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Information of Formal Education Students of Civil Defense and Firefighting Program about Lightning, Lightning Strike and Stroke of Lightning

Kemal BAŞ[1]

Abstract

This research was carried out to determine the knowledge of the students studying in the civil defense and firefighting program in a vocational school of a university about lightning, lightning strikes, and the misconceptions about lightning strikes. The data of the study were collected through a questionnaire consisting of 46 questions created by the researchers. The questionnaire form was distributed by a lecturer at Amasya University Suluova Vocational School during classes on 15.05.2018-22.05.2018 and was collected again after being applied under observation. The data were evaluated in the Statistical Package for Social Sciences (SPSS) 25.0 package program, descriptive statistics were given as numbers and percentages, and the Chi-square test was used to evaluate the difference between the groups. Type 1 error value $\alpha<0.05$ was accepted as significant in statistical analysis. A total of 146 students participated in the research. The majority of the students (94.5%) have not received training on lightning before. In some propositions about lightning, it was determined that most students' knowledge about lightning was wrong. When the students are compared according to their age groups, there is a significant difference between the groups ($p=0.004$). A significant difference was found between those aged 18-20 and those aged ≥24 years. The students' knowledge about lightning, lightning strikes, and strikes is insufficient. The lightning curriculum should be added to the Civil Defense and Firefighting programs.

Keywords: Lightning, Lightning Strike, Civil Defense and Firefighting

1. INTRODUCTION

Disaster is defined as events that cause economic and social losses, interrupt social life and develop suddenly. When natural or technological hazards are combined with risk, devastating disasters can occur. Disaster studies, which require a multidisciplinary approach, should be carried out from both technical and social sciences perspectives (Varol and Gültekin, 2016). According to their source, disasters can be divided into two as natural disasters and technological disasters. Disasters caused by natural events of geological, meteorological and hydrological origin such as earthquakes, tsunamis, volcanic eruptions, floods, landslides, avalanches, droughts, heat waves, severe cold, hurricanes, tornadoes are called natural disasters (Kadıoğlu, 2008). Technological disasters, on the other hand, can be defined as wars, terrorist attacks, use and attacks of chemical weapons, accidents caused by vehicles carrying dangerous goods, etc (Çelik et al., 2020). Natural events such as lightning, lightning strikes, or thunder have often attracted

[1]Research Assistant, First Aid and Disaster Management Department, Selçuk University, Konya
e-mail: kemal.bas@selcuk.edu.tr ORCID No: 0000-0003-0881-9793

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people's attention. Lightning is an electrical discharge that occurs between the earth and the clouds (AFAD, 2014). Lightning strike is the event that living things are injured or killed by being exposed to lightning (AFAD, 2014). Lightning occurs when a circuit is completed between the base of a storm cloud and the earth (Gül et al., 2004). Lightning strikes the earth more than 100 times per second, or 8 million times a day. In addition, 50,000 storms occur every day that can cause fire and injury (Okafor, 2005). The place with the highest intensity of lightning strikes worldwide is Africa, where some areas are struck by more than 50,000 lightning strikes per square kilometer each year (Ritenour et al., 2008). In Turkey, when the 5-year data for the 2010-2014 period is examined; While lightning and lightning activity is observed to be very low (0.5-1.7 lightning/(km2year)) in the majority of Central and Southeastern Anatolia and some parts of Eastern Anatolia; Hatay shores and the Iskenderun Gulf and Antalya, Belek, Side, Alanya; Muğla, Dalaman, Fethiye, Marmaris coastlines and their offshore areas are the areas with the highest lightning and lightning intensity (4,4-7,1 lightning/(km^{2}year)) (Öztopal, 2017). Lightning and severe air movements have important effects that can affect the public such as transportation, electronic systems, human health, and life safety (Zeng et al., 2016). In addition to the fact that lightning heats the air it passes through about 5 times more than the surface of the sun (27,760 degrees Celsius), a normal lightning flash is 300 million volts and about 30,000 amps (Ndihokubwayo and Nkundabakura., 2019). There is no complete information about deaths and injuries caused by lightning strikes. It is impossible to collect statistics on the number of lightning deaths, especially in rural areas. Many rural people live far from hospitals and do not have cars, so if someone dies of by a lightning strike, the person is most likely buried without an official record of the cause of death. However, recent research has revealed that there are 2400-6000 deaths and accidents per year caused by lightning worldwide (Holle and Lopez., 2003). Studies around the world show that people who are outdoors during a storm are at the highest risk of being killed or maimed by lightning (Trengove and Jandrell., 2015).

Turkey experiences many natural events due to many factors such as its geographical location, tectonic formation, meteorological features (Kemaloğlu, 2015). There were 46 lightning strikes between 1970 and 2012 alone (Özşahin, 2013). The province where lightning is most common is Kocaeli with 6 records. If only the last years are taken into consideration, there were 31 deaths in 2012, 26 deaths in 2013, and 25 deaths in 2014, while 36 lightning-related injuries were detected in 2012 and 2013 separately, and 62 in 2014 (Tanrıover et al., 2015). In Bangladesh, 64 deaths occurred due to lightning in just two days on 12-13 May 2016 (Holle et al., 2019), while 47 deaths occurred in one day in Pakistan (Mir et al., 2006). Between 1997 and 2007, 5033 deaths, 4670 injuries and 61,614 damages occurred due to lightning in China (Zhang et al., 2012).

There is a lot of misinformation, belief, and mystery about lightning. Many of these inaccuracies both prevent lightning victims from being brought back to life and limit research in this area (Keul et al., 2009). For example, standing under a tree protects people against lightening. But when there's a storm outside, nowhere in the area is safe. Lightning tends to strike tall objects in an area (URL 1). It is thought that the people most affected by lightning may be golfers. However, in studies examining the potential of lightning strike and impact on people working in or near trees and in some occupational groups, it has been determined that golfers are not the most affected people. On the contrary, working under trees is riskier in terms of injury and death from lightning (Holle, 2012). Percentages of deaths from lightning under and around trees have been identified in recent years as 24% in Australia (Coates, 1993), 12% in Brazil (Cardoso, 2011), 9% in Singapore (Chao et al., 1981), and 5% in Greece (Agoris, 2002).

Less than half of lightning survivors have any burns or scars on their skin. It's science fiction, not fact, that someone struck by lightning bursts into flames or turns into ashes (Cooper, 2002). Some of the common beliefs and common thoughts about lightning in South Africa are as follows: the belief that witches can control lightning, tradition is that witches can protect a person from

lightning, mirrors should be covered during a storm, some trees can protect a person from lightning, mobile phones attract lightning, a tire on the roof protects the house from lightning (Trengove and Jandrell, 2015). Many Native American tribes living in North America believe that lightning is caused by the shining of the feathers of a mystical thunderbird, and according to their beliefs, thunder refers to the flapping of birds' wings (Burlin, 1968; Lankford, 2011). Some other misconceptions about lightning are: Because the metal part of mobile phones comes into contact with the skin; it will increase the injury; lightning is 100% fatal; running reduces the chance of being struck by lightning; lightning will not hit me (Roeder, 2008).

Firefighters are faced with serious physical and chemical hazards in today's modern business life. Trauma, thermal injury, and smoke inhalation are the primary dangers (Guidotti and Clough, 1992). Apart from these, there is also the risk of encountering lightning, as most of the firefighters' work is carried out in the open area. For this reason, students studying in the civil defense and firefighting program, who are the firefighters of the future, should have correct knowledge about lightning, lightning strikes, and lightning strikes. This research was carried out to determine the knowledge of the students of civil defense and firefighting program of a vocational school at a university about lightning, lightning strikes, and known falsehoods about lightning strikes.

2. MATERIAL AND METHODS

The population of the descriptive epidemiological research consists of 199 Civil Defense and Firefighting program students studying at a vocational school of a university in Turkey in the academic year of 2017-2018. 53 of the 1st year students are daytime education and 63 are evening education, and 52 of the 2nd year students are daytime education and 31 are evening education. In the study, 146 students (73.4%) were reached. While collecting the data in the research, the questionnaire form was distributed during the separate lesson hours when everyone was at the school so that the students would not be affected by each other, and they were collected again after being administered under observation.

The research was carried out on 1 March-15 June 2018. Ethical approval for this study was obtained to Ethical Committee of Hacettepe University (Date: 17.04.2018 and number: 18/416-09). The data were collected through a questionnaire consisting of 9 questions containing socio-demographic characteristics created by the researcher and 37 questions containing lightning propositions. Statistical Package for Social Sciences (SPSS) 25.0 package program was used to evaluate the obtained data. Survey questions were taken from the work of keul et al. (Keul et al., 2009). Approval was obtained for the application of the Turkish version of the scale. The scale was translated into Turkish by a translator working at Selçuk University School of Foreign Languages, who speaks English and Turkish independently of each other. The Turkish translations were submitted to the opinion of another expert who was also educated in English and still teaches in English. The translation that best represents the items was chosen by this expert, and the Turkish translation of the scale was completed with the participation of three experts. This scale is a 37-item and a 3-point Likert-type scale (0=True, 2=False, 3=I have no idea) that evaluates student's knowledge of lightning. In these propositions, the correct answers were accepted as "Knows"; wrong answers were accepted as "Don't know" and those left blank were accepted as "I have no idea"; The total number of correct answers was calculated accordingly. The least correct answer that can be taken in these propositions is 0, and the most correct answer is 37. While determining the total correct answer groups, the median value of the students' total correct answers (14.00) was taken into consideration. Those who answered correctly below the median value were accepted as "Insufficient knowledge", and those who answered correctly above the median value were considered "Sufficient in knowledge". Descriptive statistics about the variables in the study

are given as numbers and percentages. The difference between the groups was evaluated with the Chi-square test and Fisher's Exact test. The statistical significance level in the study was accepted as $\alpha<0.05$.

2.1 Ethical Aspects of the Study

Written permissions were obtained from Hacettepe University Non-Interventional Clinical Research Ethics Committee (GO 18/416), Amasya University Rectorate (08/05/2018-E.2563) and the students who agreed to participate in the study in order to attend the study and collect data.

3. RESULTS

A total of 199 students, 116 of whom were in the first year and 83 of whom were in the second year, studying in the 2017-2018 academic year, participated in the research.

When the demographic characteristics of the students participating in the research are examined, the majority of them (n=138; 94.5%) are male; nearly half of them (n=70, 48.3%) were in the 18-20 age group, 30.8% (n=44) of them were educated in first grade daytime education. 22.9% (n=32) of the students lived in the Mediterranean Region the longest, and 20.7% (n=29) in the Black Sea Region the longest (Table 1). When classified according to the place of residence, 48.3% (n=70) of the students live in the city center, 29.7% (n=43) live in the town center, 8.2% (n=12) live in the burg, and 13.8% (n=20) lived in the village.

Table 1. Distribution of Civil Defense and Firefighting Program Students According to Some Socio-Demographic Characteristics

Socio demographic attributes	**Number**	**Percentage**
Sex (n=146)		
Male	138	94,5
Female	8	5,5
Age group (n=145*)		
18-20	70	48,3
21-23	60	41,4
≥24	15	40,3
Education type (n=143)**		
Day time education 1st class	44	30,8
Day time education 2nd class	31	21,7
Evening education 1st class	40	28,0
Evening education 2nd class	28	19,5
Longest-lived region (n=140*)**		

Mediterranean	32	22,9
Black sea	29	20,7
Southeastern Anatolia	24	17,1
Central Anatolia	20	14,3
Marmara	18	12,9
Aegean	9	6,4
East Anatolia	8	5,7

*1 person did not specify their age. **3 people did not specify in which class they were studying. ***6 people did not specify the region where they lived the longest.

When the students' lightning training status was examined, it was determined that only 8 students (5.5%) received training. When the cases of getting information about lightning, lightning strikes were examined, it was determined that 40.7% (n=59) received information. When the sources of information about lightning were analyzed, 24 students (40.7%) got information from television, 20 students (33.9%) from the internet, and 4 students (6.8%) from their friends (Table 2).

Table 2. Obtaining Information about Lightning and Distribution of the Source of the Information Received by the Students of the Civil Defense and Firefighting Program

	Number	**Percentage**
Lightning training status (n=145*)		
Educated	8	5,5
Uneducated	137	94,5
Status of getting information about lightning (n=145*)		
Receiving information	59	40,7
Not informed	86	59,3
Sources of information about lightning (=59)		
Television	24	40,7**
Internet	20	33,9
Elementary school	19	32,2
Curriculum	15	25,4
Books	10	16,9
secondary school	8	13,6
Family	7	11,9
Newspaper	7	11,9
Friend	4	6,8

*1 person did not answer the question
** Row percentages are given. Percentages were calculated over those who received information from any source.

Table 3. Distribution of Civil Defense and Firefighting Program Students according to Their Lightning Experience

Lightning experience	**Count**	**Percentage**
No	129	89,0
Yes, stroke of lightning	12	8,3
Evet, lightning strike	3	2,0
Evet, stroke of lightning and lightning strike	1	0,7
Total	145*	100,0

In the study, it was determined that more students than expected had lightning experience. 11.0% of the students experienced a stroke of lightning, lightning strike, or both (Table 3). When the students were asked whether their relatives had experienced lightning, 91.0% (n=132) stated that they had not experienced lightning, and 9.0% (n=13) stated that they had experienced lightning.

Table 4. Distribution of Civil Defense and Firefighting Program Students' Answers to Questions about Lightning and Lightning Strikes

	Answers*					
	True		**False**		**No idea**	
Questions	**Number**	**Per. (%)**	**Number**	**Per. (%)**	**Number**	**Per. (%)**
1- Lightning is caused by supernatural powers. (n=146)	89	61,0	**48**	**32,9**	9	6,1
2- Lightning is a warning, a premonition, or a punishment. (n=145)	16	11,0	**104**	**71,7**	25	17,3
3- Animals, plants, and objects can attract or repel lightning. (n=145)	95	65,5	**32**	**22,1**	18	12,4
4- Lightning can be used for fortune telling or witchcraft. (n=145)	10	6,9	**116**	**80,0**	19	13,1
5- In a thunderstorm, lightning only occurs with rain. (n=146)	66	45,2	**57**	**39,0**	23	15,8
6- Lightning only occurs with storm clouds. (n=145)	**63**	**43,4**	54	37,3	28	19,3
7- Lightning does not occur without thunder. (n=143)	64	44,8	**55**	**38,4**	24	16,8
8- If you can see clear skies, the lightning danger is minimal. (n=145)	**113**	**77,9**	13	9,0	19	13,1

9- Lightning never strikes the same place twice. (n=143)	37	25,9	**65**	**45,4**	41	28,7
10- Lightning always hits the highest point/hits the longest object. (n=146)	66	45,2	**50**	**34,2**	30	20,6
11- Hide under a tree to stay dry during thunderstorms. (n=145)	26	17,9	**101**	**69,7**	18	12,4
12- Some tree species are hit more by lightning. (n=146)	91	62,3	**19**	**13,0**	36	24,7
13- A ship/boat in water is protected from lightning. (n=145)	29	20,0	**59**	**40,7**	57	39,3
14- Swimmers are protected from lightning. (n=144)	16	11,1	**75**	**52,1**	53	36,8
15- You can safely bathe/shower during a storm. (n=145)	44	30,3	**60**	**41,4**	41	28,3
16- Metal objects on the body (wristwatches, jewelry) attract lightning. (n=144)	80	55,6	**25**	**17,3**	39	27,1
17- A working phone/ipod attracts lightning. (n=144)	92	63,9	**20**	**13,9**	32	22,2
18- The person struck by lightning dies instantly. (n=146)	48	32,9	**72**	**49,3**	26	17,8
19- The person struck by lightning burns excessively. (n=143)	97	67,8	**23**	**16,1**	23	16,1
20- A person who is struck by lightning will have an internal burn. (n=145)	78	53,8	**24**	**16,6**	43	29,6
21- Lightning victims become electrically charged and dangerous. (n=144)	82	56,9	**24**	**16,7**	38	26,4
22- Lightning victims burn, evaporate or turn to dust. (n=146)	25	17,1	**89**	**61,0**	32	21,9
23- Lightning does not cause heart damage if it travels on the right side of the body. (n=141)	20	14,2	**64**	**45,4**	57	40,4
24- Lightning victims have entry and exit points. (n=145)	71	49,0	**32**	**22,0**	42	29,0
25- Lightning can be avoided. (n=146)	**62**	**42,5**	47	32,2	37	25,3

26- New high-tech type lightning rod can control lightning. (n=146)	**73**	**50,0**	23	15,8	50	34,2
27- A large amount of energy can be produced technically from lightning. (n=138)	109	79,0	**12**	**8,7**	17	12,3
28- Car tires in a car protect a person from lightning. (n=137)	46	33,6	**45**	**32,8**	46	33,6
29- Wearing shoes with insulated rubber soles, raincoats, etc. protects a person. (n=138)	79	57,3	**21**	**15,2**	38	27,5
30- You are protected from lightning inside a building. (n=136)	54	39,7	**51**	**37,5**	31	22,8
31-Grounding a building ensures that the building is protected from lightning damage. (n=137)	96	70,1	**20**	**14,6**	21	15,3
32- You are protected from lightning in a group. (n=137)	**18**	**13,1**	83	60,6	36	26,3
33- Lie flat on the ground in a storm. (n=138)	32	23,2	**53**	**38,4**	53	38,4
34- Running reduces the chance of lightning hitting you. (n=137)	18	13,1	**76**	**55,5**	43	31,4
35- All lightning strikes catch fire quickly. (n=137)	65	57,5	**38**	**27,7**	34	24,8
36- Most injured people are golfers. (n=137)	25	18,3	**67**	**48,9**	45	32,8
37- During lightning, mirrors attract lightning. (n=138)	25	18,1	**52**	**37,7**	61	44,2

*Row percentages are given.
Bold ones are correct answers. Underlined answers are the most marked.

As a result of the research, the first 3 questions that are most correct are the 4th, 8th, and 2nd questions. The question “Lightning can be used for fortune-telling or sorcery (4.)” was answered correctly by 80.0% of the students. The question “If you can see the clear sky, the lightning hazard is least (8th)” was answered correctly by 77.9% of the students. The question “Lightning is a warning premonition or a punishment (2.)” was answered correctly by 71.7% of the students.

The first 3 questions with the highest number of wrong answers are the 27th, 31st, and 19th questions. The question "A large amount of energy can be produced technically from lightning (27)" was answered incorrectly by 79.0% of the students. “Grounding a building ensures that the building is protected from lightning damage. (31.) was answered incorrectly by 70.1% of the

students. “A person struck by lightning burns excessively (19.)” was answered incorrectly by 67.8% of the students.

The first 3 questions with the most answers as 'I have no idea' are the 37th, 23rd, and 13th propositions. The question “Mirrors attract lightning during lightning (37th)” was answered by 44.2% of the students as “I have no idea”. The question “Lightning does not cause heart damage if it travels on the right side of the body (23.)” was answered by 40.4% of the students as “I have no idea”. The question “A ship/boat in the water is protected from lightning (13.)” was answered by 39.3% of the students as “I have no idea”.

Table 5: Distribution of Civil Defense and Firefighting Program Students' Answers to Questions about Lightning, Lightning Strikes (May 2018)

	Total correct answer groups						
	<14		**≥14**		**Total**		**p value**
Age group	Number	Percentage	Number	Percentage	Number	Percentage	
18-20	40	57,1	30	42,9	70	100,0	0,004
21-23	24	40,0	36	60,0	60	100,0	
≥24	2	13,3	13	86,7	15	100,0	
Total	66	45,5	79	54,5	145	100,0	

Chi square: 10,817

When the students are compared according to their age groups, there is a significant difference between the groups (p=0.004). There was a significant difference between those aged 18-20 and those aged ≥24 years.

4. DISCUSSION

The ages of the students participating in the research are between 18-27 years old. The mean age of the student is 20.9±1.7 years (median: 21, youngest: 18, oldest: 27). The average age of the students is in line with the average age of the students who continue their associate degree education in Turkey. The reason for the wide age range may be that some of the students dropped out of the program and continued again or started their education at a later age.

94.5% of the students are male. This may be because firefighting is more preferred by men because it is difficult, requires physical strength, and is more likely to encounter dangers. Other studies in the field of firefighting also reflect this situation. For example, among 350,000 paid firefighters in a US study, the number of women is slightly more than 11,000 (3.7%) (Hulett et al., 2008).

11.0% (n= 15) of the students had a lightning experience. This value is higher than expected. The fact that a large number of students experience lightning may be due to the formation of the necessary environment for lightning, especially with storms, in Turkey, as in some other parts of the world (Tanrıover et al., 2015). It is important that 15 of the students have experienced lightning strikes and strikes. All 15 students are male. Studies have shown that the reason for the

majority of those who experience lightning strikes and strikes are men; It is shown that men do outdoor work, work in construction sites, and be outside more (Tanrıover et al., 2015). On the other hand, the fact that the students lived in different geographical regions for a long time may have caused the number of lightning experiences to increase.

A statistically significant difference was found when the distribution of total correct answer groups according to the age groups of the students was examined (p=0.004). With increasing age, the total number of correct lines increases. This may be due to the older students' observing the events around them more carefully and answering the questions by thinking.

When the distribution of correct answers between the students in the daytime and evening time and between the 1st and 2nd grade students was examined, no significant difference was found between the groups. (p=0.189 and p=0.951). This may be because students do not have lightning-related courses in their learning curriculum.

39.7% (n=54) of the students answered the proposition "You are protected from lightning inside a building" correctly. This is a less-than-expected value. However, according to US lightning safety experts, going indoors is more effective and safer in reducing risk than outdoors (Andrews et al., 2001; Cooper et al., 2009).

More than half of the students incorrectly answered the proposition "Lightning victims are electrically charged and dangerous". However, Viemeister (Viemeister, 2013) and Prahm al. (Prahm et al., 2013) state that these propositions are false and state that if a person is struck by lightning, first aid can be given by touching him and he will not be shocked because the human body does not store electricity.

More than half of the students incorrectly (n=78) answered the proposition "Lightning never strikes the same place twice". But lightning often strikes the same place multiple times, especially if it's a long, pointed, isolated object. For example, the World's tallest man-made and 553-meter-high Canadian National Castle is one of the self-supporting structures and receives dozens of lightning strikes each year (Hussein et al., 2007). Firefighters have duties such as responding to fires on the upper floors of the buildings, directing the water flow, evacuating the occupants of the building, and operating the fire operation and rescue equipment. For this reason, spreading awareness about lightning protection and safety, especially to the students of the Civil Defense and Firefighting program and then to the community, is very important to reduce the loss of life of people and animals and to stop the property damage.

18.1% (n=25) of the students answered incorrectly and 44.2% (n=61) answered as "I have no idea" to the proposition that mirrors attract lightning during lightning. Trangove and Jandrell found similar results in their study of high school students in northern Africa. According to the results of the study, the majority of students (91%) believe that mirrors attract lightning (Trengove and Jandrell, 2010). However, when the literature is examined, there is no evidence that mirrors attract lightning.

The response to question 33 regarding lightning safety is alarming. Only 38.4% (n=53) of the students agreed that lying flat on the ground during a storm is dangerous. This may be due to the intuitive notion that lightning can only kill by a direct hit, and the best way to avoid this kind of obsession is to take the lowest position. The survey did not test their awareness of the internationally accepted Lightning security stance. Therefore, the inclusion of such a statement in the survey would have surprised the respondents.

Responses to the question "You are protected from lightning within a group" regarding lightning safety are quite alarming. Only 13.1% (n=18) of the students knew that they should stay away from each other in case of lightning. Knowing this can help reduce the number of injuries that can occur during lightning. The General Directorate of Meteorology also states that it is not necessary to stand in groups in open fields (URL 2).

People in less developed countries need to be educated about lightning and its hazards because less developed countries have less education about the dangers of lightning and the safety of workplaces, schools, and homes (Holle, 2016). It is important to change the thinking of people with different cultural belief systems and to ensure that they are educated on scientific facts about lightning.

5. LIMITATIONS OF THE STUDY

A number of limitations are worth discussing. First, it was a self-report study and conducted in a city. Therefore, further large and multicenter studies are recommended to investigate the Civil defense and firefighting program students' lightning and lightning strike knowledge countrywide and assess their educational needs in this important issue. Moreover, due to the descriptive nature of this study, it is not possible to determine a cause and effect relationship between variables. The results of the study are limited with the students of the university where the research was conducted. It cannot be generalized to all university students. Despite these limitations, the findings provide a framework for the further studies of specific educational needs of students about lightning and lightning strike.

6. ACKNOWLEDGEMENTS

This study was presented as a poster in 2nd International and 20th National Public Health Congress, 2018.

7. CONCLUSION

Students answered only 3 questions out of 37 questions correctly over 50%. The fact that the number of correctly answered questions is so low indicates that students' knowledge of lightning is lacking. Lightning education has been largely ignored in countries such as Turkey, where natural disasters are common. This study draws attention to the issue of teaching the subject of lightning to students in the education period. In regions with high-risk levels for natural disasters such as Turkey, lightning safety programs are needed as the population is at greater risk. To compensate for this high level of risk, a lightning curriculum should be added to Civil Defense and firefighting programs in Turkey. To be well informed about the hazards, everyone should be aware of the daily local weather forecasts, the local lightning climate as well as the harmful consequences (Prahm et al., 2013).

The General Directorate of Meteorology of the Republic of Turkey, the media, universities, and non-governmental organizations should give instructions to citizens on safe practices during storms. However, lightning avoidance often entails a personal responsibility, so everyone should be aware of and follow lightning safety rules (Zimmermann et al., 2002). Its effectiveness is evident in the reduction in deaths and injuries from lightning over the past century. While none of the lightning casualties are completely harmless from lightning strikes, avoidance strategies can at least reduce the risks.

Some aspects of lightning and lightning strikes are misunderstood by students, and more attention should be paid to them. People should not hide under tall objects such as trees or towers because tall objects are easy targets and are subject to lightning. To prevent loss of human life, people should be educated about lightning hazards with scientific knowledge and due care should be taken during risk assessment to assess the potential hazard.

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