Research Article

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# PREPAREDNESS FOR EARTHQUAKE: KNOWLEDGE AND BEHAVIOR*

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## ABSTRACT

This research; is a cross-sectional survey conducted on individuals aged 18 years and over to determine the level of earthquake information and the extent to which their information is transformed into practice for individuals living in Erzincan province in the first- degree earthquake hazard zone. In the study, although the participants' knowledge point averages (82.17 ± 17.24) were quite high, the average behavior scores (36.27 ± 23.83) were found to be low. It was found that there was no significant relationship between the participants' knowledge scores and demographic characteristics, but the behavior average scores of the males were found to be meaningfully significantly higher when man compared to women, married compared to single, homeowners compared to non-homeowners, people with experience of devastating earthquake compared to those who were not experienced and owing to earthquake,people that lost their relatives in earthquake compared to those who did't loose ($p<0.05$). Very few (33.0%) of those who knew that they needed an earthquake bag (92.8%) were found to have an earthquake bag at home. It was also found that very few (19.3%) of those, who knew they had to have fire extinguishers, had fire extinguishers at home. It was determined that the rate of participants' who feltas if they were ready for earthquake (6.2%) was very low. As a result; it was found out that the average of earthquake knowledge score of the individuals was high but the average of behavior score was low. In line with this result, we propose to give practical trainings to transform their information about earthquake into behavior.

**Keywords:** Disaster, Earthquake, Earthquake Knowledge Level, Erzincan, Preparedness.

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## 1. INTRODUCTION AND PURPOSE

Earthquake, cracks in the ground and movements due to breakage is called the earth shaking event (Karancı at al., 1999). In 2016, there were 14.128 earthquakes in the world with a magnitude of 4.0 and above (Ersoy, 2017). Turkey is located in the most dangerous area (Pampal and Özmen, 2009). Earthquake is one of the greatest materially and spiritually problems for our country as a natural disaster. According to the earthquake zones map, 96% of the land in our country is under earthquake hazard and 98% of our population lives in risky regions (Taş, 2003).

Erzincan province in terms of the threat of earthquakes is one of Turkey's most risky localities. Within the boundaries of Erzincan province, 33 earthquakes in the historical process that caused great damage until 1900 have come to the scene. During the instrumental period (after 1900), 13 earthquakes that have caused damage greatly occured; 34,123 people lost their lives, 3,982 people were injured and 127,891 houses were seriously damaged (Pampal and Özmen, 2009). The great earthquakes in Erzincan caused the introduction of the first laws about earthquakes.

Considering buildings affected by earthquakes and the number of people who died, it is seen that earthquakes are much more affected by financial and moral capital than other types of disasters (Akar, 2013). In the last century, due to natural disasters, direct losses of our country constitute 1% of the Gross National Product (Karagöz, 2007). Indirect losses are much more. The ertquake that occured in August 17, 1999 inTurkey is reported to have animpact on public finances about 6.2 billion dollars (DPT, 1999).

Undoubtedly, the most important thing to be planned and to be implemented by various institutions, which can be classified in different stages, before, during and after the earthquake, is to make people aware of the earthquake (Aksoy and Sözen, 2014).

Earthquake awareness is to understand the risks of earthquakes and to protect people from earthquake. Being aware of earthquake requires not only learning the correct information to create earthquake awareness, but also having the right attitude, behavior and skills to determine where and how to act against earthquake (Demirci and Yıldırım, 2015).It is almost impossible to completely eliminate the problems that have occurred during the earthquake (Şimşek, 2007). But if the earthquake can be known byhumans, the effects of the earthquake can be reduced to minimum. Acquisition of earthquake consciousness; it is necessary for individuals to know what they have to do before and during the earthquake, and to apply them correctly. Therefore, in order to determine the behaviors that are effective in the acquisition of earthquake consciousness, the things to be donebefore, during and after earthquake must be determined and taught to people (Aydın, 2010).

On the other hand, having an earthquake consciousness does not only mean memorizing the rules about earthquake-related scientific facts, what should be done before and after the earthquake. Earthquake consciousness expresses consciousness against eartquakesby showing right thinking, right decision and correct behavior by individuals and society (Demirci and Yıldırım, 2015).

The most effective way to struggle disasters is to take precautions before disasters to reduce the losses and losses that may result from disasters (Ulaş Kadıoğlu and Uncu 2018). One of the most important issues in disaster mitigation studies is to raise public awareness. In order to run a successful disaster mitigation program, members of the community must understand the fact that the effects and risks of natural and technological disasters can be reduced (Sözen et al., 2001: 7-4).

The prevailing strategy for earthquake preparation is the wound wrapping strategy. However, the main strategy to be implemented should be a total preparedness and non-injury strategy that will reduce losses and increase resilience. The adoption of this strategy, greater attention to the period before the earthquake in Turkey, and dissemination of labor that should be invested in, and institutionalization of legislation related changes are to be made mandatory. In addition to Disaster

Management, there is a need to turn to Risk Management, Crisis Planning, as well as planning forms with probability scenarios (Balamir, 2000: 44).

Increasing awareness of earthquake preparedness in Japan is important for minimizing the damage caused by earthquake disaster. For this reason, dissemination of useful information about the earthquake and training of the citizens are carried out by disaster prevention personnel. Movies about the subject are shown, fairs are organized, and awareness of being prepared through radio and television is kept alive. Every year, the first day of September is declared as "National Earthquake Prevention Day" and earthquake drills are held on a national scale (Şengezer, 2000: 74).

Social preparedness against disaster in the USA is an integral part of disaster preparedness programs. Each settlement unit is considered as a local government unit and each one has different characteristics, resulting in different measures taken. In the latest study aimed at reaching the communities, all emergency materials were collected and these were matched to the relevant units using the most effective distribution method. For this, a support mechanism has been developed by using funds allocated for emergencies to units lacking the necessary resources in order to take action without involving past primary duties (Day, 2000: 121).

In the study carried out by Karancı (1997), it was found that a great majority of them still have earthquake anxiety after the 1992 Erzincan earthquake and they did not prepare for possible earthquakes for 5 years.

It was observed in the Askale-Erzurum earthquake that the principles of protection are neglected and distorted construction, which does not comply with the rules, may produce serious results in this and similar natural disasters, although its severity is low. Although our country is in the earthquake zone, it has shown that our people are not sufficiently conscious about the reality of the earthquake and that we do not have enough information about what we should do to protect against natural disasters such as earthquakes (Çakır et al., 2016).

There are some studies on earthquake preparedness that have assessed the readiness of individuals based on their knowledge and skills (Haraoka vd., 2012; Chetkovic vd., 2015; Bahtiyeh ve Öcal, 2016; Öcal, 2011]. Some studies have also considered structural and non-structural safety in some cities (Dargahi vd, 2017) and some studies have investigated students' readiness (Ronan vd., 2015; Amanat vd, 2013).

Other studies have discussed the relationship between earthquake preparedness and personal, socio-economic, cultural and psychological factors (Dooley vd., 1992; Junn ve Guerin, 1996). Researchers have attempted to analyse such factors as age, sex, income and previous earthquake experience (Palm ve Carroll, 1998); socio-economic status [18]; attitudes towards disasters (Palm, 1998); physical capacity and social attachments and relationships and (Mileti vd., 2004); and home ownership and fear of natural disasters (De Man ve Simpson-Housley, 1987), especially of earthquakes (Turner vd., 1986). These factors significantly influence public preparedness, which varies by region, time and population group (Farley vd., 1993).

In the literature, there have not been enough studies to raise awareness and preparedness of the people before the disaster. This study will make an important contribution to individuals in developing their knowledge and behavior related to disasters. It is very important that the people living in the 1st degree earthquake zone are conscious about the earthquakes and to be ready for earthquakes. This research was planned in order to determine the level of knowledge and behavior of the people about earthquakes and to determine their preparedness against earthquakes.

## 2. MATERIAL AND METHOD

### 2.1 Purpose of the research

The purpose of this research is to determine the level of knowledge of adult individuals regarding earthquakes and the extent to which they apply this information in preparation for earthquakes.

### 2.2 Type of Study

This research is a cross-sectional study.

### 2.3 The Universe of the Research and Sampling

The universe of the study was 69,502 people aged 18 years and over living in the neighborhoods and borders of the Central District of Erzincan Province. The sample consisted of 397 people identified by the Yamane formula, but the study was carried out by 400 people.

Systematic sampling method was used when sample was selected from the participants. According to TSI (Turkish Statistical Institute) data, the average household size in our country is 3.8. Taking this average into consideration, the average number of households in Erzincan was calculated as 18,290. By dividing the number of households by the number of samples, the number of cycle (45) was found. In each district, the first digit of the questionnaire was determined by lot method from 1 to 10 numbers. The specified number of cycle (45) has been added each time to reach 400 persons. If they refused to participate in the survey, or if they were not at home, a questionnaire has been applied to one of the digits after the first digit.

The questionnaire was applied by interviewers who were trained by researcher and applied between 29.04.2016-13.05.2016 with face to face interview technique. Questionnaires were applied with the approvalof the participants.

### 2.4 Data Evaluation

The data obtained in the research were transferred to the computer via package programs. Percentage ratios, t-test, variance analysis and chi-square significance tests were used in the analysis of the data. The Statistical Package for Social Sciences (SPSS) for Windows (Version 21.0) was used for the statistical analysis. Level of significance was taken as $p<0.05$.

### 2.5 Earthquake Preparedness Questionnaire (EPQ)

The Earthquake Information Scale (EIS) consists of 23 questions developed by Spittal et al. (2006) and adapted to Turkish by Oral et al. (2015). The EIS was formed by adding "do" and "do not" options by the researcher to measure the state of being prepared for earthquake. Cronbach's alpha coefficient calculated to verify the reliability of the EPQ was obtained as 0.89. The scale form used to measure the earthquake knowledge levels of the participants was used with permission.

Scoring of the scale was made by calculating over 100 points by giving four full points to the “I know” and “I did” options of 25 questions in total, along with compulsory earthquake insurance, determining the meeting place after earthquake and 23 questions in scale. “I don’t know” and “I didn’t” options aren’t rated. Increasing the preparation and behavioral score in the scale means that the participants have high earthquake information levels. Items 7-12, 14-18, 20-23 describe mitigation actions, and eight items 1-6 and 19 describe survival actions. The instructions of the scale asks participants to indicate, by circling Yes or No, which steps they had taken to prepare for a major earthquake and this format makes it easy for participants from different education levels to complete. "I made" options for 25 questions in total, together with the 23 questions in the questionnaire, compulsory earthquake insurance and determination of meeting place after earthquake.

### 2.6 Ethical Aspect of the Research

Ethical committee approval numbered 2019/10 was obtained from the Scientific Research Ethics Committee of the Rector's Office of Gümüşhane on 21.11.2019 in order to conduct the research.

## 3. FINDINGS

400 people over 18 years of age residing in Erzincan city center participated in the survey. The socio-demographic characteristics of the participants are given in Table 1.

**Table 1. Demographic features of Participants**

| Demographic features | N | % |
|---|---|---|
| **Gender** | | |
| Female | 199 | 49.8 |
| Male | 201 | 50.2 |
| **Age Groups** | | |
| 18-25 | 103 | 25.7 |
| 26-35 | 154 | 38.5 |
| 36-45 | 105 | 26.3 |
| 46+ | 38 | 9.5 |
| **Income (TL)** | | |
| 0-1,299 | 108 | 27.0 |
| 1,300-2,599 | 203 | 50.7 |
| 2,600-3,499 | 60 | 15.0 |
| 3,500+ | 29 | 7.3 |
| **Education status** | | |
| Primary School | 44 | 11.0 |
| Middle School | 38 | 9.5 |
| High School | 134 | 33.5 |
| Associate Degree | 83 | 20.7 |
| University Degree | 85 | 21.3 |
| Master's Degree+PhD | 16 | 4.0 |

It was found that 49.8% of the participants were female, 50.2% were male, the majority (38.5%) were in the 26-35 age group and 33.5% were high school graduates, 18 were the younger, 84 were the elder, average age was32, average monthly income was 1,679 TL (Table 1).

**Table 2. Socio-Demographic Characteristics of Participants**

| Socio-Demographic Characteristics | N | % |
|---|---|---|
| **Marital Status** | | |
| Single | 179 | 44.7 |
| Married | 221 | 55.3 |
| **Working Condition** | | |
| Self employed | 156 | 39.0 |
| Public employee | 119 | 29.8 |
| Unemployed | 96 | 24.0 |
| Private employee | 29 | 7.2 |
| **Residential Type** | | |
| Single storey | 82 | 20.5 |
| Two storey | 77 | 19.3 |
| Three storeyand over | 241 | 60.2 |
| **Residential Home Ownership** | | |
| Own House | 244 | 61.0 |
| Rent | 156 | 39.0 |

Again, 44.7% of the participants were single, 55.3% were married, considering their job status mostly (39%) was composed of workers, 61% were living in their own homes and 60.2% were living in three or more storey houses.

**Table 3. Rates of Participants to Know Earthquake Survey Questions Correctly**

| Survey Questions | Knows | | Applies | |
|---|---|---|---|---|
| | N | % | N | % |
| 1. It is necessary to think about the possibility of a major earthquake when buying, renting or building the house we currently live in. | 373 | 93,3 | 187 | 46,8 |
| 2. The cupboards must be fixed to the wall. | 368 | 92,0 | 131 | 32,8 |
| 3. Youneedto fasten the combior hot water tank. | 363 | 90,8 | 224 | 56,0 |
| 4. It is necessary to take measures to strengthen the chimney of the building or house we live in or to reduce the possibility of collapse in a major earthquake. | 336 | 84,0 | 163 | 40,8 |
| 5. We need to take measures to increase the earthquake resistance of the building we live in or to reduce the possibility of collapse in a major earthquake. | 369 | 92,3 | 155 | 38,8 |
| 6. We need to take measures to reinforce our roof or reduce the likelihood of collapse in a major earthquake. | 360 | 90,0 | 161 | 40,3 |
| 7. We need to make a new arrangement in our cupboards so that heavy objects are at ground level. | 334 | 83,5 | 153 | 38,3 |
| 8. Weneed to attach safety latches to our cupboards. | 298 | 74,5 | 80 | 20,0 |
| 9. It is necessary to be careful that the items containing water do not stand on electrical appliances. | 355 | 88,8 | 224 | 56,0 |
| 10. It is necessary to ensure that heavy objects stand on the ground. | 377 | 94,3 | 239 | 59,8 |
| 11. We need to store water to survive. | 353 | 88,3 | 92 | 23,0 |
| 12. Excess pochette and toilet papers should be stored to meet our toilet needs in emergencies. | 307 | 76,8 | 112 | 28,0 |
| 13. After a major earthquake, it is necessary to separate enough tools to make minor repairs at home. | 324 | 81,0 | 170 | 42,5 |
| 14. You need to get canned food for emergency use. | 352 | 88,0 | 85 | 21,3 |
| 15. You need to get a first aid kit. | 371 | 92,8 | 132 | 33,0 |
| 16. It is necessary to take the essential medicines necessary for use in diseases and allergies. | 342 | 85,5 | 114 | 28,5 |
| 17. You need to get a radio with a running battery. | 314 | 78,5 | 95 | 23,8 |
| 18. You need to get a running lantern. | 367 | 91,8 | 233 | 58,3 |
| 19. In our house, it is necessary to secure the movable items such as computers and televisions. | 361 | 90,3 | 190 | 47,5 |
| 20. It is necessary to buy an alternative cooking source (such as a barbecue, small tube, etc.). | 332 | 83,0 | 169 | 42,3 |
| 21. After the earthquake, it is necessary to determine a meeting point for everyone. | 319 | 79,8 | 81 | 20,3 |
| 22. You need to get a working fire extinguisher. | 345 | 86,3 | 77 | 19,3 |
| 23. You need to take some precautions in your workplace. | 343 | 85,8 | 106 | 26,5 |

When we look at Table 3, one of the questions we asked to determine the level of knowledge about the earthquake was "It is necessary to keep the heavy items on the ground", which is the most well-

known question, and 94.3% of the participants gave yes answer to this question. This ratio is the highest of 23 questions. However, when looking at the rate of applying this information; the application was found to be below the level of knowledge (59.8%). In addition, while the awareness rate of the question "It is necessary to consider the possibility of a major earthquake when buying, renting or building the house we live in" is high (93.3%), theapplication rate (46.8%) is low. Likewise, the awareness rate of the question of "It is necessary to buy a first aid kit" is high (92.8%) but application rate is low (33.0%).

The most basic need for sustaining our life after an earthquake is water and food. However, participants were found to have a very low rate of applicationof "storing water for survival" (23.0%) and "storing canned food to use in emergency situations" (21.3%).

In our study, we have found that the average score of the information about the earthquake was very high (82.17), but the situation is not satisfactoryat all about what to do about the earthquake. When the participants' behavior score averages were evaluated, it was found that they were very low (36.27) according to the knowledgepoint averages.

**Table 4. Comparison of Participants' Knowledge and Behavior Score Average by Some Socio-Demographic Characteristics**

| **Socio-Demographic Characteristics** | **Knowledge Score ($\bar{X}$±Sd)** | **Behavior Score ($\bar{X}$±Sd)** | **Socio-Demographic Characteristics** | **Knowledge Score ($\bar{X}$±Sd)** | **Behavior Score ($\bar{X}$±Sd)** |
|---|---|---|---|---|---|
| **Gender** | | | **Getting Earthquake Training** | | |
| Female | 81.76±17.00 | 32.84±23.05 | Trained | 86.88±13.76 | 46.77±26.76 |
| Male | 82.56±17.51 | 39.66±24.16 | Untrained | 80.35±18.10 | 32.23±21.32 |
| **t** | -0.462 | -2.886 | **t** | 3.43 | 5.67 |
| **p** | 0.644 | 0.004 | **p** | 0.001 | 0.001 |
| **Marital status** | | | **Getting First Aid Training** | | |
| Married | 82.15±16.88 | 38.75±22.84 | Trained | 84.83±14.95 | 41.69±24.05 |
| Single | 82.18±17.72 | 33.20±24.72 | Untrained | 78.34±19.51 | 28.46±21.28 |
| **t** | 0.21 | -2.32 | **t** | 3.76 | 5.66 |
| **p** | 0.983 | 0.021 | **p** | 0.001 | 0.001 |
| **Residential Home Ownership** | | | **Compulsory Earthquake Insurance** | | |
| Rent | 80.64±18.49 | 32.35±23.30 | Insured | 85.80±14.28 | 44.33±22.86 |
| Own House | 83.14±16.36 | 38.77±23.88 | Not Insured | 79.28±18.81 | 29.86±22.66 |
| **t** | 1.42 | 2.64 | **t** | 3.82 | 6.31 |
| **p** | 0.157 | 0.009 | **p** | 0.001 | 0.001 |
| **Experienced a Destructive Earthquake** | | | **Setting a meeting place** | | |
| Yes | 83.41±14.76 | 39.60±24.42 | Determined | 91.16±10.54 | 55.79±25.47 |
| No | 80.30±19.15 | 31.27±22.06 | Undetermined | 80.02±17.84 | 31.61±20.92 |
| **t** | 1.775 | 3.469 | **t** | 5.263 | 8.717 |
| **p** | 0.077 | 0.001 | **p** | 0.001 | 0.001 |
| **Loosing Relatives in Eartquake** | | | | | |
| Lost | 84.85±16.89 | 44.50±26.67 | | | |
| Not lost | 81.73±17.28 | 34.93±23.10 | | | |
| **t** | 1.25 | 2.81 | | | |
| **p** | 0.209 | 0.005 | | | |

When Table 4 is examined, it was found that there was no statistically significant relationship between the participants' knowledge scores and gender, marital status, living house, destructive earthquake, and loss of relativesinthe earthquake (p> 0.05).

There was a significant difference between the participants those who had compulsory earthquake insurance compared to those who did not have (p <0.05). In addition, those who determined a meeting place after the earthquake were found to have significantly higher mean scores of knowledge and behavior than those who did not (p <0.05).

According to those who did not take earthquake and first aid trainings, it was found that the average scores of knowledgeand behavior scores were significantly higher than those who did not, and the knowledge and behavior score averages were significantly higher than those who did not determine meeting place after earthquake (p <0.05).

**Table 5. Comparison of Participants' Knowledge and Behavior Score Average by Some Socio-Demographic Characteristics and Feeling Prepared to Earthquake**

| | Knowledge Score ($\bar{X}$±Sd) | Behavior Score ($\bar{X}$±Sd) |
|---|---|---|
| **Education status** | | |
| Primary School | 81.18±19.75 | 38.18±22.48 |
| Middle School | 80.84±18.83 | 32.00±23.81 |
| High School | 81.55±18.45 | 36.35±25.65 |
| Associate Degree | 83.66±13.40 | 35.61±24.15 |
| University Degree | 82.21±16.73 | 36.94±21.45 |
| Master's Degree+PhD | 85.25±17.69 | 40.25±24.10 |
| **F** | 0.332 | 0.413 |
| **p** | 0.894 | 0.840 |
| **Income (₺)** | | |
| 0-1,299 | 79.77±19.45 | 29.81±22.91 |
| 1,300-2,499 | 83.27±14.83 | 37.67±24.03 |
| 2,500-3,499 | 83.80±17.30 | 40.00±21.55 |
| 3,500+ | 80.00±23.05 | 42.75±26.31 |
| **F** | 1.303 | 4.179 |
| **p** | 0.273 | 0.006 |
| **Working Condition** | | |
| Self employed | 83.89±15.77 | 39.22±20.86 |
| Public sector employee | 84.82±12.93 | 50.20±20.74 |
| Unemployed | 82.92±16.30 | 36.33±26.46 |
| Private sector employee | 78.00±20.80 | 28.29±21.00 |
| **F** | 2.630 | 7.889 |
| **p** | 0.05 | 0.001 |
| **Residential Type** | | |
| Single storey | 81.17±18.15 | 30.82±23.21 |
| Two storey | 82.90±16.72 | 40.88±26.46 |
| Three storey and over | 82.27±17.14 | 36.64±21.00 |
| **F** | 0.212 | 3.656 |
| **p** | 0.809 | 0.027 |
| **Feeling Prepared to Earthquake** | | |
| I'm never prepared | 80.51±18.76 | 28.23±20.80 |
| I'm a little prepared | 83.28±14.98 | 42.02±19.93 |
| I am very prepared | 90.40±12.64 | 74.08±25.24 |
| **F** | 4.261 | 63.966 |
| **p** | 0.015 | 0.001 |

When Table 5 is analyzed, no statistically significant difference was found between the educational status and the average of knowledge and behavior score of the participants in the research group (p> 0.05). A statistically significant difference was found between the groups that felt prepared for earthquake in terms of the mean score of the participants in the study group (p <0.05). As a result of the Post Hoc Tukey test conducted to understand between which groups the difference is, it is determined that the difference is between the groups that say "I am not prepared at all" and "I am very prepared" (9.88). In addition, a statistically significant difference was found between the groups that felt prepared for earthquake in terms of the mean score of the participants (p <0.05). The difference was found to be between the groups saying "I am not prepared at all" and "I am a bit prepared" (13.79) and "I am not prepared at all" and "I am very prepared" (45.84).

**Table 6. Participants' Feeling Readiness to Earthquake**

| **Feeling Readiness to Earthquake** | **N** | **%** |
|---|---|---|
| I'm never ready | 225 | 56,2 |
| I'm a little ready | 150 | 37,5 |
| I am very ready | 25 | 6,3 |
| **Total** | **400** | **100** |

When Table 6 was examined, 56.2% of the people in the research group stated that they were never ready to earthquake, 37.5% were a little ready and 6.3% were very ready. It has been found that the majority of people in our research do not feel themselves ready to earthquake. This is also evident from the fact that the average behavior score is low (36.27).

**Table 7. Percentage of participants who report having undertaken the survival and mitigation actions listed in the EIS**

| | **Yes (%)** |
|---|---|
| **Survival Actions** | 31 |
| **Mitigation Actions** | 51 |

The average percentage of damage mitigation and survival actions carried out by Erzincan participants were 51 and 31 percent, respectively. The earthquake preparation activities undertaken by the Erzincan participants were "It is necessary to ensure that heavy objects stand on the ground" and "It is necessary to think about the possibility of a major earthquake when buying, renting or building the house we currently live in". The fact that the average preparation score is very high for Erzincan is thought to be caused by major earthquakes in the past.

## 4. DISCUSSION

61% of natural disasters occurring in our country are earthquakes (Işık vd., 2015). The measures to be taken against earthquakes are very important in terms of loss of life and property. The most important of these measures is public awareness studies.

In Spittal et al.'s (2006) study; while the awareness of the first aid kit preparation was moderate (66.10%), the rate of thinking about the possibility of a major earthquake when buying, renting or building the house they live in (37.33%), buying a working fire extinguisher (33.22%), to determine the meeting place after eartquake (19.18%), to increase the earthquake resistance of the building or house they live in or to reduce the possibility of collapse in a major earthquake (33.22%) awareness was found to be low.

In a study conducted by Güngörmış et al. (2012), it has been reported that the rate of buying a first aid kit (92.7%), thinking about the possibility of a major earthquake when buying, renting or building the house they live in (79.4%), buying a working fire extinguisher device (% 83.1), determining the meeting place after an earthquake (64.1%), taking measures to increase the earthquake resistance of the building or house they live in or reducing the possibility of collapse in a major earthquake (84.1%) awareness was high.

In our study, it was determined that the proportion of these expressions was higher than the other studies conducted and that these ratios increased gradually with years. This shows that people consider the risk of earthquakes when buying, renting or building a house. Moreover, it can be said that they have earthquake awareness in order to reduce loss of life and property after an earthquake, to receive first aid kit, to have fire extinguisher and to determine meeting place.

In our study, no significant difference was found between men and women in terms of the average of earthquake knowledge scores. In the study of Kadıoğlu and Uncu (2018), no statistically significant difference was found between gender and disaster knowledge scores. In the study of Ünal et al. (2017), a statistically significant difference was found between gender and disaster preparedness levels.

No significant difference was found between gender and earthquake knowledge point averages in Polat's (2014) and Öcal's (2007) studies. Polat's (2014) and Öcal's (2007) studies support the study we have conducted. However, Soffer et al. (2010) found that there is a meaningful relationship between gender and earthquake knowledge scores and this is in conflict with our study. Since our study is conducted in 1$^{st}$ degree earthquake zone, the average score of the individuals was found to be high. It is thought that this situation has eliminated the meaningful difference.

In our study, a significant difference was found between men and women in terms of average earthquake behavior score. In the study conducted by Najafi et al. (2015), it was found that disaster preparedness behavior scores of men were statistically more significant than women. In the study of Ostad Taghizadeh et al. (2012), no significant relationship was found between gender and earthquake preparedness. The precautions about being prepared where our study is carried out are mostly taken by household heads, and in our society, household heads are mostly men. This situation is thought to reveal the relationship between gender and average earthquake behavior score. In our study, no statistically significant difference was found between the marital status of the participants and the earthquake knowledge score average. In Polat's (2014) and Oral et al.'s (2015) study; it was reported that the average score of the married people was significantly higher than that of the single ones. It is thought that earthquake awareness is reduced to all segments of the society.

In our study, a significant difference was found between the ownership of the house where the participants reside and the mean score of behavior. Spittal and his colleagues in 2006 and 2008 reported that there was a significant positive correlation between having a home ownership and being prepared for earthquake. The studies are supporting each other.

In our study, no significant difference was found between the participants' destructive earthquake experiencing situations and the average earthquake knowledge score. In the study conducted by Öcal (2011), no significant difference was found between the earthquake experience and earthquake knowledge score. In the study of Ünal et al. (2017), a significant relationship was found between disaster survival experience and disaster levels. Ostad Taghizadeh et al. (2012) in the study they have conducted reported that there is a significant positive correlation between earthquake experience and earthquake knowledge level and earthquake preparedness. It is understood that those who lost their relatives in the earthquake transformed the earthquake knowledge into behavior more than the other persons.

In our study, a significant difference was found between participants' destructive earthquake situations and their mean behavior score. In the study conducted by Najafi et al. (2015), a significant difference was found between the individuals who experienced disasters and their behavioral score.

In our study, no significant difference was found between the educational status of the participants and the average of knowledge and behavior score. In the study conducted by Kadıoğlu and Uncu (2018), the difference between the knowledge scores according to the educational status is statistically significant. As the education level increases, the average of knowledge points increases. In the study conducted by Öcal (2011), no significant difference was found between disaster education status and earthquake knowledge score. In the study conducted by Soffer et al. (2010), no significant difference was found between their educational status and the average of knowledge and behavior score (Soffer, 2010: 4). It is thought that disaster information activities in the society are gradually increasing.

In our study, a statistically significant difference was found between the participants' earthquake education status and the average of earthquake knowledge score. In the study conducted by Kadıoğlu and Uncu (2018), the difference between disaster education status and disaster knowledge average score is statistically significant. A significant difference was found in the study conducted by Polat (2014). The studies are supporting each other.

## 5. CONCLUSION AND RECOMMENDATIONS

In this study, where we examined the state of earthquake preparedness in terms of earthquake knowledge and behavior levels of the people living in the 1st degree earthquake zone, the following results were reached:

• Significant differences were found between the mean knowledge scores of the participants and their job status, earthquake training, first aid training, compulsory earthquake insurance, determining a meeting place and feeling prepared for earthquake. A significant difference was found between the average behavior score of the participants and being male, being married, having high income, working situation, sitting in their own home, having experienced destructive earthquake, losing relatives as a result of earthquake, getting earthquake and first aid training, complying with compulsory earthquake insurance, determining a meeting place and feeling prepared for earthquake.

• The top three information that the public knows the most are; stabilizing heavy items on the ground, thinking about the possibility of a major earthquake when buying, renting or building the house we live in and buying an earthquake kit.

• The top three behaviors that the public applies the most are; to stabilize heavy items on the ground, to get a working lantern, to fix the combi or hot water tank.

• While the vast majority of women do not feel prepared for earthquake, most of the men feel more or less prepared.

Based on these results, our suggestions are:

• Providing practical training through various public and private organizations to transform the earthquake information of individuals into behavior,
• Determination of meeting areas after the earthquake by governorships and municipalities and informing the public with various signs and lighting,
• Obligation to keep earthquake kit and fire extinguisher in the houses,
• Fixed construction of cabinets and locked doors during the construction of houses and furniture,
• It is recommended to carry out social projects on earthquake and first aid education that will especially involve women.

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