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Suicide Ideation after the 1999 Earthquake in Marmara, Turkey

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VEHID, H.E., ALYANAK, B. and EKSI, A. *Suicide Ideation After the 1999 Earthquake in Marmara, Turkey.* Tohoku J. Exp. Med., 2006, **208** (1), 19-24 —— This study aims to investigate the psychological effects of the earthquake. We investigated the psychological conditions of 3,609 students survived from the Marmara Earthquake, which occurred on 17 August 1999. The Beck Depression Inventory (BDI) was employed to assess the levels of depression and other psycho-pathological states. The BDI was classified as mild depression if the score was ≦13, moderate depression (14-24) and serious depression (≧ 25). Depression level was estimated as mild in 71.5% of the students, and serious depression in 9.6% of the students. The prevalence of suicidal tendency/thought was 16.7% in this study. The prospect of suicidal thought was 1.76-time (95% Confidence interval [CI]: 1.40-2.22) higher in the students who were injured or whose relatives were injured seriously enough to require medical treatment. Suicidal thought was higher by 1.57 times (95% CI: 1.28-1.92) in students who lost their relatives and by 1.35 times (95% CI: 1.13-1.63) in those who saw extensive damage or destruction occurred in their home or property. According to logistic regression analyses, the gender influenced the thought of suicide; suicide thought was 0.71 (95% CI: 0.60-0.85) time lower in females than males. The present study indicates that injury to the self or to the loved ones, damage to home or property, or the loss of family members as a result of the earthquake enhances the suicidal tendencies. ———— earthquake; youth; thoughts of suicide

Natural disasters, especially earthquakes, are one of the reasons that devastatingly affect most of the population. Earthquake, which occurred on 17 August 1999 in Marmara, northwest region of Turkey, was the highest magnitude of earthquake that occurred at a settlement area. A high density of population exists in the Marmara region and the region also consists of half of the productivity of Turkey. Nearly 25 millions of the population had been affected from this disaster.

It is known that in adolescence, the process of physical and emotional development involves the challenge of change and growth, but also includes the pain and trauma of loss. When adolescents experience major life changes, war, accidents or disaster, fear can lie at their heart – the fear of dying, of illness or injury, of hurt and rejection.

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The Marmara Earthquake, resulting in the death of at least 17,000 people (Bayramgurlar et al. 2002), had a profoundly distressing effect on the young, just as it did on all individuals and groups who underwent the ordeal. This ordeal, testing as it was for adults alone, gave rise to a number of difficulties in younger people, as it is the young who naturally think more about harm that may come to them and/or to their loved ones and are thus far more easily affected than adults (Alpaslan et al. 1999; Rutter and Taylor 2002).

The Marmara Earthquake was responsible for enormous damage to people's homes and to the pre-existing orderliness and harmony in children and youngsters' lives. Moreover, the loss of loved ones increased the distress already created by the affair.

The psychological effects of undergoing such a disaster become apparent after the initial trauma (Appleby et al. 1999). No matter how violent the trauma, differing consequences and manifestations of grief can be observed in people who underwent the same ordeal of the same intensity. It is not only the scale and size of the disaster but also what it meant for those who went through it, which is of great importance.

This study was carried out with the aim of looking into the psychological effects on youngsters of an earthquake considered to have affected society and its members on a traumatic scale, and in particular to investigate the notion of the earthquake causing depression and leading to thoughts of suicide. With this aim, the Beck Depression Inventory (BDI) Test was applied to ascertain the level of psychological damage to have occurred in youngsters. Those questions in the BDI Test, which dealt with thoughts of suicide in particular were analysed in detail.

Materials and Methods

Subjects

Two months after the earthquake occured on 17 August 1999, the study was commissioned in Adapazari and Istanbul's Avcilar district by the National Ministry of Education Provincial Office with the aim of ascertaining the possible effects of depression in 21 schools, which have suffered the most damage. 3,609 students over the age of 14 from these schools were given the BDI Test. This test was used to ascertain the level of depression and to differentiate the other psycho-pathological states from depression (Taner 1994). Informed consent was obtained from the parents and the subjects, and the ethical committee of Istanbul University approved the study.

Beck Depression Inventory (BDI) Test

Questions related to suicide in the BDI Test were evaluated in detail. The BDI Test is composed of 21 questions, the answers being closed, non-refutable. Each question in the test consists of four self-assessment items (Taner 1994). The BDI was classified as mild depression if the score $\leqq 13$, moderate depression (14-24), and serious depression ($\geqq 25$).

One of those questions is on suicidal thought and scored as,

0 = Not thinking of committing suicide,
1 = Thinking of committing suicide but not suggest to do it,
2 = Thinking of committing suicide,
3 = I would commit suicide if I found an opportunity.

It was accepted that those who marked the first choice on this question – "not thinking of committing suicide" – had no thoughts of suicide while those who marked one of or a number of the other boxes did have such thoughts. Each student's Beck Test score was evaluated using the Mann Whitney's U-test to ascertain the presence of these suicidal thoughts (Senocak 1997).

One of the questions consisted of four columns, with questions concerning the following filling each column;

- The student's gender,
- Whether he/she or a close relative had injuries in the earthquake which required medical assistance,
- Whether he/she had lost a relative in the earthquake,
- The level of damage that had been incurred to the participant's property or house.

Statistical analysis

The relationship between suicidal thoughts and the above factors (gender, injuries to one's self or relatives, loss of a family member or members as a result of the quake and property damage) was evaluated using the ς^2 and logistic regression analysis (Senocak 1997).

A p value of < 0.05 was considered statistically significant.

Results

The age distribution of the 3,609 students given the BDI Test was 15.51 ± 1.25 years and the median age being 16. Of those students, 1,904 (52.8%) were males and 1,705 (47.2%) were females.

It was found that 15.1% of the total were injured or had family members injured to the extent that they needed medical assistance during the earthquake, 34.8% of the total had extensive damage to their house and 22.4% of the total lost a family member, relative or loved one.

According to the BDI, 71.5% of the students' scores for depression were below the average, 18.9% registered depression scores in the moderate and 9.6% students had scores at serious levels (Table 1).

The distribution of the figures for the Beck depression scores according to the choices marked on the options to the question on the test, which evaluated the presence of suicidal tendencies, is given on Table 2. The median value of the BDI Test scores was significantly higher in those who do have suicidal tendencies than these in the other groups (Table 2).

The prevalence of suicidal tendencies in the study was 16.8% in all students; 19.4% in male students and 14.3% in female students (Table 3).

Depression scores of the students who had suicidal thoughts (n = 608) were measured with the scale of the BDI. It was found that BDI scores

Table 1. *Student's circumstances after the earthquake and Beck depression evaluations*

		Beck depression scores				
		Low (%)	Moderate (%)	Serious (%)	Total (n)	ς^2
Gender	Female	67.4	20.8	11.8	1,705	29.212*
	Male	75.1	17.2	7.7	1,904	
Did you or any close relatives receive injuries, hich required medical assistance ?						146.513*
	Yes	50.4	30.3	19.3	542	
	No	75.2	16.9	7.9	3,067	
Did you lose a close/loved one to the earthquake ?						46.509*
	Yes	58.4	26.8	14.8	803	
	No	75.2	16.7	8.1	2,806	
Did your house suffer serious damage in the earthquake ?						87.735*
	Yes	63.0	23.9	13.1	1,248	
	No	76.0	16.3	7.7	2,361	
Total		71.9	18.9	9.6	3,609	

* $p < 0.05$, d.f. = 2.

Table 2. *The distribution of the Beck depression test values according to the distribution of suicidal thoughts*

Beck depression test	Mean ± S.D.	Median	z
Thinking of committing suicide (n = 608)	21.92 ± 11.54	20.0	28.291*
Not thinking of committing suicide (n = 3,001)	7.83 ± 7.13	6.0	

* $p < 0.05$.

TABLE 3. *Students' Circumstances after the earthquake and distribution of suicidal thoughts*

		Suicidal thought			
		Yes (%)	No (%)	Total (*n*)	ς^2
Gender	Female	14.3	85.7	1,705	16.627*
	Male	19.4	80.6	1,904	
Did you or any close relatives receive injuries which required medical assistance?					54.771*
	Yes	27.7	72.3	542	
	No	14.8	85.2	3,067	
Did you lose a close/loved one to the earthquake?					46.509*
	Yes	24.7	75.3	803	
	No	14.5	85.5	2,806	
Did your house suffer serious damage in the earthquake?					22.093*
	Yes	20.8	79.2	1,248	
	No	14.6	85.4	2,361	

* $p < 0.05$, d.f. = 1.

TABLE 4. *Factors in relation with suicidal thoughts (Result of the Logistic regression analyse)*

	Sig.	Exp (β)	95% CI	
			Lower	Upper
Injury to self or relative requiring medical assistance	0.000	1.763	1.403	2.215
Death of a loved one/family member	0.000	1.567	1.277	1.923
Destruction/damage to property	0.001	1.353	1.127	1.625
Gender – Female	0.000	0.711	0.595	0.849

Overall percentage: 83.3%

were at serious level in 40.1% of the students, moderate level in 34.7% and mild level in 25.2% according to the scale of the BDI.

It is noted that gender represents a significant factor in the suicidal thoughts, with the other factors such as injury, loss of a loved one or damage to home or property (Table 3). In order to show the effects of these variables on the suicidal thought**,** logistic regression analysis was applied (Table 4). The prospect of suicidal thought was found to be 1.76 times (95% Confidence interval [CI]: 1.40-2.22) increased among the students who were injured or whose relatives were injured seriously enough to require medical treatment. Suicidal thought was increased 1.57 times (95% CI: 1.28-1.92) in students who lost relatives and increased 1.35 times (95% CI: 1.13-1.63) in those who saw extensive damage or destruction occurred in their home or property. According to logistic regression analysis we also saw that the gender had influence on the thought of the suicide. Suicide thought was found to be 0.71 (95% CI: 0.60-0.85) time lower in females than males. The present study indicates that injury to the self or to the loved ones, damage to home or property or the loss of family members as a result of the earthquake influences the suicidal tendencies, which developed after the earthquake.

Discussion

The Marmara earthquake of 1999 struck at 03.02, when most people were asleep, resulting in heavy casualties. How this earthquake, responsible for the death of so many people, affected youngsters of marriageable age was evaluated in this study.

As is well known, suicide is an important problem of public health. Krug et al. (1998) stated that among natural disasters, it was earthquakes that increased the rate of suicides most. Imamura (1995), shows property loss, the failure of social security systems, the length of the period of mourning, hopelessness and depression to be amongst the factors affecting suicide tendency in the aftermath of natural disasters. Bourque et al. (2002) mention the high rate of suicide and psychological disorder found in health centres tending to survivors of California earthquakes.

There exist studies pointing to the emergence of suicide in the aftermath of natural disasters as a significant health issue (David et al. 1996; Krug et al. 1998, Kuo et al. 2003). Additionally, the rise in the suicide rate after natural disasters and the fact that this rise occurs in both males and females and at all ages has been documented (Krug et al. 1998). In our study, the rate of those who harboured thoughts of suicide was found to be 16.7%, the rates were found 14.3% for girls and 19.4% for boys, although Rutter and Taylor (2002) argue that the influence of the natural disaster on the suicidal thought is much greater in girls, giving figures of 14% for boys and 25% for girls in a similar situation.

In the BDI, 32.6% of the girls' scores pointed to depression; for boys this figure was 24.9%. It was observed that 11.8% of female students' scores and 7.7% of boys' pointed to serious depression. Additionally, the levels of serious depression in those who had seen close ones injured to the extent that they required medical help, lost loved ones and seen destruction or severe damage to their home were higher than in those who had not undergone such ordeals. In the studies on 1,000 residents living in 3 camps and in 3 makeshift shelter zones set up after the Marmara Earthquake, the level of major depression was found to be 31% (Basoglu et al. 2001, 2002), whereas the figure for major depression after the Armenian earthquake was evaluated as being 18% (Armenian et al. 1988, 2002).

The increase in depression in children and youngsters who had lost family members and loved ones were discussed (Armenian et al. 1988, 2002; Salcioglu et al. 2003). While depression levels in those who had lost loved ones were as high as 41.6%, it was found to be 24.8% in those who did not lose family members or relatives. The depression level of those who were injured or had loved ones injured, not investigated in those studies, was found to be 49.6% and it is coincident with our study.

As seen in Table 2, according to the distribution of students' scores on the Beck Test, there is a significant difference between those who have suicidal thoughts and those who do not. Of those who harboured thoughts of suicide, 74.8% had standard depression levels. Our result showing a significant difference depression scores and thoughts of suicide in adolescent is in line with the study of Warheit (Warheit et al. 1996).

The suicide rate at the time when the Kobe earthquake struck was clearly low but in the ensuing two years again showed an increase (Rutter and Taylor 2002). It was also demonstrated that Armenian children who survived two and half years after the earthquake and did not receive any psychological treatment were still experiencing recurrent frightening dreams, a sense of guilt, sadness, and hopelessness (Najarian et al. 1996). They continued to exhibit aggressive behaviour, withdrawal, a decrease in academic performance, anxiety reactions to quake reminders, and numerous somatic complaints.

Krug et al. (1998) state that if the earthquake cannot be avoided, the strengthening of buildings bring about a reduction in thoughts of suicide and in overall negative influences on mental health. Our study showed that 20.8% of people (Table 3) who had witnessed damage to their house or property entertained suicidal thoughts, confirming the need for a strengthening of buildings proposed by Kruger and colleagues (1998).

Chou et al. (2003) found that the victims were more likely to commit suicide following an earthquake 1.46-time higher than non-victims, which is similar to the present study. Thus, there is a direct link between thoughts of suicide and physical injury to oneself or family or the loss of loved ones (Table 4).

We have shown that injury to oneself or to close/loved ones, damage to one's home/property or the loss of family members as a result of earthquake lead to the feelings and inclinations to suicide in adolescents in post-earthquake periods.

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