

Evacuation of Hospitals during Disaster, Establishment of a Field Hospital, and Communication

Afet Durumunda Hastanelerin Tahliyesi, Sahra Hastanesinin Kurulumu ve Haberleşme

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ABSTRACT

The buildings, working personnel, and patients and their relatives may directly or indirectly be affected by the disasters. Here we will discuss evacuation, establishing a field hospital, communication, the role of the media in disasters, and defending against sabotage. The affected individuals should be evacuated and transferred to secure zones safely and rapidly. How the decision for evacuation should be made and how the evacuation triage should be performed are important issues. Field hospitals should be established within the bounds of possibility for continuation of the treatments of evacuated people. The standards for the field hospitals and its sections that may be created according to the needs will be explained. Undoubtedly, since one of the most important subjects in disasters is communication, the types of communication in disasters and their significance will be mentioned. How the relationships with the media should be an aspect of communication and how they can be beneficially used will also be mentioned. As in all organizations and institutions, sabotage attempts may also be present concerning health facilities. For this reason, during the preparation of the hospital disaster plan, defending against sabotage will be discussed, and what should be done at that stage will be mentioned.

Keywords: Disaster, evacuation, field hospital

Öz

Afetlerden binalar, çalışan personeller, hasta ve hasta yakınları doğrudan veya dolaylı olarak etkilenebilir. Biz burada tahliye, sahra hastanesinin kurulumu, haberleşme, medyanın afetlerdeki rolü ve sabotajlara karşı koyma konularını tartışacağız. Etkilenen kişiler güvenli bir şekilde ve hızlıca tahliye edilerek güvenli bölgelere nakledilmelidir. Tahliye kararının nasıl verileceği ve tahliye triyajının nasıl yapılacağı önem arz etmektedir. Tahliye edilen kişilerin tedavilerinin devamı için sahra hastanelerinin imkân doğrultusunda oluşturulması gerekir. Sahra hastanelerinin standartları ve ihtiyaca göre oluşturulabileceği bölümler açıklanacaktır. Hiç şüphesiz afetlerdeki en önemli konulardan biri de haberleşme olduğu için afetlerdeki haberleşme çeşitlerine ve önemine değinilecektir. Haberleşmenin bir parçası olarak medya ile ilişkilerin nasıl olması gerektiği ve nasıl faydalı olarak kullanılacağına da değinilecektir. Tüm kurum ve kuruluşlara karşı sabotaj eylemleri olabildiği gibi sağlık kuruluşlarına yönelik sabotaj eylemleri de olabilir. Bunun için hastane afet planı hazırlanmasında sabotajlara karşı koymaya da yer verilerek bu aşamada yapılacaklara değinilecektir.

Anahtar Kelimeler: Afet, tahliye, sahra hastanesi

The Evacuation

Emptying entire hospital or a part of it, which is insecure for the patients and their relatives due to internal and external factors, and transferring people to safer zones is called the evacuation of the hospital. The decision-making about the total or partial evacuation in disaster threats is within the discretion of the president of the hospital disaster plan (HDP). The disaster command center board coordinates the evacuation process. The evacuation process requires a significant amount of human resources and takes a long time. Additionally, the hospital might have been completely out of use, and the patients and personnel might have been affected. Despite all of these adverse circumstances, the evacuation should be quick and secure. For this purpose, the hospital disaster board should be in continuous communication with institutions such as the Governor's Crisis Management Center, the Provincial Directorate of Health, the Disaster and Emergency Management Authority (AFAD), the security forces and the fire department during the evacuation process and should get help when needed. The evacuation wardens and their reserves should be determined for all sections of the hospital, based on the working hours, night shifts, and vacation



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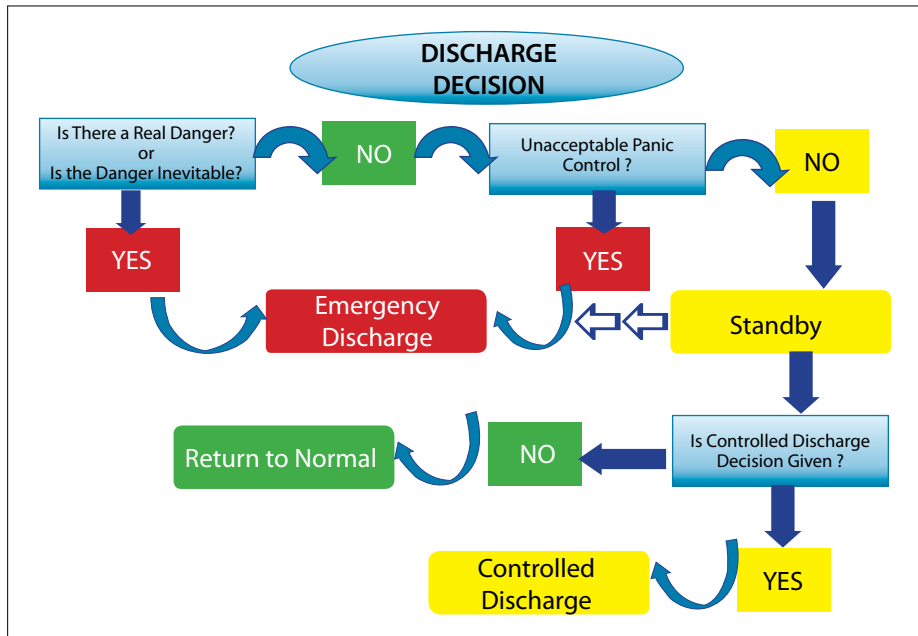


Figure 1. Decision-making for evacuation.

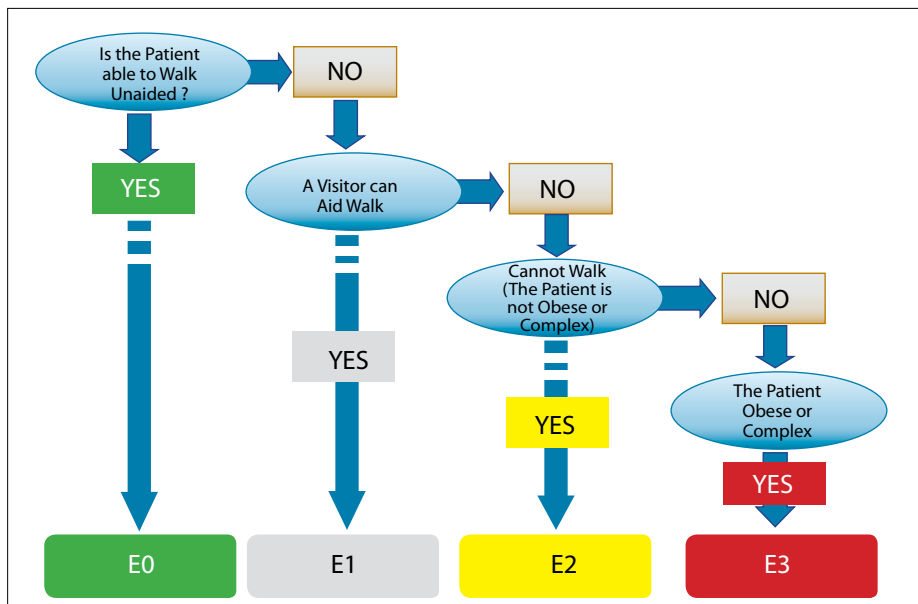


Figure 2. The evacuation triage.

days. The medical files and laboratory and imaging results should be sent along with the patients who have been referred to other centers. After completion of the evacuation processes, the hospital is checked, and whether any section of the hospital can be taken into service following the event is decided [1-3].

The types of evacuation:

1) Internal (Partial) Evacuation: It is the evacuation of only the affected section in situations where the hospital was partially affected; this can be performed in two ways, vertical and horizontal. The transfer from the lower floor to one or more

2) External (Complete) Evacuation: It is the transfer of patients to pre-determined suitable hospitals in a situation where the hospital has been completely damaged and

floors up in situations such as flood and similar events, or the transfer to the lower floor in cases where the roof and top floor are damaged is called a vertical evacuation. The type of evacuation that is performed simultaneously on several floors or in the entire block in a situation such as fire, explosion, or collapse, where a section of the hospital has been affected but has been taken under control is called a horizontal evacuation [3].

become unusable or the threat is continuing for the hospital [3].

The evacuation priorities for the transfer of patients are as follows:

- 1st row: Small children and babies, patients who are not connected to machines and can walk (For rapid evacuation of patients who can walk, a group leader can provide the exit of patients to an appropriate area by shouting "All people who can walk should follow me!")
- 2nd row: Patients who can move using a wheelchair or walker
- 3rd row: Patients for whom a stretcher is required for transport
- 4th row: All patients in the intensive care unit
- 5th row: Patients with the least probability of living

The place outside the area where the incident has occurred, is not affected by the disaster, and is considered to be safe for patients and their relatives and workers, is called the safe zone. In the safe zone, an emergency case should be present. The supplies that should be kept in this emergency case are as follows:

- Rechargeable aspirator
- Full O₂ tubes, with their regulators ready to use
- Sterile clothing and sets
- Light source
- Sufficient amount of blankets

The decision-making for evacuation should be made as shown in Figure 1, and the evacuation triage and categorization should be done as shown in Figure 2, 3.

Field Hospital

The hospitals may become unusable during disasters. The field hospitals are the hospitals that are constituted following the disasters for the purpose of providing safe health care services to disaster victims and continuation of treatment of hospitalized patients temporarily in pre-determined, safe regions close to the hospitals. According to the World Health Organization (WHO), the field hospitals are units consisting of containers, tents, and inflatable or containerized modules, having at least ten beds, one operating room, one basic laboratory and mobile X-ray equipment [4]. WHO does not propose to establish a field hospital if the hospital is still functioning during the disaster and is well-equipped and the teams are available because supporting the permanent health system is less costly and the local resources of the institution are used more efficiently [5].

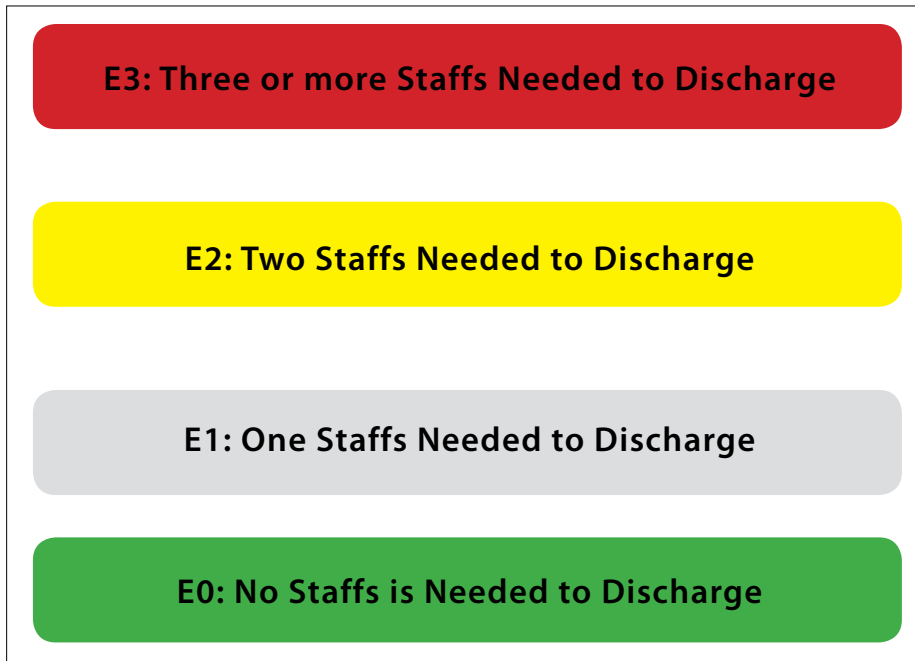


Figure 3. The evacuation triage categories according to the number of personnel required.

The area where the field hospital will be established should be investigated and determined beforehand, and when required, protocols should be signed with related organizations. This area should be away from the structures that are in danger of collapse and in a safe location not prone to floods, landslides, fire, and contamination. While this field hospital may be established in secure buildings, unharmed by the disaster (e.g., the substantial parts of a hospital, school, mosque, sports hall, and cultural center), it can be installed with portable hardware such as tents, inflatable modules, prefabricated structures, and trailer or ship containers. Among these, the usage of tents is easier and cheaper compared to the other kinds of hardware. Tents can be installed easily and quickly, can be easily transferred to another site, are easily repairable, and can be used multiple times. The materials that can be used in constituting the field hospital vary depending on the magnitude of the disaster and the financial resources of the nation and the hospital. Portable ventilator devices, together with accumulators, batteries, generators, and oxygen condensation equipment required for the operation of these devices should be kept ready and checked periodically. If the materials, generators, drugs, and medical supplies that will be used in disasters are kept ready for use in warehouses, they should be checked and updated at regular intervals. If they are not stored, protocols should be signed with the related companies beforehand [5-7].

The field hospital also has a modular structure as in HDR. This modular structure consists of

five main sections: administrative unit, hospital admission, operational unit, logistic section, and humanitarian services. These sections and the sub-sections of each section can be enlarged, downsized, or excluded from the plan completely depending on the circumstances during the disaster. Besides, during disasters, the field hospitals can be forced to undertake duties other than patient care, such as providing food aid and shelter to people affected by the disaster. Therefore, the presence of nutrition and sheltering units in the field hospital plan would be appropriate [8].

The sections of the field hospital are as follows [8, 9]:

- 1) The administrative unit and hospital admission section:
 - Hospital emergency command center
 - Emergency public relations and media center
 - Checkpoint
 - Ambulance parking and helicopter landing areas
 - Patient admission and stretcher areas
- 2) The section of the operation unit:
 - First section:
 - i. waiting area (patient relatives, elective patients that can wait for intervention)
 - ii. patient registration area
 - iii. area of the triage unit
 - iv. patient decontamination area
 - v. area for trauma resuscitation
 - vi. resuscitation area
 - vii. temporary monitored observation area

- Second section:
 - i. area for emergency treatment unit
 - ii. area for observational treatment unit
 - iii. area for medical dressing and small interventional unit
 - iv. inpatient service area for internal medicine patients
 - v. internal and coronary intensive care unit area
 - vi. quarantine area
 - vii. operating room area
 - viii. surgical intensive care area
 - ix. postoperative inpatient service area
 - x. surgical inpatient service area
 - xi. blood bank area
 - xii. radiology unit area
 - xiii. laboratory area
 - xiv. morgue
 - xv. pharmacy
 - xvi. medical supply storage unit
- Logistics section:
 - i. area for public health unit
 - ii. elective examination areas
 1. Examination areas of internal medicine, cardiology, and pulmonary diseases
 2. Examination areas of pediatrics, gynecology, and obstetrics
 3. Areas of ophthalmology, ear-nose-throat, orthopedics, urology, and dermatology
 4. Examination areas of neurology and psychiatry
 - iii. Areas for personnel services
 1. Kitchen area
 2. Personnel dining and cafeteria area
 3. Personnel resting area
 4. Meeting area
 5. Personnel bathing and toilet area
 6. Drinking water and food storage area
 7. Anesthesia and surgical supply storage area
 8. Generator and uninterruptible power supply area
 9. Fuel supply tank area
 10. Medical waste and garbage area
- Humanitarian services section:
 - i. Care area for relatives and children of personnel
 - ii. Civil parking area
 - iii. Bathrooms and toilets

Communication in Disasters and the Media

Although communication and coordination are critical in disasters, the communication systems usually do not function properly during a catastrophe. This situation is one of the most significant problems concerning disasters. It becomes even a greater problem if communication and coordination with necessary institutions have not been established ahead of a catastrophe. Conflicts occur between institutions or even between units of the same institution, and they cannot be solved during the disaster. In this way, some institutions or units are excluded and the information and resources cannot be used effectively. This situation leads to further increase in chaos. In-house and inter-institutional training and drills should be performed, responsibilities and jurisdictions of the individuals should be determined, and it should be known whether the person who will be contacted is legally authorized, reliable and competent to prevent the chaos that occurs during a disaster [10-12].

Since communication is critical for coordination between institutions or subordinate units of an institution, all communication methods should be used. Telephone, telegram, media communication such as radio and television, landline phones, cellular and satellite phones, mobile communication devices, amateur radio users, and couriers can be used for this purpose. Since a communication system suitable for using in all kinds of disasters is not yet accessible, the communication should not depend on only one method. More than one communication method should be available during the preparation of the disaster plan, taking the infrastructure and resources of the hospital into consideration. Since the cellular phones may be out of order due to the overload, the most suitable methods of communication during disasters are radio and satellite communications. The satellite communication is likely to be affected less; it is usually not affected in situations where over-crowded communication is encountered [13-15]. The institutions should acquire a radio or satellite phone, set up required infrastructure, give necessary training to the personnel, and perform drills to be able to use these communication methods [13, 16].

As for all circumstances in the hospital, the communication may also be adversely affected by the disasters. Various methods should be developed for recalling the hospital personnel and previously trained volunteers and using them at the time of disaster; considering these adverse circumstances. The contact information

of these people should be recorded and updated at regular intervals. An active communication channel should be established among these individuals before the disaster. The employees can be called one by one during a catastrophe. They can be informed by a computer-aided automated paging system; if no system is functioning, they can be notified by the courier system. The required infrastructure should be established for radio communication with the Governor's Crisis Management Center, the Provincial Directorate of Health, the fire department, the security forces, and 112 Emergency Medical Services, because one hospital may not be able to manage the patient load during disasters. The patient load is shared via the inter-institutional communication, and therefore, less turmoil is encountered [17, 18].

In disasters, another significant tool of communication is the media. All events that have occurred may be addressed to the nation and the world in a short period through the media, and the necessary assistance may be requested. Even small-scale disasters may receive a response through the social media at the national or international level. In this way, extensive numbers of volunteers and many materials can be received by the hospital and the disaster area. Good relationships should be constituted considering the benefits of the media, and speculations should not be allowed by giving the necessary information regularly and quickly [19]. The loss of life and property can be reduced by establishing a logical, effective, and constructive relationship with the media, informing the public correctly about the magnitude and duration of the disaster, the affected area, and things needed to be done [20, 21]. A media center should be set up, and the media should be informed directly by the public relations authority from a single center. The probability of sensational and speculative news should be reduced by providing trained and knowledgeable individuals for working in this center. Additionally, since the media will use its own resources for making news, preparations should be done against inappropriate news [22]. The media center should give the most reliable and detailed information to the press at the shortest time by developing an appropriate strategy. Thus, the majority of the media will be directed to a place that may make an official, true, and timely press statement. By the help of this center, coordination with the media and news is acquired, announcement of which is dangerous regarding security can be put on hold. Furthermore, by explaining the names and places of the people who are alive and/or injured, the influx of people worrying about

their relatives is reduced [23]. In situations that the communication systems are harmed, necessary assistance can be provided by establishing communication through the media. Disaster training may be performed by converting the interviews with the experts about the disaster to educational essays and publishing them periodically. Moreover, awareness should be raised in the public by including any faulty application of the local and government authorities, if there is any, in the educational essays, and also including their timely and correct applications about the disaster [24, 25].

When appropriate communication cannot be established with the media, or sometimes when the media exaggerates the events with the purpose of rating, the sensational news is issued, even if its official or not. This ungrounded news leads to panic and turmoil in the community. Besides, by exerting pressure on the authorities to get information and shoot on location, they may slow down the execution of the workflow. The pressure to make statements on many topics that are impossible to know or predict at the early phase of a disaster leads to misconceptions about the authorities in the community. Giving estimated answers or stating that it is still early for answers raises conflicts about the competence of the institution [12, 26].

To be more successful in relationships with the media, the following points should be considered [27]:

- appropriate planning
- training the media about disasters
- introduction of the disaster plan to the press
- ensuring the participation of local broadcasting organizations
- conducting the planning within the knowledge of the media
- setting up the press and broadcast center
- taking the crowdedness of broadcasting organizations under control is important

Plan for Defending Against Sabotage

Sabotage is derived from the French word "sabot." It means disastrous, deep, and intentional. The aggressive and destructive activities performed for temporarily disabling all kinds of transportation and communication, and personnel and administrative structure entirely or partially is called sabotage.

The necessary precautions to protect the organizations and institutions against sabotages,

expose the persons or the groups who perform or might perform sabotage activities and make them ineffective by taking necessary measures, and eliminate sabotage activities are called defending against sabotage [28, 29].

Through which doors and at which days the visitors of the patients in hospital can enter and exit should be pre-determined to prevent a sabotage activity. While entering, the equipment and belongings that are allowed by the hospital administration should be permitted to pass. To which sections or units the personnel, patients, and visitors have entry permits should be pre-determined. Unauthorized people should not be permitted to enter. The parking places of the personnel and visitors should be pre-determined, and the entry-exit should be kept under control. The interiors and exteriors of the hospital should be lighted against a sabotage action that can be performed at night, and the malfunctions should be immediately repaired.

Security should be maintained for 24 hours by the security personnel standing sentinel and patrolling and camera system. When required, law-enforcement officers should be called. The fuel, oxygen, and nitrogen tanks, bought for using in the hospital, should be stored away from the hospital and their security should be ensured. With the purpose of protecting the work order and functionality of the hospital, to raise the morale of the personnel against defeatist actions, and to prevent conflict within the personnel, training should be done and planning should be carried out on the psychological defense-related issues.

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References

1. TC Başbakanlık Afet ve Acil Durum Yönetimi Başkanlığı. Türkiye Afet Müdahale Planı (TAMP) Nisan 2013.
2. Barış E. Hastane Tahliyesi. TATD Hastane Afet Planlaması Eğitimi kurs kitabı. İzmir: 2008. p.38-41.
3. Yazar O. Afetlerde Hastane ve Hastane Yönetim Hizmetleri. Afet Tıbbi. 2002: 635-40.
4. Center for International Disaster Information (CIDI). World Health Organization Guidelines on the Offer and Acceptance of Field Hospitals for Use in Iraq.
5. Yalbaz İS. Afet-Aciliyet Yönetim Sürecinde Saha-Acil Durum Hastaneleri ve Bir Araştırma. İstanbul: 2008.
6. Nates JL. Combined external and internal disaster: impact and response in a Houston trauma center intensive care unit. Crit Care Med 2004; 32: 686-90. [\[CrossRef\]](#)
7. Kayahan C. Afetlerde Seyyar ve Uydu Hastaneler. I. Ulusal Afet Tıbbi Kongresi. Haziran 2004, Antalya: 24.
8. Lau PF, Lau CC. A disaster drill in Hong Kong. Accid Emerg Nurs 1997; 5: 34-8. [\[CrossRef\]](#)
9. Hospital Incident Command System Guidebook. California Emergency Medical Services Authority (EMSA) FE. California May 2014.
10. Waeckerle JF, Lillibridge SR, Burkle FM Jr, Noji EK. Disaster medicine: challenges for today. Ann Emerg Med 1994; 23: 715-8. [\[CrossRef\]](#)
11. Özer M. Atatürk Hastanesi Afet Tatbikatı Deneyimi Sunumu, Hastane Afet Planları Eğitim Paneli. Ankara, 2008.
12. Yüksel AE. Gazi Üniversitesi Tıp Fakültesi Hastanesi Hastane Afet Planı Modeli. Gazi Üniversitesi Sağlık Bilimleri Enstitüsü Acil Yardım ve Rehabilitasyon Anabilim Dalı, Doktora Tezi. 2010.
13. Öztürk İ. Afet Haberleşmesi Tezi. 2012.
14. Hakoğlu O. Hastane Afet Planı Bilgi ve İletişim Sistemlerinin Karşılaştırılması: Afet Durumunda Hastane Personeli ile İletişim Sağlama Sistemlerinin Geliştirilmesi ve Hastanenin Lojistik İhtiyaçlarının Duyurulması. 2013.
15. Usta A. Afetlerde haberleşme. I. Ulusal Afet Tıbbi Kongresi. Antalya, 2004.
16. Afet ve Olağan Dışı Durumlarda Mobil Çağrı Merkezleri Ekim 2011.
17. Schultz CH, Koenig KL, Noji EK. Disaster Preparedness. Rosen's Emergency Medicine: Concepts and Clinical Practice. 5th ed., Mosby, St. Louis, USA, 2002. p. 2631-40.
18. Palteki T, Kaşıkçı HÖ. Hastaneler İçin Afete (Depreme) Hazırlıklı Olma Kılavuzu. 2010.
19. Neal DM. The local Red Cross in time of disaster: characteristics and conditions of organizational effectiveness during the Loma Prieta earthquake and central Texas floods. J Volunt Adm 1992-1993; 11: 6-16.
20. Zincir O, Yazıcı S. Kriz Yönetimi ve Afetlerde Sosyal Medya Kullanımı. İÜ Siyasal Bilgiler Fakültesi Dergisi Ekim 2013; 49: 65-82.
21. Sasser S. Field triage in disasters. Prehosp Emerg Care 2006; 10: 322-3. [\[CrossRef\]](#)
22. Partridge RA, Proano L, Marozzi D, et al. Oxford American Handbook of Disaster Medicine. New York: Oxford University Press. 2012.
23. Houston JB, Pfefferbaum B, Rosenoltz CE. Framing and frame changing in coverage of major U.S. natural disasters. Journal Mass Commun Q 2012; 89: 606-23. [\[CrossRef\]](#)
24. Wenger D, Quarantelli EL, Dynes R. Disaster analysis emergency management offices and arrangement, final project report no 34, Disasters Research Center, University of Delaware, Newark. 1986.
25. Koç H. Türk Basınının Doğal Afetlere İlişkin Bakış Açısını Belirlemeye Yönelik Bir İnceleme. Journal of World of Turks. 2013; 5: 121-37.
26. Uludağ Z. Depremde Yazılı ve Görsel Medyanın Rolü. Samsun İlinin Deprem Riski ve Alınabilecek Önlemler Sempozyumu 11-12 Mayıs 2012 Samsun.
27. Altıntop İ. Erciyes Üniversitesi Tıp Fakültesi Hastaneleri Afet Planı. Erciyes Üniversitesi Tıp Fakültesi Acil Tıp Anabilim Dalı, Tıpta uzmanlık tezi. 2006.
28. 2591 Sayılı Sabotajlara Karşı Koruma Yönetmeliği. Özdevecioğlu M, Aksoy MS. Organizasyonlarda Sabotaj: Türleri, Amaçları, Hedefleri ve Yönetimi. CÜ İktisadi ve İdari Bilimler Dergisi. 2005; 6: 95-109.