

# The Regulation on Emergencies in Workplaces: Applicability in a University Hospital

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## ABSTRACT

**Introduction:** Hospitals provide healthcare services to society during and after emergencies. Therefore, the hospitals should be well-prepared for emergencies and have easy applicable, and efficient emergency plans. We aimed to investigate the applicability of emergency regulations in a university hospital.

**Methods:** It is a descriptive study in which the current emergency plan of a university hospital is compared with the regulations and legislation in effect in Turkey. The number of teams and officials included in the teams in the current legislative emergency plan are identified and compared to the available emergency teams in a hospital for the present study.

**Results:** The present study identified the potential emergencies in accordance with the "Regulation on Emergencies in Workplaces" and the conditions in the particular region and hospital. 16 teams were identified for these emergencies and the number of officials in each team was confirmed. In the current staff of the hospital, there were 12 teams. Additionally, three teams were identified in the current hospital team that was not stated in the regulation. Although stipulated in the regulations, chemical, biological, radiological, and nuclear teams, and national medical rescue teams were not available in the hospital. Therefore, these teams and the number of officials in each team were determined.

**Discussion:** Due to the geopolitical location of Turkey, the high disaster risk in the region, and the history of disasters, all hospitals should have applicable and constantly updated emergency plans. The number of teams in emergency plans and the number of officials in these teams should be arranged under current legislation, size of the hospitals, risk analyses, and functionality. With this study, we determined the emergency teams and the number of staff in the hospital.

**Keywords:** Disaster, Emergency plan, Regulation, Workplace, Hospital disaster plan

## Introduction

Disasters are defined as sudden ecological and human-induced events that are beyond the amenities and capacity of the institution, disrupt their normal functioning, require foreign aid, and weaken the strength of the institution to meet healthcare needs (1, 2). Emergency, on the

other hand, is all large-scale circumstances that can be coped with local amenities and require urgent action (3). Even though the terms disaster and emergency are used interchangeably, the sphere of influence and the influenced mass are narrower at emergencies and are mostly

human-induced. An emergency defined in the regulation on emergencies in workplaces in Turkey is the events such as fire, explosion, dissemination of hazardous chemical substances, and natural disasters that occur at the workplace or in some part of it and necessitate emergency action, first aid, or evacuation (4). In addition, according to the emergency regulation at workplaces, the plan that includes actions to be taken in emergencies that may occur in the workplaces is called the emergency plan, and the places determined to protect the employees from the negative consequences of emergencies are called safe places(4). All workplaces are required to have emergency plans to protect the lives of the staff, patients, and visitors and minimize the potential damages in case of an emergency. All emergency cases should be specified in these emergency plans from the very beginning of the workplace establishment. Necessary measures should be taken to prevent or restrain the negative effects of the specified emergencies. Emergency actions and evacuation methods should be created in line with this plan and the staff to be commissioned should be identified. Finalized emergency plans should be documented and instructed to the commissioned staff and others following training and drills at certain intervals (5). Finally, these plans should be reviewed and updated annually. Moreover, emergency plans should be updated after every emergency, training, and drill if the staff or their duties, the location of the facility, the business policies or implementations are changed (6, 7).

As emergency is a reactive work, measures should be taken in advance at the workplaces for emergencies. Emergency actions should serve the aim to restore the workplace to its previous state with minimum damage and as soon as possible after an emergency (8, 9). Not only should it be intended to revert to its previous state, but also to be rebuilt better. One of these workplaces is hospitals with a very high workload in daily life. In case of an emergency, this workload will naturally increase beyond measure. Moreover, if an emergency event occurs within the hospital,

life will come to a stopping point. In order to not encounter these difficulties in the hospitals and provide healthcare services in all circumstances, implementation of the regulation on emergencies in workplaces in hospitals is of vital importance. This regulation was published in the official gazette on June 18, 2013, and entered into force (4). This regulation aims to make all workplaces be prepared for emergencies in advance. First Aid Regulation regarding the first aid practices to the injured in emergencies at workplaces was published on July 29, 2015. Accordingly, workplaces should have first aid teams available as per their workplace hazard class to reduce the risk of death and injury resulting from accidents (10). According to the regulation on tasks regarding Chemical, Biological, Radiological and Nuclear (CBRN) Hazards published on May 03, 2012, the Ministry of Health has to establish first aid and ambulance services, emergency medical intervention teams, and mobile hospitals in case of CBRN threats and hazards (11). Furthermore, the regulation of implementation of Hospital Disaster and Emergency Plan (HDEP), stipulates that every hospital should have an emergency plan and a National Medical Rescue Team (NMRT) (12). NMRT is established within the Ministry of Health in all national and international emergencies and disasters to medically rescue the disaster victims and the healthcare staff included in these teams are highly trained healthcare personnel. NMRT engages in medical rescue, emergency medical aid, transportation of disaster victims, and on-site medical response in emergencies and disasters at home or abroad (13, 14). In line with all these regulations, emergency plans should be made in hospitals depending on their size and functionality. In the present study, we have aimed to investigate the applicability of current regulations in a university hospital.

## Material and Methods

### Study design

It is a descriptive study in which the current emergency plan of a university hospital is compared with the regulations and legislation in

effect in our country, Iran. Approval was obtained from the ethics committee of the university for the present study.

### Data collection

Current disaster and emergency plans of the hospital were obtained from the hospital administration. Furthermore, information such as surface area, bed capacity of the hospital, number of academicians and staff, the daily number of patients under care were obtained from the hospital administration. Regulation on emergencies in workplaces was reviewed and the teams required for emergencies and the number of the staff in these teams were evaluated. In addition, the current First Aid Regulation, CBRN Regulation, and HDEP Implementation Regulation were obtained from the official website that was reviewed and the number of teams and required personnel was determined. Risk assessment results included in the studies conducted by the “Work Safety Unit of the Hospital” and risk posing probabilities were reviewed based on regulations. Besides, the current emergency plan of the hospital was reviewed and the number of existing emergency teams and the staff members in the teams was obtained.

The stages specified in the regulation were implemented in the present study. Our priority in preparing the emergency plan for the hospital is identifying the emergencies and determining the emergency teams to restore the hospital to its previous state after an emergency with minimum

damage and as quickly as possible. Based on the matters stipulated in the regulation of risk assessment results, events resulting from fire, hazardous chemical substances, combustibles, and explosives, events necessitating first aid and evacuation, the possibility of natural disasters, and sabotage were taken into consideration.

### Results

The hospital where we conducted the present study is a third-level university hospital. It provides services to many nearby cities and regions due to its location. The indoor area of the hospital is around 165,000 square meters and it has 1,418 beds out of which 194 are intensive care beds. The hospital provides services to 1,059,447 patients annually with 3,392 staff members composed of 255 faculty members, 385 research assistants, and 2,652 healthcare personnel. Potential emergencies were identified with the studies conducted according to the “Regulation on Workplace Emergencies” and in consideration of the conditions in the region and hospital. These emergencies are given in Table 1.

As stipulated in the “Regulation on Workplace Emergencies”, teams such as warning, search, rescue, evacuation, communication, first aid, and firefighting should be established. However, in consideration of the location of the hospital and the excess number of patients and visitors, the emergencies were diversified and consequently, the number of teams was high. These teams are given in Table 2.

**Table 1.** Possible Disasters for the Hospital

| Fire                   | Mass food poisoning                         | Communication and computer system crash | Mass traffic accidents |
|------------------------|---|---|------------------------|
| Earthquake             | Chemical accidents                          | Power cut                               | Extreme cold           |
| Flooding or inundation | Flammable and explosive substance accidents | Sabotage                                | Migration              |
| Heavy snow             | Terror and Anarchic events                  | Accidents at work                       | Mobilization           |
| Storm                  | Radiation accidents                         | Epidemic diseases                       | Occupational disease   |
| CBRN events            |   |   |                        |

**Table 2.** Hospital Disaster Teams and Staff Members

| Team name                | Number of officers | Team name                            | Number of officers |
|--------------------------|--------------------|--------------------------------------|--------------------|
| Search team              | 110 person         | CBRN team                            | 110 person         |
| Rescue team              | 110 person         | Labeling team                        | 110 person         |
| Evacuation team          | 110 person         | Environmental accident team          | 110 person         |
| Communication team       | 110 person         | Patient Transport team               | 110 person         |
| Safety and Security team | 110 person         | First Aid team                       | 330 person         |
| Technical Repair team    | 110 person         | NMRT team                            | 5 person           |
| Fire Fighting team       | 110 person         | Control Center and Headquarters team | 7 person           |
| Leak Control team        | 110 person         | Social Aid team                      | 110 person         |

Pursuant to Article 11 of the “Regulation on Emergencies in Workplaces”, the hazard class of the hospital is highly dangerous, and accordingly, each team has to specify one employee per 30 employees. Furthermore, according to clause (b) of Article 11, highly hazardous workplaces should assign one support member per 30 employees. Under Article 10 of “First Aid Regulation”, highly hazardous workplaces should appoint one first aid personnel per 10 employees. Inline with “HDEP Implementation Regulation”, an NMRT team should be established in each hospital consisting of five people, including a physician who has received NMRT training. Furthermore, the CBRN team should be formed in hospitals to take measures against CBRN threats and hazards. The number of teams was determined in terms of the staff, size, and needs of the hospital in line with these regulations. Since there is 3,292 personnel in the hospital, the numbers of officials in the teams were calculated accordingly and presented in Table 2.

The HDEP plan of the hospital was reviewed and current teams and the number of personnel in each team were determined. The number of teams

and the number of staff in each team established under the regulations, capacity, and risks of the hospital were determined and compared. Labelling and marking team, leakage control team, patient transport team and environmental accident team were established in consideration of emergency risks and needs of the hospital. In addition, NMRT and CBRN teams were established pursuant to regulations as they were not already available. In the current team of the hospital, there were 12 teams. In this team, the most personnel were in the rescue, fire fighting, and first aid teams, and each team had 120 people. At least the staff included a social aid team and consisted of six people. In addition, in the team determined according to the regulations (teams with result of study), three teams that were not included in the regulation were determined in the current hospital team. In this team, the first aid team had the most personnel and consisted of 330 people. The team with the least staff is the NMRT team and consists of five people. Comparison of the existing emergency teams of the hospital with the teams determined as a result of the study is presented in Table 3.

**Table 3.** Comparison of Disaster Teams and Staff Members

| The Present Team of the Hospital     |                    | Teams with Result of Study           |                    |
|--------------------------------------|--------------------|--------------------------------------|--------------------|
| Team name                            | Number of officers | Team name                            | Number of officers |
| Search team                          | 40 person          | Search team                          | 110 person         |
| Rescue team                          | 120 person         | Rescue team                          | 110 person         |
| Evacuation team                      | 105 person         | Evacuation team                      | 110 person         |
| Communication team                   | 8 person           | Communication team                   | 110 person         |
| Safety and Security team             | 117 person         | Safety and Security team             | 110 person         |
| Fire Fighting team                   | 120 person         | Fire Fighting team                   | 110 person         |
| Technical Repair team                | 45 person          | Technical Repair team                | 110 person         |
| First Aid team                       | 120 person         | First Aid team                       | 330 person         |
| Control Center and Headquarters team | 7 person           | Control Center and Headquarters team | 7 person           |
| Social Aid team                      | 6 person           | Social Aid team                      | 110 person         |
| Technical Protection team            | 47 person          | Technical Protection team            | 0 person           |
| Physical Protection team             | 35 person          | Physical Protection team             | 0 person           |
| The Burial team                      | 0 person           | The Burial team                      | 0 person           |
| Labeling and Marking team            | 0 person           | Labeling and Marking team            | 110 person         |
| NMRT team                            | 0 person           | NMRT team                            | 5 person           |
| CBRN team                            | 0 person           | CBRN team                            | 110 person         |
| Leak Control team                    | 0 person           | Leak Control team                    | 110 person         |
| Patient Transport team               | 0 person           | Patient Transport team               | 110 person         |
| Environmental Accident team          | 0 person           | Environmental Accident team          | 110 person         |

## Discussion

The hospital where we conducted the present study provides services to the Eastern Anatolia Region and some of the nearby regions. Consequently, the area it covers and the capacity are quite large. The hospital has some advantages in terms of the number of patients, staff, medical equipment, and size of the building but considering the disadvantages, the hospital should have emergency plans that meet the standards since an emergency event may occur at any time, anywhere, and in any size. Emergency plans should therefore be available at all workplaces, especially the hospitals, to minimize loss of life and property and damages in case of an emergency. In this study, we determined the required teams and the number of personnel in the teams in order to provide better and quality health care in the hospital during any disaster that may occur.

Natural disasters such as earthquakes, floods, storms, chemical explosions, industrial accidents, wars, migrations, and human-induced disasters are considered as emergencies for hospitals in the review of the literature (15, 16). In order to prepare hospitals for these emergencies in advance, first, the dynamics and geographical conditions of the

hospital and risk analyses should be evaluated. As a result of these risk analyses, the events that may be considered as emergencies for the hospital can be identified. Next, emergency plans for these events should be developed. In the present study, we determined possible hospital emergencies by considering the functionality and the size of the hospital as well as the geographical conditions and human actions. Due to the geopolitical location of Turkey, factors such as immigration, CBRN events, and mobilization are specified as emergencies.

The hospital under investigation had an emergency plan, emergency teams, and the total number and names of the staff members in these teams were specified. We compared the teams specified in the emergency plan and the number of staff members in these teams with the current regulations in our country. It was observed that the number of teams found in HDEP and the staff in each team was not equal to those specified in the regulation. Furthermore, as the hospital provides services to the cities in the region, it is considered that additional teams might be needed upon the determination of potential emergencies in the region. This factor was included in our study. It was observed that since the number of present

emergency teams and staff is sufficient for a hospital having 3,392 employees, 26 gates, and 10,000 visitors on average per day, disaster recovery will not be executed efficiently or there will be no recovery. Reviewing the studies in the literature, it was emphasized that these teams should be prepared before the disaster occurs and that they should conduct training programs and practices intermittently (15, 16). The fact that determining factors in disaster management such as the geographical conditions and risks of hospitals, the number of people they serve, and the size of the hospital play an important role in determining the disaster teams formed and the number of personnel in the team is undeniable (12). As a result, it was observed that the NMRT and CBRN teams stipulated in regulations were not available. During the present study, these two teams were established and the number of officials was specified. Furthermore, when the risks to be posed in an emergency are considered, it is necessary to identify details such as the number of injured and patients during the rescue and transport works, determine the extent they will be affected by the disaster, the authorities responsible for the evacuation, how the evacuation will be carried out and where the people will be taken. In this respect, it was concluded that a labeling and marking team should be established. A leakage control team was established in the hospital to detect chemical leakages at normal times or after disasters. It was understood that a patient transport team should be established to transport the injured or patients to other hospitals or a field hospital and an environmental accident team is required to be established to respond to potential environmental accidents.

In case of emergencies, emergency action methods should be determined and documented in advance, and teams and officials should be identified to implement these measures (5, 17). The hospital has many advantages, namely, the number of staff, medical equipment, and the size of the building. Apart from these advantages, it should also be recognized that it is critical for the hospital to have an emergency plan to be applied in

case of an emergency to be able to restore the hospital to its previous state with minimum damage and as fast as possible. Kaji AH et al. conducted a study in the hospitals in Los Angeles and revealed that the hospitals were not sufficiently prepared for disasters. Although these hospitals were not prepared for disasters, it has been emphasized that they generally have a high level of equipment and supplies (18). Likewise, Naser WN et al. emphasized in their disaster preparedness study in South Yemen that all hospitals were largely unprepared for possible disasters. They further stated that two out of 10 hospitals were insufficiently and eight were unacceptably prepared for disasters (19). In the present study, Table 3 reveals that our hospital is not fully prepared for disasters. In order to overcome these deficiencies, the managers should be informed about emergencies followed by informing and training the employees working in the emergency team. As a result, the officials in the emergency team should be trained according to their job descriptions and be well-equipped with the support of senior management. This claim can be supported by Wurmb T. et al. who stated in their study on the hospital emergency plan that emergency management is a complex process and should be supported by the hospital management. They also emphasized that training and exercises are indispensable for successful emergency management (20). Hospital administration should authorize the emergency planning team to implement the decisions and entrust the sanction power to the emergency planning team to show their support and prepare a cooperative environment.

When the number of emergency teams and staff working in the hospital was analyzed, it has been seen that not only do they not comply with the regulation but are also neglected. Therefore, in the current research, the number of staff in the team was determined not less than the number specified in the regulations. It was observed that while the number of officials in most of the teams was so few, some teams had officials more than needed. It was observed that there was 120 personnel in the

rescue and firefighting team and 117 in the security and guidance team. The excess number of the officials in these teams is not objectionable under the regulation and does not cause any trouble as the provision of Article 11 of the regulation states that "...at least .... officials" should be in each team (4). On the contrary, if the number of officials in a team is less than the number stated in the regulation, serious problems may be encountered during emergency responses. It would be more accurate to determine the number of these teams and their personnel taking into account the characteristics and geographical features of the hospitals. Examination of the available emergency teams in the hospital revealed that the number of officials in the search and rescue team, first aid team, communication team, technical repair team, and evacuation team were less than the numbers specified in the regulation. It was also observed that there existed a burial team, but the number and names of the officials were not identified. The present study was conducted based on the least number of officials specified in the regulation.

Literature review revealed that all institutions focus on communication in case of an emergency. Healthy communication both within the institution and between the teams, and with other stakeholder institutions is very important (4, 11, 12). Consequently, including eight personnel in the communication team of the hospital is important for healthy communication, and therefore the total should be 110 in accordance with the regulation. Moreover, the number of officials in the team specified in the regulations in our country is legally compulsory and allows the emergency team to work more effectively. It should be taken into consideration that the lacking number of officials in the teams will lead to legal problems, weaken the response to emergencies, and lead to additional hazards. Consequently, the numbers of emergency teams and the officials in these teams should comply with the legislation for hospitals working 24/7 with a 100% occupancy rate.

### **Limitations**

The present study was conducted based on current HDEP and the regulations in effect. Although literature was reviewed, hospital executives were contacted only in cases of emergencies. Officials in emergency teams were not contacted. Whether or not the officials in emergency teams are active in their working lives was not investigated. Besides, the determination of emergency teams revealed that there were some deficiencies. However, some teams were established in accordance with the size and functionality of the hospital and these teams may not be deemed suitable by other researchers. Because these teams were not included in the legislation, the perspectives of other researchers may differ or not be considered suitable in terms of the technical knowledge regarding emergencies.

### **Conclusion**

Due to the geopolitical location of our country, high disaster risk in the region, and in the light of past disasters, all hospitals should have applicable and constantly updated emergency plans. Additionally, teams to take part in emergency cases should be determined meticulously in these emergency plans. The number of staff and officers to be assigned to the teams should be arranged according to the country's legislation and the size of the hospital, risk analysis, and functionality.

### **Conflict of interest**

No conflict of interest was declared by the authors.

### **Financial Disclosure**

The authors declared that this study received no financial support.

### **Ethical approval**

Approval was obtained from the ethics committee of the university for the present study (Date: 27.02.2020, no: 02/21).

### **Authors' contributions**

ET and SS designed research; ET and SS conducted research; ET and SS analyzed data; ET and SS wrote the paper. ET and SS had the primary

responsibility for the final content. All authors read and approved the final manuscript.

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