Chapter VII

Summary and Conclusion

On Sunday, 26 December 2004 at 00:58:53 UTC, a great earthquake with a moment magnitude of 9.0 or possibly greater (Stein and Okal, 2005) nucleated 250 km southwest of the north tip of Sumatra, Indonesia. A large tsunami was generated and severely damaged coastal communities in countries along the Indian Ocean, including Indonesia, Thailand, Sri Lanka, India, Maldives, and Somalia (Synolakis and Kong, 2006; Synolakis and Okal, 2005) where distances of more than 6000 km, which correspond to wave travel time up to 8 hrs.

The 2004 Indian Ocean tsunami hit the Indian mainland roughly two hours after the earthquake. The waves completely leveled villages and devasted cities along the southeastern coast, resulting in over 9000 deaths. The vast majority of casualties came from the state of Tamil Nadu. Eighty percent of the people who were affected by the tsunami came from fishing communities and over 50,000 fishing vessels were damaged by the waves. Nagapattinam district was the worst hit region of Tamil Nadu, accounting for over half of the deaths from the tsunami on the Indian mainland.

Disaster such as the tsunami can have a devastating impact on the psychological and social well-being of anyone exposed to them. Disasters threaten personal safety, overwhelm defense mechanisms, and disrupt community and family structures. Children and adolescents are more vulnerable than adults to the traumatic events of disasters. The symptoms of PTSD can severely affect the behaviour and emotions of children and adolescents, leading to many problems such
as repetitive behaviour, intrusive thoughts and flashbacks of trauma, sleep disturbances, nightmares, anger, separation anxiety, and memory and concentration problems (Perrin, Smith & Yule, 2000). Adolescents are vulnerable to development of serious mental health problems, immediately and over a period of years. To our knowledge, very few studies in India have been published regarding the long term psychosocial impacts in adolescents. An assessment to such problems is essential to estimate the need for long term mental health services, to identify those at highest risk for mental health problems, and to design & implement appropriate mental health intervention for future rehabilitation. With this above said background the study aims to find the long term psychosocial impact among adolescences in tsunami-affected provinces in southern Tamil Nadu.

Aim

The main aim of this present study was to investigate long term psychosocial impacts among the survived adolescences and to develop the psychosocial interventions to reduce the effect of psychosocial problems present among the adolescence in tsunami-affected provinces in southern Tamil Nadu.

Statement of the Problem

1. Whether the survived adolescence would have long term psychosocial impacts after the Indian Ocean tsunami2004?

2. Whether the psychosocial interventions reduce the effect of psychosocial problems present among the adolescence in tsunami-affected provinces in southern Tamil Nadu?
Objectives of the study

1. To find the level of Post-traumatic Stress Disorder (PTSD) among survived adolescences at six years after tsunami disaster.

2. To find the level of depression among survived adolescences at six years after tsunami disaster.

3. To find the level of anxiety among survived adolescences at six years after tsunami disaster.

4. To find the level of self-esteem among survived adolescences at six years after tsunami disaster.

5. To find the level of behavioral problems among survived adolescences at six years after tsunami disaster.

6. To find the effectiveness of the psychosocial intervention program among the survived adolescents.

7. To use the empirical data with a representation of spatial technology with an implication for policies (GIS).

Hypotheses

1. Adolescents survived post-tsunami 2004 would have PTSD in comparison to adolescents not affected by tsunami.

2. Adolescents survived post-tsunami 2004 would have depression in comparison to adolescents not affected by tsunami.
3. Adolescents survived post-tsunami 2004 would have anxiety in comparison to adolescents not affected by tsunami.

4. Adolescents survived post-tsunami 2004 would have poor self-esteem in comparison to adolescents not affected by tsunami.

5. Adolescents survived post-tsunami 2004 would have behavioral problems in comparison to adolescents not affected by tsunami.

6. Intervention program would reduce the psychosocial problems in the experimental group compared to control group.

**Method of Investigation**

This present study was conducted in two phases. Among the survived adolescents, the researcher conducted a Focus Group Discussion (Qualitative research method) and a survey (Quantitative research method) to identify the long-term psychosocial impacts in phase I of the study. In Phase II, the researcher developed and conducted an intervention program to reduce the long term psychosocial effects in the survived adolescents.

**Method of Investigation – Phase I**

**Research Design – Phase I - Qualitative and Quantitative Method**

The first phase of the study was expost-facto in nature using focus group discussion (Qualitative) and survey (Quantitative) method.
Sample Design - Phase I

The samples were selected using purposive sampling design from the tsunami affected provinces in Chennai and Nagapattinam district.

Sample Procedure – Phase I

The samples of the study are those who met the inclusion criteria listed below, were selected from the tsunami affected provinces in and around Chennai and Nagapattinam areas, Tamil Nadu. Permission was obtained from the schools and NGO’s to conduct the study and the procedure to be followed while conducting the study was explained to them both orally and in written form. Written consent was obtained from the samples selected for the study.

Sample description – Phase I

Around 852 samples were selected from tsunami affected provinces in Chennai (northern part) and Nagapattinam areas. Out of that, 796 samples completed the survey. They comprised of 456 tsunami affected adolescence and 340 not affected adolescence for comparison. The samples age range from 14-18 years with mean age of 15.4 years. Participants were selected from Standard IX to XII and most of them stay with their parents, and few of them stay with their relatives and in NGO’s and all the participants were from the low socio economic background.

Inclusion criteria – Phase I

- Adolescents between the age group of 14 to 18.
- Adolescents affected (life loss or property loss) by tsunami 2004.
- Socio-economic status matched.
Adolescents staying near sea shores.
• Fishing community only
• Adolescents studying from standard 9 to +2.

**Exclusion criteria – Phase I**

• History of physical disability
• History of mental disability
• Adolescents who didn’t go to school.
• Adolescents below 14years and above 18years.
• High and middle class status.

The following standardized tools were used to assess the long term psychosocial problems in the adolescents.

**Table 7.1 Tools used to measure psychosocial aspects**

<table>
<thead>
<tr>
<th>S.No</th>
<th>Name of the Tool</th>
<th>Authors</th>
<th>Variable Measured</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Personal data sheet</td>
<td>-</td>
<td>Sociodemographic informations</td>
</tr>
<tr>
<td>5.</td>
<td>Rosenberg Self-esteem Scale (RSE)</td>
<td>Morris Rosenberg (1965)</td>
<td>Self-esteem</td>
</tr>
</tbody>
</table>
Table 7.2 Tools used to Measure Geological aspects

<table>
<thead>
<tr>
<th>S.No</th>
<th>Name of the Tool</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Global Positioning System (GPS)</td>
<td>a space-based global navigation satellite system (GNSS) that provides location and time information in all weather, anywhere on or near the Earth. In this study, GPS is used to find the location of the samples selected for the study.</td>
</tr>
<tr>
<td>2.</td>
<td>Geographic Information System (GIS)</td>
<td>Geographic Information Systems (GIS) are computer tools used for presentation, description and analysis of spatial data (Price, 2010). GIS software is quickly becoming more powerful, accessible and widely available (Unwin, 1996; Price, 2010). In this study, GIS software is used to represent the statistical data in a spatial data format.</td>
</tr>
</tbody>
</table>

Method of Assessment

For data collection the samples were met at their home, schools and NGOs. The nature and purpose of the investigation was explained. The researcher made them understand the need and importance of the study. Following which, focus group discussion and questionnaire survey was administered.
Method of Investigation - Phase II

Research Design – Phase II

In the second phase of the study, quasi experimental design was used to find the effectiveness of the psychosocial intervention program among the experimental group in comparison with the control group.

Sample Design – Phase II

Random sampling using lottery method was used to divide experimental and control group from the selected samples.

Sample description- Phase II

Forty subjects, who were identified with the presence of PTSD symptoms, depressive, anxiety, behavioral problem and low self esteem in the phase I of the study, were equally divided into the experimental and control group using random sampling procedure. Twenty subjects were randomly assigned each into experimental group and control group. Subjects in the experimental group received intervention program and subjects in the control group didn’t receive any intervention program. Informed consent was obtained from all the subjects in the experimental group participated in the study stating their acceptance to undergo the intervention program.
Assessments used

The same tools used for measuring PTSD, depressive, anxiety, behavioral problem and self esteem in Phase I were used for pre, post and follow up assessment in order to measure the PTSD, depressive, anxiety, behavioral problem and self esteem level in the Phase II of the study. Post intervention assessment was performed in order to find out pre-post differences in the scores.

Conduction of the intervention program

The total duration of the program was about five weeks. Ten sessions were given to the subjects in the experimental group. The subjects in the control group did not receive any kind of intervention program.

Intervention consists of ten sessions lasting 45 to 60 minutes each. Each session is divided into three parts, beginning the session with songs and dance. The second part is based on the central activity focused on the main theme of the program (e.g. drawing of traumatic events or systematic desensitization), and the third part is a relaxation period.

Components of Psychosocial intervention program

1. Art therapy
2. Cognitive Behavioural Therapy
   2.1 Exposure therapy
      2.1.1 Systematic desensitization
   2.2 Psycho education
3. Relaxation Technique.
Statistical Analysis

The data obtained first and second phase of the study was analyzed and interpreted using the following statistics.

Descriptive statistics

- Mean and standard deviation
- Percentage (%)

Inferential statistics

- ‘t’ test for comparison of mean differences between tsunami affected adolescents and not affected adolescents.
- Correlation was done to find the relationship between variables
- One way ANOVA was done to find out the difference between pre, post and follow up group.
- Discriminant analysis was done between variables

Major Findings of the Study

1. Adolescents survived from the post tsunami had partial remission of Post Traumatic stress disorder after six years.
2. Adolescents survived from the post tsunami had mild level of depression after six years.
3. Adolescents survived show low level of self-esteem compared to adolescents not exposed to the event.
4. Adolescents survived from the post tsunami had anxiety and witnessed behavioral problems in the competence scale after six years.

5. It is also observed that damage variable both property and life loss are the most discriminating variable between group.

6. Psychosocial intervention program reduced the psychosocial problems in the experimental group.

7. Psychosocial intervention program reduced PTSD symptoms in the experimental group as compared to the control group.

8. Psychosocial intervention program reduced depressive symptoms in the experimental group as compared to the control group.

9. Psychosocial intervention program improved self esteem level in the experimental group as compared to the control group.

10. Psychosocial intervention program reduced anxiety symptoms in the experimental group as compared to the control group.

11. Psychosocial intervention program reduced the behavioral problems in the experimental groups as compared to the control group.

12. Finally, the study revealed that long term psychosocial problems have reduced through effective psychosocial intervention.
Conclusion

1. It was found that tsunami affected adolescents have psychosocial problems when compared with not affected adolescents after six years of exposure.

2. Psychosocial intervention program helped the affected adolescents to reduce the psychosocial problems such as PTSD symptoms, depressive symptoms, anxiety symptoms, behavioral problems and improve their self esteem level.

Implications of the Study

1. The results of the study clearly indicate the significance of psychosocial intervention program in training the affected adolescents from tsunami affected province area after six years.

2. Training the tsunami affected adolescents is not only reducing the long term posttraumatic stress and associated symptoms but also helps in improving their behavior and livelihood.

3. The intervention program used in this study facilitates the adolescents to encounter the problems that may arise in the future.

4. This intervention program was simple and easy to follow and in making use of all the available resources for the group. The group was provided with important aspects of psychosocial intervention to help the adolescents to socialize, defuse their feelings and emotions which allows them to heal in a normally and hope for the best future.

5. Psychosocial intervention training does not require any sophisticated equipment.

6. This psychosocial intervention program can be administered in a group setting.
Limitations of the Study

Although the results of the psychosocial intervention program appear to be positive, this study has few limitations.

1. As the intervention group was small, it cannot be generalized to general population and the program was focused only on the adolescent group.

2. An important issue in this study was unavailability of more adolescent’s especially female participants.

3. Number of session given for the parents/guardian/ care givers were limited due their unavailability.

Suggestion for Future Research

1. A similar study can be conducted in most vulnerable group of adults and late adults especially women population.

2. Similar researches can be conducted using a larger population for long term intervention.

3. Incorporating more number of variables for a detailed research in long term psychosocial disaster effects.

4. The developing countries should plan for this kind of research at the earliest targeting all kind of population affected by various disasters.

5. Incorporating effective evacuation plan and preparedness in India would help in decreasing the death rate among the coastal areas in future.
6. In the recent past, many studies have focused only on immediate effects of disasters and long term intervention is not stressed. Hence, it is recommended to conduct long term periodic monitoring to ensure that the effective treatment is available for people at risk.