post-Traumatic Stress Disorder (PTSD) Caused by Earthquake:  
The Ahmedabad Experience**

**By**

*D. M. Pestonjee  
Satish C. Pandey*

**W.P.No.2001-04-01**

**April 2001**

11649

WP1649



WP

2001-04-01

(1649)

**The main objective of the working paper series of the IIMA is to help faculty members to test out their research findings at the pre-publication stage.**

**INDIAN INSTITUTE OF MANAGEMENT  
AHMEDABAD-380 015  
INDIA**

**A Preliminary Study of Psychological Aftereffects of Post-Traumatic Stress Disorder (PTSD) Caused by Earthquake:  
The Ahmedabad Experience**

**D. M. Pestonjee and Satish C. Pandey**

**ABSTRACT**

01

The present study is a preliminary study intended to investigate various psychological symptoms related to post-traumatic stress caused by an earthquake of severe magnitude. The main objective of this study was to investigate psychological symptoms, which appeared in earthquake-affected people's behavior. Because this study was a preliminary study, so, no hypothesis was tested in this case. Another objective of this study is to collect information about psychological symptoms that may be used in developing a psychometric tool to measure Post-traumatic Stress Disorder (Earthquake-specific). This study was conducted on a small sample of 54 people (Males = 34, Females = 20), selected by incidental sampling method. The age range of the sample varies from 18 to 62 yrs. (average age = approximately 35 yrs.). The sample includes students, professionals, employees of educational institution, doctors and older people, too. These people were interviewed by a semi-structured interview schedule, intended to explore their feelings after the earthquake experience. Most of the people included in this study were residents of single-storied to ten-storied buildings. Apart from interview, the findings of this study are also supported by the researcher's observation of people's verbal and non-verbal behavior, as observed during the interview process. The interviews conducted in this study varied from 10 to 30 minutes, depending upon the interviewees' cooperation to the researcher. The findings of this study has identified anxiety reactions, phobic reactions, hyperarousal, hypervigilance and overalertness, psychosomatic disorders related to nightmares, insomnia, loss of appetite, eating disorders, high or low B.P., shivering of various body parts and hypertension, depression, and frustration and anger, as major psychological aftereffects of earthquake-induced post-traumatic stress disorder. Being a qualitative research, the researchers advise to generalize findings of this study carefully.

---

Prof. D. M. Pestonjee, Professor (Organizational Behavior), Indian Institute of Management, Ahmedabad-380015

Dr. Satish C. Pandey, Faculty (Organizational Behavior & HR), Nirma Institute of Management, Ahmedabad-382481

For any information regarding this paper, please contact:  
E-mail: [satishpandey\\_99@yahoo.com](mailto:satishpandey_99@yahoo.com)

# A Preliminary Study of Psychological Aftereffects of Post-Traumatic Stress Disorder (PTSD) Caused by Earthquake: The Ahmedabad Experience

D. M. Pestonjee and Satish C. Pandey

## Introduction:

January 26, 2001, people of India were celebrating 52<sup>nd</sup> Republic Day. Some were watching TV, while some others were busy in their day-to-day activities. Time, morning 8.45 a.m., suddenly buildings start shaking and after few seconds, there was a different scene. Many buildings and houses collapsed, panic spread among people. After few minutes' people realized that many of them lost almost everything in that shaking experience.

This was one of the worst earthquakes of the country in India. People of Gujrat lost their family members, properties, business and many other things; the damage is unrecoverable. This earthquake shook the economy of not only Gujrat state but also that of the whole country. Besides, economic damages, this earthquake caused worst damage to the people of Gujrat, those who lost almost everything in this tragedy. We are not concerned here about loss of properties or loss of economy but loss of mental health of the people of Gujrat. The psychological damage caused by this one of worst earthquakes in centuries.

---

**Prof. D. M. Pestonjee** is Professor, Organizational Behavior Area at Indian Institute of Management, Ahmedabad-380015

**Dr. Satish C. Pandey** is Faculty, Organizational Behavior and HR Area at Nirma Institute of Management, Ahmedabad-382481

For any communication regarding this paper, please contact:

E-mail: [satishpandey\\_99@yahoo.com](mailto:satishpandey_99@yahoo.com)

There have been many studies conducted on post-traumatic stress symptoms and other psychological disorders caused by natural disasters such as floods, earthquakes, droughts and some man-made disasters such as bomb-blasts, fire accidents, aero-accidents and other events in US and other countries but very few studies have been conducted in India. As per the news published in a leading daily newspaper "The Economic Times", dated 5<sup>th</sup> February 2001, about 10 to 20 percent of the survivors of Gujrat earthquake are expected to develop several mental problems in the opinion of psychiatrists from NIMHANS, Bangalore. In case of Latur earthquake 1993, NIMHANS experts observed 10 to 20 percent of PTSD cases. The V.H.A.I. study conducted during the early post impact phases in five villages in Latur and Osmanabad areas, revealed that the survivors were suffering from post traumatic stress disorder (74%), major depression (89%), generalized anxiety disorder (42%) and panic disorder (28%).

**Post Traumatic Stress Disorder**, also known as **PTSD**, is an acquired mental condition that is manifested following a psychologically distressing event outside the range of usual human experience. This disorder presumes that the person experienced a traumatic event or events involving actual or threatened death or injury to themselves or others, and where they felt fear, helplessness, or horror. Symptoms of PTSD may be delayed, or may become evident at any time following the original trauma(s), including years after the incident.

The symptoms of PTSD include *intrusions*, such as flashbacks or nightmares, *avoidance*, where the person tries to reduce exposure to people or things that might bring on their intrusive symptoms, and *hyperarousal*, that is, signs of increased arousal, such as hypervigilance or jumpiness.

In practical terms, symptoms can include any combination of the following:

- Recurring nightmares about the event(s), including possibly intrusive memory flashbacks which may come in the form of strong emotion, audio memory, or visual memory, or a combination of these.
- Difficulty sleeping or changes in appetite.
- Feelings of anxiety and fear, especially when exposed to events or situations reminiscent of the trauma(s).
- Jumpiness, edginess, exaggerated startle reflex, or becoming overly alert.
- Depression, sadness, and lack of energy, spontaneous crying, sense of despair and hopelessness.
- Memory problems, including difficulty in remembering aspects of the trauma(s).
- Feeling "scattered" or "off center", and unable to focus on work or daily activities. Difficulty in making decisions or carrying out plans.
- Irritability, agitation, or feelings of anger and resentment.
- Feeling emotionally "numb," withdrawn, disconnected, or different from others.
- Overprotectiveness of loved ones, or fear for the safety of loved ones.
- Not being able to face certain aspects of the trauma, and avoiding activities, places, or even people that remind you of the event(s).

There are divergent opinions about the extent of post disaster psychological disorder (Perry & Lindel, 1987). Some are of the view that disasters represent catastrophic events producing adverse psychological reaction among most victims, while others suggest that

the extent of the problem has been overestimated, and that psychological problems due to the stressful event appear only among people with a pre-existing vulnerability.

The emotional response to disaster follows a predictable pattern over phases. The phases include: (i) evaluating damages, (ii) the heroic phase, (iii) the honeymoon, (iv) disillusionment and (v) reconstruction. These phases have been divided by considering specific characteristics over defined periods of time.

1. Evaluation of damages (few hours): characterized by apathy, disorientation, wandering, surprise, perplexity, fear, anxiety and helplessness.
2. Heroic phase (1-2 weeks): characterized by strong direct feeling, heroism, solidarity and optimism.
3. Honeymoon (2-24 weeks): characterized by great solidarity, eagerness to rebuild and sharing of common experiences.
4. Disillusionment (2 months - 2 years): characterized by withdrawal, loneliness, anger, frustration, community disorganization, negativity, hostility, impulsiveness, violence, alcohol and drug abuse.
5. Reconstruction phase (rest of life): characterized by acceptance of losses, realistic assessment of the situation and search for alternatives to rebuild lives.

The factors influencing psychosocial response involve three broad areas, viz:

**The disaster:** Occurrence, magnitude, suddenness & type.

**The community:** Level of preparedness, social support, leadership & past experience/s.

**The victims:** Age, level of education/exposure, marital status, physical health, personality, coping skills, losses & social support.

Scarcity of resources, inadequate intervention and lack of mental health support system worsen the psychosocial aftermath, which is a major concern in developing countries. The differences in culture patterns, social structures, and coping behaviors may reasonably modify the incidence, the severity, and the psychosocial outcome. Flynn (1997) particularly emphasizes the factors of nature of people, culture and society.

Perceived emotional support, perceived disruption and perceived benefit are three new dimensions that have attracted attention. In a study on family role, Solomon et al. (1993) found that perceived emotional support was found to be an important moderator of disaster's effect on psychiatric distress, generally overriding the effect of family role. Burnett et al. (1997) had emphasized the importance of perceived disruption as a major determinant and proposed a scale for its measurement. McMillen (1997) analyzed the importance of perceived benefit in post disaster phase and observed that perceived benefit moderated the effect of severity of disaster exposure on mental health diagnosis over time. Without perceived benefit, as exposure severity increased, the amount of recovery decreased. If benefit was perceived, as exposure severity increased, the amount of recovery increased. On comparison between three types of disasters he further observed that survivors of a tornado had the highest rates of perceived benefit, followed by survivors of a mass killing and survivors of a plane crash.

Analysis of specific disorders following disaster reveals occurrence of the following morbid conditions in general - PTSD (Post Traumatic Stress Disorder), grief, depression, anxiety & alcohol and substance abuse.

Early classical descriptions portray a stunned, dazed individual with apparently disengaged behavior as "disaster syndrome" occurring in 25% (Freiderick, 1981) to 75% (Duffy, 1988) of victims. According to Raphael (1986) psychological morbidity tends to affect nearly 30-40% of the disaster population within the first year following it. At two years, levels are generally less but with persistent level of morbidity that seems to become chronic for some individuals and for some disasters. Disasters that are man-made and with high shock and destruction show persisting levels of severe impairment.

PTSD following disasters has been worked upon by a number of workers. The proportion of PTSD among disaster has been observed to be 34.3% following 1995 Oklahoma terrorist bombing (North et al., 1999) and 18.5% following Tangsham quake (Benz & Hexiang, 1999). PTSD has also been reported following 1995 Hanshin-Awaji quake (Irie, 1996), Exxon Valder Oil Spill (Palinkas et al., 1993), Armenian earthquake among children (Miller et al., 1993) and among survivors of mass shooting (North et al., 1997).

Grief is an obviously expected condition after disaster. There may be grief for the loss of loved ones, home, treasured possessions, livelihood or even the community one belonged to. The severity of the emotional reactions of grief includes sadness, distress, anger, longing and yearning for what has been lost.

Alcohol or substance abuse forms another important psychiatric problem. A high incidence of abuse associated with criminal violence as well as stress disorder, and other mental disorders among the vulnerable. Relapse of chronic mental disorder due to discontinuation of maintenance treatment or non-availability of medicines is also an important aspect deserving due consideration.



Psychopathological aftermath of three other types of disasters is worth being mentioned, i.e. Tadjikistan following collapse of USSR (Veeken, 1998), Kurdistan during war (Bailly, 1996) and war-trauma following 1991-95 Yugoslav-War. The commonality is that all three were political events jeopardizing a nation as a whole and pushing the people into a disaster like condition. The psychopathological profile also resembles those of disasters. Hence such conditions warrant similar crisis intervention programs.

These problems do not present necessarily as individual cases to be treated. Adverse social conditions like social withdrawal, diminished resources and opportunities, increased criminal behavior, unrest, increased number of orphans and widows further complicate the issue. Increased widowhood deserves special attention especially in Indian set up, as they are not usually earners.

Psychological trauma "occurs when an individual is exposed to an overwhelming event that renders him or her helpless in the face of intolerable danger, anxiety, and instinctual arousal" (Eth & Pynoos, 1985, p. 90). This definition is similar to that used by van der Kolk (1987a), who considered psychological traumas to be those life experiences that "overwhelm both psychological and biological coping mechanisms" (p. xii). Psychologically traumatizing events experienced by children and adolescents examined in the literature include war or disasters, loss of loved ones or an aspect of one's self, and receiving or witnessing abuse or violence.

Several researchers have cautioned that PTSD as it applies to adults may not be applicable to children (Finklehor, 1990; Pynoos & Nader, 1988), or that PTSD is being overapplied to all survivors of all stressful events (Terr, 1988). The arguments center on differences observed in children's and adults' behaviors or emotions following various

traumas. There is agreement, however, that further refinement of theory and models will greatly aid researchers and clinicians in understanding children's responses to traumatic occurrences (Finklehor, 1990; Terr, 1988), and the PTSD model deserves careful consideration

The effects of trauma are organized in the following sections: cognitive, affective, behavioral, and somatic-physiological. It is acknowledged that many of the effects logically could fall under two or more categories. Findings that meet the DSM-III-R (American Psychiatric Association, 1987) criteria for PTSD are noted in each summary section, as well as effects noted in the literature that are not currently part of the PTSD criteria.

Van der Kolk (1988) stated that trauma affects both the psyche and the soma and that most PTSD symptoms are caused by physiological and neurochemical changes. According to van der Kolk (1987b), traumatized people fear "going into their heads" to work through the memories, fears, terror, or effects of the traumatic event, and therefore, must "go into their bodies" as a means of warding off the unpleasant sensations. This results in numerous somatized presentations that have been triggered by profound alterations of physiological or neurochemical changes in the brain (van der Kolk, 1984).

To assess the mental health impact of earthquakes, Durkin (1993) surveyed 288 Coalinga, California households following the May 2, 1983 event, and 116 households in a large housing project in Santiago, Chile, after the March 3rd, 1985 earthquake. This paper presents the post-earthquake prevalence of major depression, PTSD and their symptoms among residents of these two communities. It compares these rates to an

study are also supported by the researcher's observation of people's verbal and non-verbal behavior, as observed during the interview process. The interviews conducted in his study varied from 10 to 30 minutes, depending upon the interviewee's cooperation to the researcher.

### **Psychological Symptoms as Aftereffects of Post-Traumatic Stress Caused by an Earthquake:**

On the basis of verbal responses of different people during interview sessions, the researcher has identified several psychological symptoms developed in people's behavior as aftereffects of the earthquake.

For many people, especially children and youth, this was first traumatic experience of their life. Many of them could not realize first time what was happening to them. But, later, people of all age groups, were highly anxious about their future, especially, when they knew that many multistoried buildings have collapsed in Ahmedabad. Some children started crying whenever they experienced aftershocks. People of all age groups developed a tendency to rush to open spaces or ground floor whenever they experienced aftershocks. Even after 20 days of the earthquake, many people were not ready to sleep in their flats or houses. This fear psychosis was observed in a very high intensity, in the behavior of residents of multi-storied buildings. Many nights, people slept in their cars or under the open sky in winter nights. Later, people arranged for tents and started to sleep in tents. Many people were in their flats when the first earthquake rocked in the morning of 26<sup>th</sup> January 2001. These people told the researcher that every time whenever they approached any multi-storied building or tower, they felt shaking experience and sometimes they experienced illusion that the building is shaking or it is inclined to one-

side, or it may fall at any time over them. Many of them complained about high B.P., loss of sleep, loss of appetite, weakened digestive system, hypertension, feeling giddy always, ringing ears and always experiencing vibrations under their feet. Many people who had seen collapse of buildings before their eyes, always complained about shivering symptoms, feeling giddy and ringing ears. Parents reported that their children were very scared about earthquake, many of them reported nightmares related to earthquakes, crying in nights, fear from darkness and being alone, disturbed eating habits and loss of interest in playing and other activities. People of all age groups reported about their frequent nightmares about falling buildings and rocking earthquakes. People who had flats or houses near main roads, reported to the researcher about their illusion of tremors during nights with aftershocks. People were so confused that they were unable to identify tremors from vibrations caused by a moving heavy vehicle on the road. The intensity of these symptoms was very high in the behavior of those people who were in their high-rise flats during the earthquake. The intensity of symptoms was observed very high in the behavior of people who were on higher floors in multi-storied buildings. People who were in their single-storied houses, bungalows and small houses, reported less intensity of post-traumatic stress symptoms.

Regarding the group of older people, the researcher observed that older people also developed high anxiety, fear and other symptoms but many of them reported that whenever they experienced aftershock, they started to recite religious chants to cope with their stress. For older people, as they reported, the major cause of worry for them was the future of the next generation. But, on the other hand, the young generation people were also worried about their older parents because of their aging problems and other age-

related health problems. Older people cannot move fast or step down fast from stairs; so, people living in multi-storied buildings were looking very anxious about the safety of older people in their locality. In Gujrati community, still many families are living under joint family system, so people immediately came to help each other. People started to live together with their relatives, neighbors and friends to feel safe. This type of community-focused helping approach helped many families to fight with post-traumatic stress together. One another thing, the researcher observed that amongst many groups, earthquake was the only topic of discussion all the times. Perhaps, that might be a coping strategy adopted by people to cope with their stress. By sharing their thoughts and feelings with others, people lessened their post-traumatic stress.

Many people reported that they had developed a tendency to experience or feel mild tremors frequently; sometimes they also felt that this might be their illusion, but they were very scared about it. This symptom was reported by the people who were residents of high-rise buildings. Students reported that many of them were not able to concentrate on studies because of fear of tremors. Loss of good night sleep was one major aftereffect of this earthquake. One person, who was working as medical representative for a leading pharma company, reported that after this earthquake, sale of sleeping pills and tranquilizers has increased in Ahmedabad market. Dr. Hitendra Gandhi, a practicing psychiatrist of Ahmedabad, with whom the researcher conducted a formal interview, mentioned that high anxiety was first major symptom identified in most of persons, followed by fear psychosis, hyperarousal, hypervigilance and overalertness to any type of stimuli. He also mentioned that after 2-3 months, cases of depression are likely to

increase significantly, because after 2-3 months, for most of the people, life would be normalized and support groups would be away from the scene. At that time, most of the people are likely to develop feelings of loneliness, hopelessness and depressive symptoms. He also advised that parents should take care of their children because any psychological disorder developed at this stage, is likely to affect their personality seriously. These children may develop dependency syndrome, phobia of heights, closed places and moving objects, neurotic disorders and prolonged depression in the longer run. Children should be treated with love and care, and healthy coping behaviors should be developed in them through proper guidance from parents and teachers.

As per a report mentioned in an Indian magazine "India Today", issue 12 February 2001, "Studies done in Latur reveal that the magnitude of psychological damage in people is directly proportional to the extent of devastation and casualties in their area. A psychological study of 2,152 individuals in the earthquake-affected area in Latur, found 40 percent of them had turned suicidal, and over 60 percent suffered from post-traumatic stress disorder. There were cases of families avoiding meals together as they didn't want to face each other, or talk about deaths within the family. Then, of course, there is dilemma that hampered people from getting back to routine life." (Unnithan, Sandeep 2001).

In an interview of Prof. James W. Pennebaker at University of Texas, Austin, by Dennis King, published in Journal of Counseling & Development, Summer98; some issues had

been raised by Prof. Pennebaker regarding the PTSD caused by earthquake amongst different group. Some excerpts are given below:

*"JP: Others have talked about the psychological stages of trauma or grief, and they are good rough guidelines. I have become interested in the social stages of trauma. In looking at traumatic experiences, such as the death of a spouse or living through an earthquake or a war, we have found that three very clear changes emerge. In the early stage, people seem to be drawn together. Later they tend to avoid each other, and, finally, things return to normal. For instance, in the San Francisco earthquake or the Persian Gulf War, the first 2 or 3 weeks after the trauma, people talked about these events with a high degree of intensity, and literally lived with the events. Complete strangers often talked with each other, and there was a feeling that you had something in common with every other member of the culture.*

*About 3 weeks after the events, people stopped talking about them. They continued to think about them, but they stopped talking about them. When interviewed, they said that, although they still wanted to tell their story, they had gotten tired of hearing about other people and their stories. This phase, which I have called the inhibition stage, where people want to talk but cannot, lasts 6 to 8 weeks. In studies of several hundred people, we discovered that during the inhibition phase, people experience increased dream activity about the traumatic events and increased conflict with coworkers and spouses. Writing about the events seems to help during this phase. In the last phase of trauma, there is a return to normal behavior.*

*In most situations, after a traumatic event, mental health professionals rush in to help during the first few days after the crisis when people need them the least. I am not saying that early help from mental health professionals is not very beneficial. Rather, many of these things go on naturally. During that phase of trauma, people are talking to each other and supporting each other. The time when mental health professionals are really needed would be 3 to 11 weeks after the disaster, when victims' friends and the media people leave, and all the newspapers are bored with covering it.*

*According to Pennebaker, counselors involved in crisis intervention are needed not only in the immediate wake of the crisis but, more crucially, during the 3 to 11 weeks after the crisis. It is during this inhibition stage that social support tends to evaporate and stressing or destructive responses tend to appear. Pennebaker believes that writing is beneficial to survivors during this stage; talking out one's deepest feelings and thoughts about the crisis may be equally helpful, a matter for future researchers to explore."*

In this study, the researchers found that many findings of Prof. Pennebaker are found valid in case of Ahmedabad people. However, at the time (Feb-March 2001), when this paper was being written, we can call that phase as "Honeymoon Phase", where people show great solidarity and willingness to rebuild their world themselves. But, with the start of summer (from April 2001), when climate of Gujrat will be very hot, the "Disillusionment Phase" may create serious depressive symptoms amongst people. This will be a very difficult time when reconstruction of houses and other infrastructural facilities will be a real challenge for government and non-government bodies, working for the rehabilitation of earthquake victims. At that time, water and electricity shortage



post-traumatic reactions in children may reach epidemic proportions, remain high for a prolonged period, and jeopardize the well-being of the child population of a large region. Systematic screening of children for PTSD can provide critical information for a rational public mental health program after such a disaster. (Pynoos et al, 1993)

### **The Study:**

The present study is a preliminary study intended to investigate various psychological symptoms related to post-traumatic stress caused by an earthquake. The main objective of this study was to investigate psychological symptoms, which appeared in earthquake-affected people's behavior. Because, this study was a preliminary study, so, no hypothesis was tested in this case. Another objective of this study is to collect information about psychological symptoms that may be used in developing a psychometric tool to measure Post-traumatic Stress Disorder (Earthquake-specific). This study was conducted on a small sample of 54 people (Males = 34, Females = 20), selected by incidental sampling method. The age range of the sample varies from 18 to 62 yrs. (average age = approximately 35 yrs.). The sample includes students, professionals, employees of an educational institute, doctors and older people, too. These people were interviewed by a semi-structured interview schedule, intended to explore their feelings after the earthquake experience. Most of the people included in this study were residents of single-storied to ten-storied buildings. Some of those buildings, were damaged seriously in that earthquake and declared "unsafe to live" by Ahmedabad Urban Development Authority (AUDA), whereas, some of them were declared "safe to live" after investigating the condition of buildings. Apart from interview, the findings of this

unexposed reference population in Los Angeles, California. It was found that unweighted prevalence rates of major depression among the Chile sample were the same as the Coalinga sample but at least 2.7 times the background rate for the, unexposed, Los Angeles sample. In addition, while the Coalinga PTSD rate was only slightly higher than the LA background rate, the Chile PTSD rate was seven times the rate for both the Coalinga earthquake and the LA, non-earthquake, samples. The depression and PTSD symptom rates were significantly higher for Chile than for Coalinga. The results suggest that, in the absence of major building collapses, the need for immediate mental health services may eclipse the demand for other forms of emergency services. Mental health workers must employ community outreach programs and local physicians should be prepared to deal with psychiatric disorders.

One and half years after the devastating earthquake in Armenia in 1988, 231 children from three cities at increasing distances from the epicenter were randomly screened in their schools to determine the frequency and severity of post-traumatic stress reactions, using the Children's Post-traumatic Stress Disorder Reaction Index (CPTSD-RI). A systematic clinical assessment of PTSD based on DSM-III-R criteria was also conducted on approximately half of this sample. A high CPTSD-RI score was strongly correlated with a clinical diagnosis of PTSD. A strong positive correlation was found between proximity to the epicenter and overall severity of post-traumatic stress reaction, as well as severity of core component symptoms of PTSD. High rates of chronic, severe post-traumatic stress reactions were found among children in the two most damaged cities, Spitak and Gumri. Analyses controlling for exposure revealed that girls reported more persistent fears than boys. These findings indicate that after catastrophic natural disaster,

problems will make rehabilitation work more difficult. This may aggravate frustration and depression amongst earthquake victims. This is the time when people need psychological help to cope with PTSD. Otherwise, at this stage, frustration and anger of people may create civic problems for the government and society. As per Prof. Pennebaker's findings, this inhibition stage is very crucial from the mental health rehabilitation point of view. During this inhibition stage, post-traumatic stress, frustration, anger and depression are likely to increase among earthquake victims.

On the basis of the above discussion, we can identify some psychological symptoms, which may be considered very important for development of a psychometric tool for measuring post-traumatic stress disorder (PTSD-earthquake specific).

- Anxiety Reactions
- Phobic Reactions
- Hyperarousal, hypervigilance and overalertness
- Psychosomatic Disorders related to nightmares, insomnia, loss of appetite, eating disorders, high or low B.P., shivering of various body parts and hypertension.
- Depression
- Frustration and anger

These symptoms in different combinations may appear at different stages of PTSD, but to test this phenomenon validly, there is a need for developing a psychometric tool, which may be helpful to measure severity of these symptoms in the behavior of PTSD-affected people. This study is a humble effort in this direction.

## Limitations of the Present Study:

1. Most of the participants of this study belonged to a specific group of society, (the middle-class families living in multi-storied buildings), and, the sample for this study was incidental by nature. The sample does not include people from poor and weaker sections of the society.
2. In this study, researchers could not contact any person who survived his/her life after being crushed in debris. So, these symptoms are applicable to people who are moderately affected by this earthquake. In case of surviving from death-like situation, many other psychotic, neurotic and psychosomatic disorders are likely to be developed in the survivor's personality. Until we conduct an in-depth study of such survivors, it would be very dangerous to generalize anything from the findings of this study. However, in this study, a few cases had lost their houses in this earthquake, and some of them could not enter in their buildings because their buildings were not declared as "safe shelter to live".
3. The findings of this study are based on the analysis of observations and verbal responses of the people who could be contacted incidentally within a period of one month after the earthquake. These verbal reports are reflections of victims' mental state at the time of interview. But, this information may be very useful to develop a tool for the measurement of PTSD.
4. The nature of this study is qualitative rather than quantitative, but reveals many facets of relevant information related to post-psychological effects of an earthquake disaster.

5. The sample of this study is very small and incidental by nature. A study based on questionnaire survey, followed by in-depth interviews of affected people may throw more light on some other hidden aspects of PTSD.

### **Conclusion:**

However, there have been many studies conducted on PTSD in US and other countries and in India, a study in Latur was conducted by NIMHANS team from Bangalore. But, in case of Gujrat experience, (The Ahmedabad experience as per the scope of this study), situation is quite different. This earthquake not only damaged cities and villages but also it shattered the economy and social strength of the state. In Ahmedabad, maximum damage was caused by poorly constructed multi-storied buildings, which put a serious question of exploding cities and weakening societies in our country. However, the main objective of this study was to collect information to identify post-traumatic psychological aftereffects of this earthquake on the behavior of people. Another important aspect of this study is that this is only an exploratory study, that too, in the context of Ahmedabad city. Much damage happened in Kutchh and Saurashtra regions, and rural people are the worst victims. Things are expected to become worst with the beginning of summer in Gujrat, when rehabilitation work may go slow because of hot weather. All these factors may aggravate PTSD symptoms amongst different sections of earthquake victims. Now, there is an urgent need to provide food, shelter, water, medicines and other basic amenities to victims but also a social and psychological support to rebuild their self-confidence and self-esteem, and mental health. This study is just a humble effort in this direction. However, in Ahmedabad, Gujrat Psychiatric Society started individual and group

counseling sessions for earthquake victims at various places, with the help of social workers, doctors and other NGOs, which may be called as "Crisis Intervention" but definitely there is a strong need to go for long-term psychological rehabilitation plan for earthquake victims of Gujrat. With our earlier experiences of Latur study, more effective psychological rehabilitation plan can be developed for Gujrat earthquake victims.

### **References:**

Armsworth, Mary W., Holaday, Margot: The effects of psychological trauma on children and adolescents. Journal of Counseling & Development, Sep/Oct93, Vol. 72 Issue 1, p49, 8p.

Bailey, L. (1996) Population wide sequelae of trauma : The example of Iraqi Kurdistan, JEUR, 9, 4, 161-164.

Benz, G., Xueyi, W. & Hexiang, S. (1999) A study of the prevalence of post traumatic stress disorder after a violent earthquake in Tangshan. Chinese Journal of Psychiatry, 32, 2, 106-108.

Burnett, K., Ironson, G., Benight, C., Wynings, C., Greenwood, D., Craver, C.S.,

Cruess, D., Baum, A. & Schneiderman, N. (1997) Measurement of perceived disruption during rebuilding following Hurricane Andrew. Journal of Traumatic Stress, 10, 4, 673-681.

Duffy, J.C. (1988) Common Psychological themes in societies' reaction to terrorism and disasters. Military Medicine, 153, 387-390.

Durkin, Michael E. Major depression and post-traumatic stress disorder following the Coalinga and Chile earthquakes: a cross-cultural comparison. Journal of Social Behavior and Personality (ISSN: 0886-1641), v. 8, no. 5, pp. 405-420 (1993).

Eth, S., & Pynoos, R. S. (Eds.). (1985). Post traumatic stress disorder in children. Washington, DC: American Psychiatric Press.

Finklehor, D. (1987). The trauma of child sexual abuse: Two models. Journal of Interpersonal Violence, 2(4), 348-366.

Finklehor, D. (1990). Early and long-term effects of child sexual abuse: An update. Professional Psychology: Research and Practice, 21, 325-330.

Frederic, C.J. (1981) Violence and disasters : immediate and long term consequence. In : Helping Victims of Violence. Proceeding of WHO working group on the Psychosocial Consequences of Violence. The Hague, 6-10, 32-46.

Irie, M. (1996) A case of post traumatic stress disorder caused by Hanshin-Awaji Great Earthquake disaster in 1995. Japanese Journal of Psychosomatic Medicine, 36, 8, 697-701.

King, Dennis J.; Holden, Janice Miner: Disclosure of trauma and psychosomatic health: An interview with James W. Pennebaker. Journal of Counseling & Development, Summer 98, Vol. 76 Issue 3, p358, 6p, 1bw.

McMillen, J.C., Smith, E.M. & Fisher, R.H. (1997) Perceived benefit and mental health after three types of disaster. Journal of Consulting and Clinical Psychology, 65, 5, 733-739.

North, C.S., Nixon, S.J., Shariat, S., Mallonee, S., McMillen, J.C., Spitznagel, E.L. &

- Smith, E.N. (1999) Psychiatric disorders among survivors of the Oklahoma city bombing. Journal of the American Medical Association, 25, 282, 8, 755-762.
- North, C.S., Smith, E.N. & Spitznagel, E.L. (1997) One year follow up of survivors of a mass shooting. American Journal of Psychiatry, 151, 12, 1696-1702.
- Palinkas, L.A., Petterson, J.S., Russel, J. & Downs, M.A. (1993) Community patterns of psychiatric disorders after Exxon Valdez oil Spill. American Journal of Psychiatry, 150, 10, 1517-1523.
- Perry, R.W. & Lindell, M.K. (1978) The psychological consequences of natural disaster: A review of research on American Communities. Mass Emergencies, 3, 105-115.
- Pynoos, R. S., & Nader, K. (1988, October). Responding to children traumatized in the school setting: A workshop for service providers (teachers, school psychologists, school counselors, administrators, and mental health professionals). Paper presented at the fourth annual meeting of The Society for Traumatic Stress Studies, Dallas, TX.
- Pynoos, Robert S; Goenjian, Armen K; Tashjian, Madeline; Karakashian, Meline; Manjikian, Raffi; Manoukian, Gagik; Steinberg, Alan M; Fairbanks, Lynn A. Post-traumatic stress reactions in children after the 1988 Armenian earthquake. British Journal of Psychiatry (ISSN: 0007-1250), v. 163, pp. 239-247 (August 1993).
- Shetty, H. (1997): Marathawada Earthquake. In NIMHANS Proceedings of National Workshop on Psychosocial consequences of disasters, Bangalore.
- Soloman, S.D., Bravo, M., Rubio Stipee, M. & Cavino, G. (1993) Effect of family role on response to disaster. Journal of Trauma & Stress, 6, 2, 255-269.



Terr, L. C. (1988, October). An overview of psychic trauma in children. Presented at the fifth International Conference on Multiple Personality/Dissociative States, Chicago, IL

Unnithan, Sandeep (2001). "Latur: Still Shaken", India Today, Issue Feb. 21, 2001.

Van der Kolk, B. A. (1984). Post traumatic stress disorder: Psychological and biological sequelae. Washington, DC: American Psychiatric Press.

Van der Kolk, B. A. (Ed.). (1987a). Psychological trauma Washington, DC: American Psychiatric Press.

Van der Kolk B. A. (1987b, November). The human response to overwhelming trauma through the life cycle. Paper presented at the fourth International Conference on Multiple Personality/Dissoactive States, Chicago, IL.

Van der Kolk, B. A. (1988). The trauma spectrum: The interaction of biological and social events in the genesis of the trauma response. Journal of Traumatic Stress, 1, 273-290.

Veeken, H. (1998) Tadzjikistan, no money, no medical care. Netherlands : Tijdschrift Voor Geneeskunde, May 2, 142, 18, 1036-1039.

### News Items:

"Earthquake Phobia Grips Amdavadis" – The Times of India, Ahmedabad ed., dated 4 February 2001.

"Mental Scars of Quake May Take Years to Heal"- The Economic Times, Ahmedabad ed., dated 5<sup>th</sup> February 2001.

"Quake Trauma Writ Large on Children's Faces"- The Times of India, Ahmedabad ed., dated 8<sup>th</sup> February 2001.

\*\*\*\*\*