

ORIGINAL ARTICLE

Psychological Distress Among The Adult Survivors of Kathmandu Valley From Nepal's 2015 Earthquake

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ABSTRACT

Background: Nepal is known for its exquisite natural beauty, with the iconic Himalayas running across the northern and western part of the country. Kathmandu valley, which is the capital of the country and the main hub for trade, commerce, education and administration, is considered as one of the earthquake prone areas. It is a highly populated area with an estimated population of about 2 million. After 82 years on April 25th at 11:56 am local time, an earthquake of magnitude 7.8 struck Nepal, with an epicenter 77 kilometers northwest of Nepal's capital Kathmandu in the Gorkha district. As of May 15th, 8,316 people had been reported killed and 17,866 people injured. A study was carried out to assess psychological distress among the adult survivors of Kathmandu valley from Nepal's 2015 earthquake.

Methodology: A cross sectional study was conducted among 304 adult survivors with an objective to identify the psychological distress among the adult survivors of Kathmandu valley from Nepal's 2015 earthquake. This study was carried out in Kathmandu valley; there are three districts in Kathmandu valley which are Kathmandu, Bhaktapur and Lalitpur. Among the three districts, Kathmandu district and Kathmandu metropolitan city was selected purposively. There are 35 wards in Kathmandu metropolitan city.

Results: Among the total of 304 respondents interviewed for the study, nearly half of them were female (54.6%) and males (45.4%). Considering the age group 30.6% of them belonged to age group of 26 to 35 years. Out of the total 304 respondents, 18.1 % were suffering from moderate anxiety and 21.7 % were having moderate depression, 16.1 % had mild anxiety and 21.1% had mild depression, 12.5% were having severe anxiety and 13.5 % were suffering from severe depression. Depression was seen significantly higher in businessmen, middle income family, patients with behavior changes, injured people and in those people who lost their family members in the earthquake ($p < 0.05$). Those who live in second floor, who had changed personal habits, injured during earthquake and those who lost their family members in the earthquake were found significantly associated with anxiety ($p < 0.05$). The analysis shows person aged above 55 years had 2.3 times higher chance to have anxiety than those below aged 55 years (adj. OR=2.3, 95% CI: 0.458-12.039).

Conclusion: This suggests that to reduce negative health impacts of the earthquake adequate psychological counseling is needed for those who survived the tragedy.

Keywords: Survivors, Depression, Health impact, Post-Earthquake

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INTRODUCTION

The natural catastrophes that have been occurred recently has been greater than earlier times and considering the situation, that a larger proportion of population have been residing in risky areas, the outcome of such catastrophes have been aggravated. These disasters lead to high-risk conditions for the functional and psychological problems, most evidently seen is after enduring a traumatic event; many people develop symptoms of psychological stress. Natural disasters are one of the main priorities of the mental health community, since the survivors may need psychological support for at least 1 year following the event

The psychological impacts are more expansive in scope, more extended in time, and frequently more debilitating in severity than the injurious physical impacts of natural disaster. (Shultz, 2013) Much of the affected population is likely to be burdened by a wide range of symptoms of normal distress caused by severe loss, trauma, continuing danger, and constrained social and living conditions. (Ovesen, & Heiselberg, 2016)

Nepal is known for its exquisite natural beauty, with the iconic Himalayas running across the northern and western part of the country. (World Statistics Pocketbook, 2015) Vulnerable to various types of disasters, e.g. floods, landslides, earthquake, fire, epidemics as well as the effects of climate change. Nepal ranks 11th globally among countries most vulnerable to earthquakes. (Bittner) The analysis of historical data suggests that a great earthquake in the Himalayan region generally occurs in an interval of 80 to 100 years. (Palani, 2015)

After 82 years on April 25th at 11:56 am local time, an earthquake of magnitude 7.8 struck Nepal, with an epicenter 77 kilometers northwest of Nepal's capital Kathmandu in the Gorkha district. As of May 15th, 8,316 people had been reported killed and 17,866 people injured. (Nepal Earthquakes, 2015) Kathmandu valley, which is the capital of the country and the main hub for trade, commerce, education and administration, is considered as one of the earthquake prone areas. It is a highly populated area with an estimated population of about 2 million. (Uprety, 2012) After earthquake

thousands of people had been injured and displaced, and still-functional hospitals and clinics were overwhelmed with patients. (Nepal Earthquake Response, 2015) This may be ascribed to different methodologies; the time elapsed between the onset of the disaster and data collection, the methods of sampling and case detection and the diagnostic criteria, which make comparison of these findings difficult. Our study subjects lived 76 Kilometer far from the epicenter of the Nepal's 2015 earthquake, and their dwellings were destroyed by it. Several studies reported that the more severe the psychiatric symptoms were, the closer were the victims to the epicenter. (Chen et al, 2007) Our study was across-sectional design and lacked the detailed evaluation of post disaster influencing factors that might influence the pattern of recovery (eg. Post disaster life events, ongoing disruptions, and consultations for psychological problems). However, the results of this study, which includes a sufficient number of samples of earthquake survivors, can serve as a practical assessment for identifying those at risk of mental disorders.

METHODOLOGY

A cross sectional study was conducted among 304 adult survivors with an objective to identify the psychological distress among the adult survivors of Kathmandu valley from Nepal's 2015 earthquake. This study was carried out in Kathmandu valley; there are three districts in Kathmandu valley which are Kathmandu, Bhaktapur and Lalitpur. Among the three districts, Kathmandu district and Kathmandu metropolitan city was selected purposively. There are 35wards in Kathmandu metropolitan city. Out of 35 wards, 5 wards (wards 1,10,12,14 and 34) were selected by using simple random sampling method, then household were selected using Systematic sampling technique by selecting every second house and data was collected including all adult members of families available during the interview. From each wards around 60 respondents were selected. Study period was 4 months from December 2015-March 2016. Study population was all Adult survivors of Kathmandu Valley who experienced the Nepal's 2015 Earthquake.

Data collection Instrument/Tools

In data collection tools, two parts of questionnaire were used. One was interviewer administered questionnaire, which included socio-demographic and factor influencing causes of psychological distress, and the other self-administered questionnaire that included Beck Anxiety Index (BAI) (Beck A, 1988) and Beck Depression Index (BDI). (Beck's, 1988) For ensuring the questionnaire's quality, BAI and BDI were translated into Nepali from English and then back translated into English by English language teachers proficient in both languages and medical doctors. Different people conducted the back translation. A pretesting was done among 20 respondents from the non-study area to identify potential problems with the questionnaire.

Interpretation of BAI and BDI

Beck Anxiety Inventory (BAI)

The following criterion indicates the severity of anxiety based on the total score:

- 0-9= Minimal Anxiety considered Normal
- 10-16 = Mild Anxiety
- 17-29 = Moderate Anxiety
- 30- 63 = Sever Anxiety

Beck Depression Index (BDI)

We evaluated severity of depression according to the following criteria.

- 0-9= Minimal depression considered Normal
- 10-18 = Mild depression
- 19-29 = Moderate depression
- 30- 63 = Severe depression

Data Collection method

Data was obtained using interviewer administered questionnaire and self-administer questionnaire.

Data Management and Analysis

After collection of data, all responses were checked for their completeness, correctness and internal consistency in order to exclude missing or inconsistent data. Corrected data were entered into the MS Excel. The

data were analyzed by using the statistical software namely SPSS (Statistical Package for Social Science) 16.0 version. Statistical significance was set at 95% confidence level and $P < 0.05$. Descriptive statistics was generated along with mean and standard deviation. Association between socio-demographic characteristics, and psychological distress among adult survivors of Kathmandu valley was also elicited by Logistic regression analysis.

Ethical Issues

All ethical issues related to the proposal was approved by the ethical review committee of State University of Bangladesh, Informed written consent was obtained from the respondent before the interview. Confidentiality of the data was also maintained.

RESULTS

The results highlight the key socio-demographic domains of the respondents along the psychological distress status.

Among the total of 304 respondents interviewed for the study, nearly half of them were female (54.6%) and males (45.4%). Considering the age group majority were found 93 (30.6 %) the age group of 26 to 35 years, 78 (25.7 %) were up to 25 years, 78 (25.7 %) were the age group 36 to 45, followed by 35 (11.5 %) were 46 to 55, and rest 20 (6.6%) were more than 55 years.

Table 1 shows the socio-demographic characteristics of adult survivors. Mostly, 68.1 % were found married, 29.3 % were unmarried and 2.6 % were found Divorced/ Separated/widowed. In this study, 37.2 % (n=113) of the respondents were Graduate/ Post graduate, 21.1 % were HSEB, 17.1 % had passed Secondary, 13.2% were Primary and 11.5% (n=35) had Vocational education. Similarly, a total of 40.8 % were working (involved in jobs), 26.6 % were unemployed, 15.8% had business, 5.9% were others and 5.6% were labor and rest 5.3% were engaged in agriculture. With Mean income \pm SD, i.e. 33860.197 \pm 29750.13, Min- 4000, Max-200000, 46.1 % had the monthly income less than NRS 20000, 28.9 % were earned NRS 21000-40000, and rest 25% had more than NRs

Table 1: Frequency of Socio-Demographic Variables of Respondents.

Gender	Frequency	Percent
Male	138	45.4
Female	166	54.6
Marital status		
Unmarried	89	29.3
Married	207	68.1
Divorced/separated/widow	8	2.6
Age group		
Up to 25	78	25.7
26-35	93	30.6
36-45	78	25.7
46-55	35	11.5
More than 55	20	6.6
Mean age \pm SD = 34.94 \pm 12.116 Min- 16 Max-65		
Level of Education		
Primary	40	13.2
Secondary	52	17.1
HSEB	64	21.1
Graduate\Post Graduate +	113	37.2
Others	35	11.5
Occupation		
Jobless	81	26.6
Job	124	40.8
Business	48	15.8
Agriculture	16	5.3
Labour	17	5.6
Others	18	5.9
Total Income		
up to 20000	140	46.1
21000-40000	88	28.9
41000 +	76	25.0
Mean income (NRS) \pm SD 33860.197 \pm 29750.13, Min- 4000, Max-200000		
Type of Family		
Nuclear	187	61.5
Joint	102	33.6
Extended	15	4.9
Ethnicity		
Brahmin\Chhetri	159	52.3
Newar	82	27.0
Tamang	12	3.9
Gurung	6	2.0
Magar	9	3.0
Dalit	19	6.2
Madeshi	7	2.3
Others	10	3.3

41000. Majority of them, 61.5% belonged to nuclear type of family, 33.6 % from joint type and rest 4.9% from extended type of family. Among the respondents nearly half of them (52.3%) were *Brahmin/Chhetri*, 27.0% were *Newar*, 6.2 % were *Dalit*, 3.9% *Tamang* were found. Similarly 3.3% were others minority group, 3.0 % were *Magar*, 2.3 % were *Madeshi* and rest 2 % were *Gurung*.

Table 2: Factors influencing Variables in psychological distress

Floor Stayed Before Earthquake	Frequency	Percent
First	112	36.8
Second	111	36.5
Third	49	16.1
Fourth	25	8.2
Fifth or Above	7	2.3
Type of Residence before Earthquake		
RCC Building with Pillar	146	48.0
RCC Building without Pillar	85	28.0
Building without RCC and Pillar	57	18.8
Others	16	5.3
Any habituation after earthquake		
Yes	93	30.6
No	211	69.4
Faced any obstacle after earthquake		
Yes	212	69.7
No	92	30.3
Loss of property after Earthquake		
Yes	187	61.5
No	117	38.5
Injury After Earthquake		
Yes	102	33.6
No	202	66.4
Injuries of Family member after Earthquake		
Yes	93	30.6
No	211	69.4
Death in neighbors or relatives		
Yes	118	38.8
No	186	61.2
Death of Family member		
Yes	32	10.5
No	272	89.5

Influencing Factors for Psychological distress

Table 2 shows Majority 36.8% people stayed in first floor of building, 36.5% stayed at 2nd floor of building, 16.1 % were staying at 3rd floor, and 8.2% were staying at 4th floor and 2.3 % at 5th and above floor of house. Nearly half of the respondents (48%) were living in RCC Building with Pillar, 28% lived in RCC Building without pillar, 18.8% lived in Building without RCC and pillar and 5.3% were living in other types of temporary residence. Similarly, 69.4% had not changed their personal habit and the rest 30.6% were changed personal habit. Majority 69.7% had faced obstacle after earthquake, 61.5% had damage/loss their property and rest 38.5% did not face any damage/loss. In the case of injuries, 33.60 % had suffered by different type of injuries, and 30.60 % had suffered injuries among family member. In the reporting of those

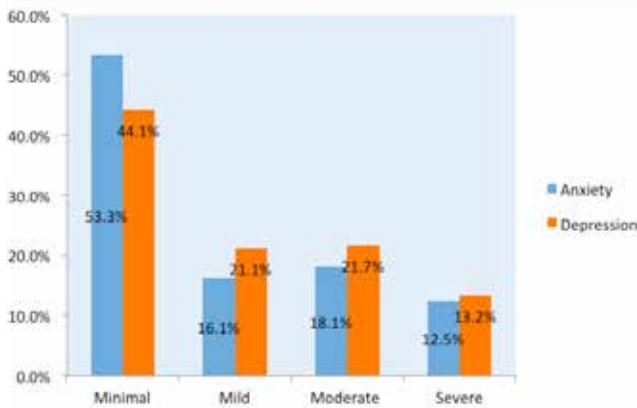


Figure 1: Percentages of severity of Anxiety and depression according to score

who were deceased, 38.8% said that there were deaths in neighborhood and relatives and 10.50% had death of family member.

Figure 1 reveals that, among the 304 respondent almost half of the respondents (53.3%) had minimal anxiety and, 44.1 % had minimal depression which is considered normal. Similarly 18.1 % were suffering from moderate anxiety and 21.7 % were having moderate depression, 16.1 % had mild anxiety and 21.1% had mild depression, 12.5% were having severe anxiety and 13.5 % were suffering from severe depression.

Table 3 summarizes the results of linear regression analysis examining the association between predisposing

Table 3: Factors influencing the anxiety and depression (logistic regression model)

	Anxiety Adjusted Odd Ratio (95% CI)	Depression Adjusted Odd Ratio (95% CI)
Age		
Up to 25	1	1
26-35	1.606(0.557-4.633)	0.579(0.196-1.712)
36-45	1.452(0.448-4.699)	0.412(0.123-1.372)
46-55	0.602(0.146-2.478)	0.360(0.084-1.553)
>55	2.348(0.458-12.039)	0.237(0.042-1.337)
Gender		
Male	1	1
Female	1.319(0.650-2.675)	1.246(0.589-2.635)
Marital status		
Unmarried	1	1
Married	0.483(0.178-1.316)	1.390(0.494-3.906)
Divorced/Separated/widow	0.770(0.075-7.934)	3493113474.661(0.000)
Educational Status		
Primary	1	1
Secondary	1.401(0.446-4.398)	2.783(0.781-9.921)
HSEB	0.458(0.157-1.337)	0.811(0.275-2.391)
>Graduate\Post graduate	0.525(0.171-1.605)	0.629(0.203-1.949)
Others	0.647(0.175-2.392)	0.340(0.086-1.347)
Occupational Status		
Job less	1	1
Job	0.680(0.288-1.603)	0.512(0.211-1.242)
Business	0.774(0.284-2.107)	0.251(0.085-0.742)*
Agriculture	1.771(0.371-8.445)	3.820(0.541-26.986)
Labour	2.675(0.518-13.830)	0.544(0.103-2.882)
Others	0.694(0.157-3.063)	2.722(0.519-14.268)
Family Income		
<20000	1	1
21000-40000	1.067(0.508-2.239)	2.317(1.078-4.978)*
>41000	.611(0.259-1.443)	0.797(0.339-1.877)
Family Type		
Nuclear	1	1
Joint	0.854(0.426-1.710)	1.309(0.639-2.680)
Extended	3.303(0.647-16.849)	2.099(0.416-10.580)
Ethnicity		
Others Minority group	1	1
Brahmin/chhetri	1.171(0.217-6.309)	0.812(0.160-4.117)

Table 3: Factors influencing the anxiety and depression (logistic regression model) (counted)

	Anxiety Adjusted Odd Ratio (95% CI)	Depression Adjusted Odd Ratio (95% CI)
Newar	0.869(0.148-5.104)	0.459(0.083-2.553)
Tamang	0.619(0.071-5.424)	0.381(0.042-3.484)
Gurung	3.379(0.227-50.397)	0.361(0.023-5.657)
Magar	1.019(0.090-11.576)	4.783(0.383-59.691)
Dalit	2.150(0.259-17.842)	0.786(0.098-6.302)
Madeshi	5.475(0.248-120.937)	0.319(0.021-4.751)
Floor stayed before earthquake		
First	1	1
Second	2.814(1.334-5.937)*	1.839(0.862-3.925)
Third	1.198(0.448-3.208)	2.442(0.927-6.430)
Fourth	2.552(0.752-8.652)	2.756(0.731-10.396)
Fifth or above	0.451(0.054-3.747)	4.310(0.528-35.177)
Types of Building Stayed Before Earthquake		
RCC Building with Pillar	1	1
RCC Building without pillar	1.309(0.595-2.882)	1.069(0.478-2.391)
Building without RCC and pillar	1.078(0.413-2.816)	0.493(0.179-1.359)
Others	1.516(0.386-5.945)	1.581(0.368-6.788)
Change in personal habit after earthquake		
No	1	1
Yes	3.218(1.358-7.627)*	3.835(1.523-9.659)*
Faced any obstacle after earthquake		
No	1	1
Yes	1.707(0.783-3.718)	1.422(0.663-3.048)
Loss of property after earthquake		
No	1	1
Yes	0.682(0.318-1.464)	0.620(0.291-1.323)
Personal Injury after earthquake		
No	1	1
Yes	3.471(1.516-7.945)*	3.491(1.445-8.436)*
Family member injury after earthquake		
No	1	1
Yes	1.640(0.656-4.097)	1.959(0.747-5.140)
Death of relatives after earthquake		
No	1	1
Yes	2.234(1.155-4.322)*	2.379(1.194-4.741)*
Death of family member after earthquake		
No	1	1
Yes	2.500(0.727-8.595)	1.121(0.323-3.891)

factors and anxiety or depression on people living in earthquake affected areas. Depression was seen significantly higher in businessmen, middle income family, patients with behavior changes, injured people and in those people who lost their family members in the earthquake ($p < 0.05$). Those who live in second floor, who had changed personal habits, injured during earthquake and those who lost their family members in the earthquake were found significantly associated with anxiety ($p < 0.05$). The analysis shows person aged above 55 years had 2.3 times higher chance to have anxiety than those below aged 55 years (adj. OR=2.3, 95% CI: 0.458-

12.039). Likewise, *Madeshi* ethnicity was more likely to have anxiety (adj. OR= 5.4, 95% CI: 0.248-120.9) than other ethnic minorities. On the other hand, *Tamang* (adj. OR= 0.3, 95% CI: 0.042-3.484) and *Gurung* (adj. OR= 0.3, 95% CI: 0.023-5.657) ethnicities were found less likely to have depression than other ethnic groups. People who stayed in buildings without RCC and pillars were found less likely to have depression than people living in building with RCC with or without pillars before the earthquake (adj. OR= 0.49, 95% CI: 0.179-1.359).

Table 3 shows that in age group above 55 years were 2.348 more likely to suffer from anxiety when compared

to age group up to 25 years (AOR=2.348 95% CI: .458-12.039). There is positive relationship in elder age more likely suffered from depression compared to younger age. However, statistically it was not significant. Similarly, females are 1.319 times more likely to suffer from anxiety (95% CI: 0.650-2.675) and 1.246 times more likely to suffer from depression when compared to males gender (95% CI: 0.589-2.635). However, statistically it was not significant. An increase in the education level increases the chance of developing anxiety and depression. The people who have secondary level of education are 1.401 times more likely suffered from anxiety (95% CI: 0.446-4.398) and 2.783 times more likely to suffer from depression as compared to primary level of education (95% CI: 0.781-9.921), however statistically it was not significant.

DISCUSSION

This descriptive type of cross sectional study was conducted among 304 adult survivors of Kathmandu valley who experienced Nepal's 2015 earthquake. Various studies indicate that a great number of individuals will develop emotional distress such as anxiety, depression, PTSD, sleep disorders symptoms and difficulties in disaster situation. Earthquakes have been responsible for many of the most devastating natural disasters of the 21th century. Unlike other natural disasters, an earthquake usually occurs without warning, the impact is widespread and severe, and the effects often persist long afterwards. In the aftermath of the earthquake, the threat of injury may continue for few months or up to years, with the possibility of aftershocks. Disruptions may be experienced for several years as survivors are relocated and towns are rebuilt. The prevalence of anxiety and depression symptoms among the adult survivors of Kathmandu valley from Nepal's 2015 earthquake were similar to those found in previous study done with survivors of natural catastrophe. (King et al., 2008)

Our findings were three and five times higher respectively than reported anxiety and depression among the general population. A study conducted in six European countries in between July 2003 and September 2004 showed that the estimated prevalence of

generalized anxiety disorder is 5–16% and Depression occurs in around 10% of general practice attendees. (King et al., 2008) According to Nepal police data, a three month comparison before and after the earthquake showed that there was an increase in suicidal tendencies by 41 %. (Gautam, 2015)

If we compare such event to the WHO definition, from our findings, severe depression (10.5%) can lead to suicide. (*Depression, 2014*) Our result is very near to Haiti 2010 earthquake, in where 40% had anxiety symptoms and 55% subjects had depression. (Guimaro et al., 2013). Although Bam earthquake in Iran on the 26th December 2003 showed 58% respondent had severe mental health problems. (Montazeri et al., 2005)

Similarly, 8 month after the 2008 Wenchuan earthquake in china showed the depression was 35.7%. (Qu et al., 2014) Another study which was conducted in 2010 showed the anxiety and depression symptoms 43.8 % and 38.6% respectively. (Zhang, Wang, Shi, Wang, & Zhang, 2012) A study which was conducted in Sichuan of china showed the 41.8% respondent had anxiety and depression symptoms. (Wang et al., 2008)

According to previous literature gender, marital status, age, income, education, ethnic and marginalized people had closely been associated with developing anxiety and depression after earthquake. The Mental Health and Related Factors after the Great East Japan Earthquake and Tsunami revealed that mental health problems were prevalent among survivors of the 2011 earthquake and tsunami in Japan. After 6–11 months of disaster it was identified that females, younger males were having health complaints, severe economic status, relocations. Younger males and males with severe economic status were more likely to have severe mental health problem than their counterpart females. (Yokoyama et al., 2014) Similarly the survivors of Bam earthquake in Iran (26th of December 2003) indicated that female gender; lower education, unemployment, and loss of family members were associated with severe psychological distress among earthquake victims. (Montazeri et al., 2005) Another study after the May 2008 on Wenchuan earthquake, the prevalence of Post-Traumatic Stress Disorder was noticed. Members of the Qiang ethnic-minority group were 1.6

times more likely to exhibit PTSD symptoms than individuals of Han ethnicity. (Montazeri et al., 2005) Similarly, another study assessed the estimated rate of depression and associated risk factors among survivors 8 months after the 2008 Wenchuan earthquake in China. The severity of depressive symptoms was significantly associated with females not living in an urban area, whereas marital status was seen to be a protector against depressive symptoms. (Qu et al., 2014)

In the present study, factors significantly associated with psychological distress immediately after the earthquake were females, fear of the earthquake and aftershocks, living at home or office after the earthquake, injury or physical illness after the earthquake, serious house damage, living in a temporary shelter or at a relative's home after the earthquake and physical illness after the earthquake. Livelihood security, loss of a family member, residential house damage or collapse, changing personal habits, suffering from injuries were the factors influencing development of symptoms of Anxiety and Depression. Such influencing factors and their association with psychological distress can be found in previous literatures.

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A study assessed the estimated rate of depression and associated risk factors among survivors 8 months after the 2008 Wenchuan earthquake in China. The severity of depressive symptoms was significantly associated with perceived livelihood security, loss of a family member, residential house damage or collapse. (Qu et al., 2014)

CONCLUSION

In conclusion the findings from this study indicated that the adult survivors of Kathmandu valley from Nepal's 2015 earthquake suffer from psychological distress were minimal in half of the survivors. Similarly, 69.4% had not changed their personal habit and Majority 69.7% had faced obstacle after earthquake, 61.5% had damage/loss their property and rest 38.5% did not face any damage/loss. In the case of injuries, 33.60 % had suffered by different type of injuries, and 30.60 % had suffered injuries among family member. This suggests that to reduce negative health impacts of the earthquake adequate psychological counseling is needed for those who survived the tragedy.

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