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An earthquake education program with parent participation for preschool children

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The purpose of this study was to determine the effects of the earthquake education program which was prepared for 5 to 6 year old children and to draw attention to the importance of parent participation. The earthquake education program was applied to 93 children and 31 parents in the province of Denizli situated in the first degree seismic zone in Turkey. The study included two experimental groups and one control group. The first group was the experimental group in which the earthquake education program with parent participation was applied (n=31). The second group was the experimental group in which the earthquake education program was applied without parent participation (n=31). The last group was the control group in which the earthquake education program was not applied (n=31).

According to the study results, the mean of earthquake knowledge scores of the experimental group (Group 1) in which the earthquake education program was applied with parent participation was found to be significantly higher than that of the second experimental group (Group 2) in which the activities were performed without parent participation and higher than that of the control group (Group 3). The findings indicated that the program carried out with parent participation was effective.

Key words: Earthquake, earthquake education, preschool children, parent participation.

INTRODUCTION

Natural disasters are phenomena that give substantial harm to the living and non-living things and are caused by natural, technological and human elements (Sahin and Sipahioğlu, 2002). Natural disasters cause serious damage especially in developing countries. Earthquakes among disasters are the most difficult to predict (Fujieda, 2008). Earthquake is a phenomenon which occurs when the tension stored near the surface of the earth in a long period is released once the strain in the rocks exceeds the resistance limit of the rocks. A huge amount of energy accumulated in the depths of the earth is released and this energy spreads from the source to all directions. The spreading mechanism reaches to the surface shaking the whole ground and the earth through which the waves pass (Karaesman, 2002). Turkey is a country where earthquakes occur frequently and large-scale earthquakes are seen. 92% of Turkey’s land falls within the seismic zone. Among these lands, the Northern, Eastern and Western regions are first degree seismic zones. Province of Denizli, in which this study was carried out, is situated in the first degree seismic zone (Demircioglu, 2010; Gökçe, 2007; Küçük, 2006; National Strategy Report Related to Natural Disasters in Turkey, 2004; Öcal, 2007; Özugüven, 2006). In May 2010, 1863 earthquakes in total occurred in Turkey. 50% of the earthquakes with a magnitude of 4.0 and higher happened in the Aegean and Mediterranean Regions where the province of Denizli is located (Monthly Earthquake Report, 2010).

The level of earthquake knowledge is closely related to the emotions (anxiety, fear, etc.) that individuals feel before, during and after the earthquake and how they react to this. In this respect, earthquake education is important in increasing earthquake awareness. Unless the members of a society are informed about earthquake, they will not be able act appropriately during an earthquake. Moreover, they may perceive the earthquake with a perspective of fear, anxiety, worry and even guilt. Besides, age is another factor that shapes a person’s perception about earthquake. As one gets older, more clear, concrete and real information can be obtained (Bulut, 2009; Karairmak and Aydin, 2008). Another factor besides age which makes the education of children a priority is the fact that children have difficulty in perceiving
earthquake as an out-of-control and natural disaster. Thus, their anxieties and fears are at the highest level (Altay, 2008; Çakar, 2008; Grotberg, 2001; Ronan and Johnston, 2003). Earthquake education should be started in the preschool period. The development of children in preschool period is very fast. The skills and behaviors acquired in this period have important effects in the short and long term. Spreading preschool education and increasing its quality is among the priorities of educational policies throughout the world. Starting to teach abstract but vital issues like earthquake in the early years of life might have many advantages both individually and socially. For example, for individuals living in Turkey where there is a possibility of experiencing severe earthquakes, it might be possible to acquire skills about how to behave during the earthquake and how to recover after the earthquake by educating them at an early age.

Parent participation is considered an important factor in preschool children’s education in all areas (Campbell and Verna, 2007; Dunst, 2002). Therefore, parent participation can also be considered an important factor in increasing children’s knowledge and awareness about earthquake. Parents enable child to acquire their first experiences. Moreover, children imitate their parents’ behaviors and take them as a model (Altay, 2008). Parents are a part of the educational system. Educators could support the developments of children in the best way by cooperating with their parents (Whitman et al., 2008). The activities carried out at home have an importance place in parent participation. These activities, which include the mother-father and the child, may support all development areas of the child (Breit-Smith, Cabell and Justice, 2010). It is stated that abstract and complex issues like earthquake can be comprehended better by the children through experiences in the family atmosphere. Survival possibility of knowledgeable and conscious parents during disasters is higher compared to parents who have no adequate information (Kilik, Özgüven and Sayil, 2003; Margolin, Ramosa and Guran, 2010; Repetti, Taylor and Seeman, 2002; Salmon and Bryant, 2002). The parents’ knowledge and way of understanding about earthquake can directly affect children’s knowledge and perspective.

The number of studies on earthquake education both in Turkey and abroad has increased recently. For example, the purpose of the study entitled “Disaster Risk Reduction Begins at School” in The World Disaster Reduction Campaign organized by UNESCO in 2006-2007 was to offer disaster education and to strengthen the structures against the natural disasters in Canada, India, Nepal and the United States (Fujieda, 2008). It was intended to strengthen the school buildings against natural disasters and to provide the cooperation and training of the institutions in some Asia-Pacific countries (Fiji, Indonesia, India and Uzbekistan) in a project entitled “Reducing Vulnerability of School Children to Earthquakes” developed by School Earthquake Safety Initiative (SESI) which was temporarily founded by The United Nations Centre for Regional Development (UNCRD) (2009). The findings indicated that the knowledge of teachers on earthquake was positively correlated with the knowledge levels of children (Reducing Vulnerability of School Children to Earthquakes, 2009).

A great number of studies were carried out throughout the world (Nimpuno and Boshoff, 2009; Shaw and Kobayashi, 2001). These studies focused on the improvement of the schools and determining the knowledge levels about earthquake. However, there are not sufficient programs and studies conducted on earthquake education, particularly for preschool children (Margolin, Ramos and Guran, 2010).

Especially after 1992 Erzincan and 1999 Marmara earthquakes, more comprehensive and longitudinal studies were carried out in Turkey (Kasapoglu and Ecevit, 2001; Önsüz et al, 2009). Although the number of studies in Turkey on improving the earthquake awareness is gradually increasing, the number of current studies is not enough. Although there have been some programs carried out with parents and preschool children, they are widespread. The current studies generally include the primary school, secondary school, high school or university levels (Tanrısever et al., 2008). However, some previous studies have demonstrated that the knowledge of primary school, secondary school and undergraduate students is insufficient and that teachers do not put enough emphasis on this issue in class (Altay, 2008; Ocal, 2005, 2007).

Since there are no sufficient studies on preschool children’s knowledge about earthquake throughout Turkey and specifically in the province of Denizli which bears a high probability of having an earthquake, this study aimed to determine the effect of Earthquake Education Program prepared for 5 to 6 year-old children and to draw attention to parent participation. The study also aims to provide guidance for prospective researches in this field.

**METHOD**

Experimental method was used in this study which was conducted to demonstrate the effect of Earthquake Education Program and the importance of parent participation. Earthquake Education program consisted of 20 activities prepared for 5 to 6 year-old children. The program consisted of two activities per day and lasted for 10 days. The activities included experiments, games, dramas, stories, pictures, art, reading and writing activities which were designed to introduce what earthquake was, what happened during an earthquake, what should be done before and during an earthquake, and the contents and importance of an earthquake bag were.

On the first day of the program the children were introduced to the concept of earthquake and what happens during an earthquake. The possible causes of earthquake were covered on the second day. On the third day, the magnitudes and probable damages of earthquakes were explained to children. On the next successive three days children were trained on how they should behave during an earthquake. On the seventh and eighth days the children were explained what has to be done before an earthquake at school and
at home. The earthquake bag and its contents were introduced to the children on the ninth day. All information covered during the program were repeated and reviewed on the last day. Some general evaluations were made at the end of each day. At the beginning of each day children were reminded of some of the information given the day before. The activities of parent participation were designed in concordance with what was covered with children at school. These activities also consisted of various training methods (such as, plays, experiments, stories, pictures, dramas etc.). The program was designed in accordance with the experiment-based learning and constructivist approach in order to make children to learn through experience. Theorists like Dewey, Piaget and Bandura, who defend experiment-based learning and constructivist approach, state that children construct their knowledge and fulfill permanent learning through active participation and by interacting with the environment, solving problems and utilizing all senses (Shin, 2008). Therefore, necessary attention was paid to ensure that all children were active, all types of activities were available, there were various stimuli and the topics were taught verbally by means of concrete samples and analogy technique.

In the program of the experimental group with parent participation, 10 parent participation activities took place. During the program, the parents were presented an activity per day. These presented activities were brought to school the following day. These activities were used in the activities carried out in the kindergarten in the next day.

Participants

The children participated in the study in three groups:

1st group (Experimental group with parent participation): This group included 31 children [15 girls (48.4%) and 16 boys (51.6%)] and their parents. The mean age of children was 5 years, 2 months and 20 days (minimum: 4 years, 10 months and 2 days; maximum: 6 years, 1 month and 10 days).

2nd group (Experimental group without parent participation): This group included 31 children [13 girls (41.9%) and 18 boys (58.1%)]. The mean age of children was 5 years, 5 months and 7 days (minimum: 4 years, 2 days; maximum: 6 years, 3 months). Parents were excluded from this group.

3rd group (Control group): This group included 31 children [15 girls (48.4%) and 16 boys (51.6%)]. The mean age of children was 5 years, 4 months and 6 days (minimum: 4 years, 9 months, 2 days; maximum: 6 years and 2 days).

All 93 children who participated in the study in three groups were attending the kindergartens of primary schools affiliated with the Ministry of National Education in the province of Denizli. The schools, from which experimental groups and the control group were taken, were selected by using random selection method. The children were assigned to experimental groups and the control group randomly. None of the children and parents had participated in any earthquake education program before.

Measures

Personal information form

Information form for the children consists of questions regarding the demographic characteristics of children and their families.

Evaluation test for earthquake knowledge

Evaluation test for earthquake knowledge was used as pre-test and post-test in the study. The test was composed of 10 questions. One of the questions was open ended (What are the three most important things that should be available in the earthquake bag?); one of them was 4-point Likert type scale (never, rarely, sometimes, often) Likert type scale and 8 questions were designed as 3-point Likert type scale (Yes, No, Not Sure). The questions were prepared in parallel with the topics introduced in the program (anxiety about the earthquake, what happens during the earthquake, what should be done before and during the earthquake, the importance and contents of the earthquake bag). The 3 questions in the test were reversely scored. The minimum and maximum scores that could be taken from the test were 9 and 28, respectively. Higher scores indicated higher levels of earthquake awareness, while lower scores indicated lower levels of earthquake awareness. The internal validity coefficient (Cronbach Alpha) of the test was .71.

Procedure

The teachers, pre-service teachers and parents were informed beforehand about the process, activities and purpose before the program. At the end of the program, an evaluation meeting was held with parents and teachers. Permission was received from the parents for their children’s participating in the study. Pre-test and post-test were applied to children before and after the earthquake program. The activities were carried out by the kindergarten teachers with the help of pre-service teachers. In the experimental group with parent participation, one instructive activity per day was assigned to be done at home. The personal information form and pre-test and post-test (Evaluation Test for Earthquake Knowledge) were applied to children individually by the kindergarten teachers in a private room outside the classroom.

No topic-related activity was carried out in control group. Pre-tests and post-tests were applied to the children in control group synchronously with the experimental groups by the kindergarten teachers.

Pre-tests and post-tests were analyzed by means of SPSS 13.0. Two-Way Variance Analysis (ANOVA) Technique was used in order to determine the effect of parent participation and the project. LSD, one of the Post-Hoc techniques, was used to determine the difference among groups. Frequency and percentage distribution was calculated for the last question of the Evaluation Test for Earthquake Knowledge, “What are the three most important things that should be available in the earthquake bag?”

RESULTS

According to Table 2, no significant difference was found between the pre-test mean scores of the experimental group with parent participation ($\chi = 18.35$), experimental group without parent participation ($\chi = 16.81$), and the control group ($\chi = 16.83$) [$F (2.90) = 0.092; p > 0.01$].

Also, a significant difference was found between the mean pre-test and post-test scores of the evaluation test for earthquake knowledge applied before and after the project [$F (2.90) = 59.068; p < 0.001$]. The results indicated that there was a significant difference between the pre-tests and post-tests of the two experimental
Table 1. The mean and the standard deviation values of pre-tests and post-tests obtained from experimental and control groups in the evaluation test for earthquake knowledge.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Pre-test</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>S</td>
</tr>
<tr>
<td>Experimental group with parent participation</td>
<td>31</td>
<td>18.35  2.72</td>
</tr>
<tr>
<td>Experimental group without parent participation</td>
<td>31</td>
<td>16.87  3.29</td>
</tr>
<tr>
<td>Control group</td>
<td>31</td>
<td>16.83  3.19</td>
</tr>
</tbody>
</table>

Table 2. Two way ANOVA results of the pre-test and post-test scores obtained from experimental and control groups in the test for earthquake knowledge.

<table>
<thead>
<tr>
<th>Source</th>
<th>Dependent variable</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>p</th>
<th>Significant difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected model</td>
<td>Pre-test</td>
<td>46.516</td>
<td>2</td>
<td>23.258</td>
<td>2.449</td>
<td>0.092</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Post-test</td>
<td>676.215</td>
<td>2</td>
<td>338.108</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>Pre-test</td>
<td>28010.710</td>
<td>1</td>
<td>28010.710</td>
<td>2949.275</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Post-test</td>
<td>39226.882</td>
<td>1</td>
<td>39226.882</td>
<td>6856.472</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>Groups</td>
<td>Pre-test</td>
<td>46.516</td>
<td>2</td>
<td>23.258</td>
<td>2.449*</td>
<td>0.092</td>
<td>2-1, 3-1</td>
</tr>
<tr>
<td></td>
<td>Post-test</td>
<td>676.215</td>
<td>2</td>
<td>338.108</td>
<td>59.098**</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>Pre-test</td>
<td>854.774</td>
<td>90</td>
<td>9.497</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Post-test</td>
<td>514.903</td>
<td>90</td>
<td>5.721</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>Pre-test</td>
<td>28912.000</td>
<td>93</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Post-test</td>
<td>40418.000</td>
<td>93</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected total</td>
<td>Pre-test</td>
<td>901.290</td>
<td>92</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Post-test</td>
<td>1191.118</td>
<td>92</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* p > 0.01; ** p < .001; 1: Experimental group with parent participation; 2: Experimental group without parent participation; 3: Control group.

groups, while there was no significant difference within the control group. According to the results of the LSD test which was applied to determine the differences between the groups, the mean score of the experimental group with parent participation ($\bar{x} = 23.48$) was higher than the mean score of the experimental group without parent participation ($\bar{x} = 21.16$) and the mean score of the control group ($\bar{x} = 16.96$). This finding demonstrated that the earthquake education program prepared for 5 to 6 year old children increased children’s knowledge on earthquake. The greatest increase in terms of children’s knowledge on earthquake was observed in the experimental group with parent participation. The earthquake training program with parent participation seemed to be more effective in improving children’s knowledge on earthquake compared to the program without parent participation.

Nine of the children in the experimental group with parent participation stated that they did not know the answer to the question “what the three most important things that should be available in the earthquake bag?” 22 of the children who answered the question gave 27 different answers. The three items that were most frequently stated (Table 3) were ‘food’, ‘toy’ and ‘paper-water-first aid supplies’. In the post-test all children in the group answered the question. The three items that were most frequently stated in 14 different answers in the post-test were ‘water’, ‘first aid supplies’ and ‘food’. This finding supported the effectiveness of the project in terms of the question was answered by all children, reduced numbers of answers and the percentage of correct answers that were stated in the post-test.

Eleven of the children in the experimental group without parent participation stated that they did not know the answer to the question “what the three most important things that should be available in the earthquake bag?”
Table 3. The distribution of the answers given by the experimental group with parent participation to the question “What are the three most important things that should be available in the earthquake bag?” in pre-test and post-test.

<table>
<thead>
<tr>
<th></th>
<th>Pre-test</th>
<th></th>
<th>Post-test</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>%</td>
<td></td>
<td>f</td>
</tr>
<tr>
<td>1. Food</td>
<td>8</td>
<td>11.9</td>
<td>1. Water</td>
<td>29</td>
</tr>
<tr>
<td>2. Toy</td>
<td>6</td>
<td>9.0</td>
<td>2. First Aid Supplies</td>
<td>21</td>
</tr>
<tr>
<td>3. Paper-Water-First Aid Supplies</td>
<td>5</td>
<td>7.5</td>
<td>3. Food</td>
<td>17</td>
</tr>
</tbody>
</table>

Table 4. The distribution of the answers given by the experimental group without parent participation to the question “What are the three most important things that should be available in the earthquake bag?” in pre-test and post-test.

<table>
<thead>
<tr>
<th></th>
<th>Pre-test</th>
<th></th>
<th>Post-test</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>%</td>
<td></td>
<td>f</td>
</tr>
<tr>
<td>1. Water-First Aid Supplies</td>
<td>10</td>
<td>18.2</td>
<td>1. Water</td>
<td>28</td>
</tr>
<tr>
<td>2. Food</td>
<td>7</td>
<td>12.7</td>
<td>2. Food</td>
<td>21</td>
</tr>
<tr>
<td>3. Clothes</td>
<td>6</td>
<td>10.9</td>
<td>3. Torch</td>
<td>11</td>
</tr>
</tbody>
</table>

Table 5. The distribution of the answers given by the control group to the question “What are the three most important things that should be available in the earthquake bag?” in pre-test and post-test.

<table>
<thead>
<tr>
<th></th>
<th>Pre-test</th>
<th></th>
<th>Post-test</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>%</td>
<td></td>
<td>f</td>
</tr>
<tr>
<td>2. Plaster</td>
<td>10</td>
<td>10.2</td>
<td>2. Milk</td>
<td>16</td>
</tr>
<tr>
<td>3. Food</td>
<td>8</td>
<td>8.2</td>
<td>3. Food</td>
<td>10</td>
</tr>
</tbody>
</table>

20 of the children who answered the question gave 20 different answers. The three items that were most frequently stated (Table 4) were ‘first aid supplies, ‘food’ and ‘clothes’. In the post-test all children in the group answered the question and the three items that were most frequently stated in 9 different answers were ‘water’, ‘food’ and ‘torch’. This finding supported the effectiveness of the project on the experimental group in terms of all children answered the question in the post-test, reduced numbers of answers and the percentage of correct answers that were stated.

Three of the children in the control group stated that they did not know the answer to the question “what the three most important things that should be available in the earthquake bag?” 28 of the children who answered the question gave 16 different answers. The three items that were most frequently stated (Table 5) were ‘clothes’, ‘plaster’ and ‘food’. In the post-test 2 children in the group could not answer the question. 29 of the children who answered the question gave 16 different answers again. The three items that were most frequently stated were ‘clothes’, ‘milk’ and ‘food’. As it is shown, some children could not answer the question in the post-test either. Moreover, the answers were not different in terms of number and name. When the answers in both experimental and control groups were compared (in terms of number and name), a finding was obtained in favor of the experimental groups.

According to the Disaster Preparedness and Earthquake Education Association, the first aid bag should include water, torch, spare battery, pipe, battery-operated radio, telephone card, money, nonperishable food, medicine and clothes in an order of priority (Earthquake Grandfather is Narrating the Earthquake, 2010). Four of the 27 different answers (food, water, first aid supplies, money) given by the children in the experimental group with parent participation in pre-test were correct. Eight of the 14 different answers (water, first aid supplies, food, money, pipe, torch, medicine, clothes) given by the same group in the post-test were correct. Five of the 20 different answers (clothes, food, first aid supplies, water, money) given by the children in the experimental group without parent participation in pre-test were correct. Eight of the 9 different answers...
(water, first aid supplies, food, money, pipe, torch, medicine, clothes) given by the same group in the post-test were correct. Four of the 16 different answers (food, clothes, plaster, water) given by the children in the control group in pre-test were correct. Four of the 16 different answers (food, clothes, plaster, water) given by the same group in the post-test were correct.

When the findings above were evaluated, it was concluded that the earthquake education program caused a difference between the pre-test and post-test results of the experimental groups.

**DISCUSSION**

According to the results of the study, it was determined that the mean scores of the experimental group with parent participation (Group 1) was significantly higher than those of the experimental group in which only classroom activities were carried out (Group 2) and those of the control group. A significant difference was observed between the mean scores of the other experimental group (Group 2) and the control group in favor of the experimental group. These findings proved the effectiveness of the program conducted with parent participation. Education is the most important tool in providing information about the earthquake. Studies carried out with different age groups indicated that increasing the knowledge and awareness level about the earthquake improved the individuals’ readiness to earthquake and contributed more to the reduction of negative effects of earthquake (Öcal, 2005, 2007). Proctor et al. (2007), in their study conducted with 177 children at the age of 4 to 5 and their parents, found that the reactions of children after an earthquake were closely related to the behavior of their parents behaved and that children took their parents as role models in their behaviors before the earthquake. Including mothers to psychological support workshops after natural disasters like earthquakes increased the effectiveness of the workshops (Güvercin, 2006). In this respect, the workshops about natural disasters should be multi-dimensional and should include the parents. The projects conducted in Turkey with preschool children and their parents on earthquake were not sufficient and widespread enough. This issue was highlighted in the Earthquake Council held by the Ministry of Public Works in 2004, and it was noted that the earthquake education should be started in preschool period (Education Commission Report, 2004). There are also a few studies conducted at the level of primary and secondary school. It was determined in one of these studies that the Basic Natural Disaster Awareness Education Program applied to 105 students from the 6th grade of primary schools increased children’s knowledge levels about earthquake (Özgüven, 2006). There are also studies carried out on the earthquake education in Turkey especially at the level of primary, secondary and high schools. It was concluded in these studies that visual materials (painting books, handbooks, brochure, etc.) about earthquake for preschool children were more commonly applied compared to education programs (Mischievous World. Earthquake and Living with It, 2004; Istanbul Seismic Risk Mitigation and Emergency Preparedness Project, 2010; Danger Hunt, 2009).

Mitchell (2009), in his study on the primary school programs of 10 States in the Northeastern part of the USA, found that the education programs on natural disaster were inadequate and that no connection was made between natural disaster issues and scientific and social issues. The same study showed that natural disaster issues were taken into account the least in kindergartens. It has also been reported that it is required to establish a cooperation between schools, parents and society in order to reduce the negative effects of earthquakes (Margolin, Ramos and Guran, 2010).

**Conclusion**

The findings indicated that the program carried out with parent participation was effective. This study is limited to 93 children receiving preschool education. Larger sampling groups may be created for further research on this subject. The longitudinal results of earthquake education might be followed. Besides education programs, longitudinal projects may be designed to develop earthquake awareness and increase knowledge about earthquake. The relationship between different variables (socio-economic level, age, gender, etc.) and earthquake knowledge and awareness may be examined.

Schools are the most advantageous institutions to reduce the risk in natural disasters like earthquakes. The applications carried out at schools for this purpose may help to inform children, teachers and parents and to reduce risks in the process of fight against disasters. It is important to train as many people as possible in a short period in order to reduce risks. Thus, education programs should include all educational levels starting from the kindergartens. Permanent child learning and adult education should be maintained through applications with parent participation. Besides special educational projects, courses related to earthquake and/or natural disasters in school programs would be beneficial. In reducing earthquake-related risks, education should be accompanied by necessary improvement studies to be carried out in all buildings, especially at schools, homes and working offices. In the construction of new buildings, a control system should be established concerning the implementation of earthquake regulations. It might also be informative and suggestive to show presentations, programs, advertisements and videos about the reduction of earthquake risk regularly via mass communication.
tools like radio, television, the Internet and newspapers.

REFERENCES


Izzet Baysal University, Bolu, Turkey.


