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Early Respiratory Problems and Tobacco Use in the Region Affected by Kahramanmaraş Earthquakes

Kahramanmaraş Depremlerinden Etkilenen Bölgede Erken Solunum Sorunları ve Tütün Kullanımı

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Abstract

Objective: Many respiratory complications have been reported in post-earthquake conditions. We aimed to reveal respiratory medical requirements during the early post-earthquake period and possible changes in tobacco use.

Methods: Data on age, gender, symptom, diagnosis, medications used continuously, if any, earthquake-induced disruption in medications and medical devices, place of residence, prescribed medications, smoking status, and number of cigarettes consumed daily before and during the earthquake were collected.

Results: In 137 patients, the most frequently (29.9%) presentation was asthma, followed by chronic obstructive pulmonary disease (COPD)/chronic bronchitis. Twelve patients had chest trauma and nine had a costal fracture. Sixty-nine (50.4%) patients were admitted for chronic and 46 (33.6%) for acute respiratory diseases. Medication use was not interrupted in chronic respiratory diseases. The most common complaint was cough followed by shortness of breath. Bronchodilators and expectorants were frequently prescribed, and 15.3% of patients were treated/intervened in the emergency department. Interference in use of medical devices. The rate of smoking among patients was 28.5% compared with 24.1% before the earthquake. The number of daily cigarettes smoked by active smokers before and after the earthquake increased (p=0.048).

Conclusion: In the aftermath of the Kahramanmaraş earthquakes; exacerbation, medication, and device management for patients with asthma and COPD were the primary medical requirements in terms of respiratory diseases. Provision of medication support for chronic pulmonary diseases avoided interruption. Patients still living in crowded/dysadvantaged conditions need proper management of lower respiratory tract infections, pulmonary thromboembolism, asthma, and COPD exacerbations. The rate of smoking and the number of cigarettes smoked per day have increased among patients with respiratory problems.

Keywords: Kahramanmaraş earthquake, chronic obstructive pulmonary disease, asthma, tobacco use

Öz

Amaç: Deprem sonrası koşullarda birçok solunum komplikasyonu bildirilmiştir. Bu çalışmada, deprem sonrası erken dönemde solunumsal tıbbi gereksinimleri ve tütün kullanımı açısından meydana gelen olası değişiklikleri ortaya koymayı amaçladık.

Yöntem: Göğüs hastalıkları polikliniğine başvuranlarda yaş, cinsiyet, semptom, tanı, varsa sürekli kullanılan ilaçlar, ilaç ve tıbbi cihazlarda depreme bağlı bozulma, ikamet yeri, reçete edilen ilaçlar, sigara içme durumu, deprem öncesi ve deprem sırasında günlük tüketilen sigara sayısı toplandı.

Bulgular: Yüz otuz yedi hastada en sık (%29,9) astım, ardından kronik obstrüktif akciğer hastalığı (KOAH)/kronik bronşit başvurusu vardı. On ikisinde göğüs travması ve dokuzunda kosta kırığı vardı. Altmış dokuz hasta (%50,4) kronik, 46 hasta (%33,6) akut solunum yolu hastalığı nedeniyle başvurdu. Kronik solunum yolu hastalıklarında ilaç kullanımı kesintiye uğramamıştır. En sık görülen şikayet öksürük olup bunu nefes darlığı takip etmektedir. Bronkodilatörler ve ekspektoranlar sıklıkla reçete edilmiş ve %15,3'ü acil serviste tedavi/müdahale edilmiştir. Tıbbi cihaz kullanımında kesintiler vardı. Hastalar arasında

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Öz

sigara içme oranı depremden önce %24,1 iken depremden sonra %28,5 olmuştur. Depremden önce ve sonra aktif sigara içenlerin günlük içtikleri sigara sayısı artmıştır (p=0,048).

Sonuç: Kahramanmaraş depremleri sonrasında; astım ve KOAH'lı hastalarda alevlenme, ilaç ve cihaz yönetimi solunum yolu hastalıkları açısından öncelikli tıbbi gereksinimler olmuştur. Kronik akciğer hastalıklarına yönelik ilaç desteğinin sağlanması kesintiye uğramamıştır. Halen kalabalık/dezavantajlı koşullarda yaşayan hastaların alt solunum yolu enfeksiyonları, pulmoner tromboembolizm, astım ve KOAH alevlenmelerinin uygun şekilde yönetilmesi gerekmektedir. Solunum problemi olan hastalarda sigara içme oranı ve günlük içilen sigara sayısı artmıştır.

Anahtar Kelimeler: Kahramanmaraş depremi, kronik obstrüktif akciğer hastalığı, astım, tütün kullanımı

Introduction

An earthquake is a catastrophic natural disaster that not only kills and injures the people it affects but also displaces them and impacts healthcare delivery. There are many respiratory complications caused by both earthquake and post-earthquake exposure. These can be summarized as dust and particle inhalation, aspiration of water and waterborne pathogens, thoracic trauma, pulmonary thromboembolism (PTE), psychological effects of respiratory symptoms, and infectious respiratory diseases[1].

Thoracic trauma is the most common cause of hospitalization within the first 24 hours after an earthquake. It accounts for 10% of hospital admissions at the first moment and has a high mortality risk. Dehydration, prolonged immobility, and earthquake-induced injuries effectively cause deep vein thrombosis in survivors[1-7]. In the 2004 Mid-Niigata Prefecture, Japan earthquake, the incidence of PTE was >5% in regions with a high rate of survivors[8]. Displacement of people, unsafe water and hygiene conditions, disabling health service provision, and weak or low immunity predispose individuals to post-earthquake lung infections[9].

There is insufficient information on the effects of earthquakes on the development or attacks of chronic obstructive pulmonary disease (COPD) and asthma[10]. A large-scale disaster may cause exacerbation in patients with COPD. Lack of access to medication, medical devices, and medical resources[11].

Considering the stress caused by a natural disaster, such as an earthquake, on living, working, and social conditions, it may be associated with changes in smoking habits. The September 11 terrorist attacks showed that up to 30% of New York City residents increased their use of cigarettes, alcohol, and addictive substances[12,13]. In the 2010 Canterbuty earthquake, approximately one-fourth of those who quit smoking started smoking again after the earthquakes, and more than one-third of those who increased their tobacco consumption cited earthquakes as the reason for the increase. Therefore, it is important to maintain public health services consistently in planning for disaster aftermaths[14].

The aim of this study was to reveal the problems that emerged in terms of pulmonary diseases in the early period after the earthquakes that affected 10 provinces of our country and caused great destruction, the medication needs and the needs of patients with chronic respiratory system diseases, and to determine whether a change occurred in terms of tobacco use.

Materials and Methods

Workspace

The study was conducted at Samandağ near the Mediterranean coast, with a surface area of 446 km^2 and a population of 121,109. On February 6, 2023, two earthquakes with magnitudes of 7.8 Mw (±0.1) and 7.5 Mw occurred nine hours apart, with epicenters in Pazarcık and Ekinözü districts of Kahramanmaraş, respectively. Then, on February 20, 2023, another earthquake with a magnitude of 6.4 occurred in Hatay's Defne district at 20.04, and three minutes later, at 20.07, another earthquake with a magnitude of 5.8 occurred in Hatay, Samandağ. According to official figures, the earthquakes killed at least 50,500 people in Türkiye and 8,476 people in Syria and injured more than 122,000 people in total. The earthquakes were followed by more than 24,000 aftershocks with magnitudes up to 6.7 Mw[15].

The Chest Diseases Outpatient Clinic was first opened at the Samandağ State Hospital in Samandağ district on March 24, 2023. Data on patients were recorded between March 24, 2023 and 06.04.2023, when the outpatient clinic remained open. During this period, patients in the district were able to obtain their prescribed medicines from three open pharmacies, the Mamak Municipality Mobile Tent Pharmacy and the Bakırköy

Municipality Mobile Container Pharmacy, which were set up in the hospital garden.

Patient Selection and Measurement

Age, gender, symptom, diagnosis, medications used continuously, if any, whether they experienced any earthquake-induced disruption in these medications, place of residence, continuous use of medical devices, medications prescribed in the outpatient clinic, smoking status, and number of cigarettes consumed daily before and during the earthquake were recorded for patients who applied to the chest diseases outpatient clinic and for whom consultation was requested from the emergency department.

The research was approved by the İzmir Bakırçay University Non-Interventional Clinical Research Ethics Committee (decision no: 1008, date: 26.04.2023).

Statistical Analysis

Parametric analyses were performed using the patient records. Patients who smoked before and after the earthquake were divided into two groups and compared using the independent samples t-test.

Results

A total of 137 patients, 58 women (42.3%) and 79 men (57.7%), were included in the study. The mean age was 49.36±15.8 years.

In the district, which was heavily affected by the earthquake, the most common (29.9%) presentation to the chest diseases outpatient clinic, which was opened for the first time after 48 days, was asthma, followed by COPD/chronic bronchitis (Table 1). Of the 12 patients with chest trauma, nine had a costal fracture and one had a lung contusion. Sixty-nine (50.4%) patients were admitted for chronic respiratory diseases, 46 (33.6%) for acute lung problems, and the remaining patients were admitted for control examinations and medical reports. When patients with chronic diseases and continuous medication use were questioned, it was learned that their medication use was not interrupted except for three days after the earthquake. After this date, two mobile pharmacies were established in the district by non-governmental organizations, one in the form of a tent and one in the form of a container, and the three undamaged pharmacies were provided by their owners for urgent cases.

The most common complaint was cough (51.8%) followed by shortness of breath (35.8%) (Table 2). Four (2.9%), 52 (38%) and 54 (39.4%) patients were prescribed three, two and one medications, respectively. No prescription was made for 27 patients. The most common prescriptions were bronchodilators and expectorants, while 21 (15.3%) patients were treated and intervened in the emergency department (Table 3).

Of the patients, 129 (94.2%) lived in tents/containers, seven (5.1%) lived in slightly damaged structures, and one (0.7%) lived in a vehicle. When patients with continuous use of medical devices were questioned, four of the patients living in tents were still using oxygen concentrators, seven were using nebulizers, and one was using bi-level positive airway pressure for obstructive sleep apnea syndrome. The oxygen concentrators of two patients were trapped under the debris.

Table 1. Diagnoses of patients affected by the earthquake at the chest diseases outpatient clinic

Diagnosis	n (%)
Asthma	41 (29.9)
COPD/chronic bronchitis	27 (19.7)
Acute bronchitis	17 (12.4)
Upper airway infection	12 (8.8)
Thoracic trauma	12 (8.8)
Acute sinusitis	6 (4.4)
Pneumonia	7 (5.1)
Pulmonary thromboembolism	1 (0.7)
OSAS	1 (0.7)
Other	18 (13.1)
Normal	23 (16.8)

>100% for patients with multiple diagnoses, COPD: Chronic obstructive pulmonary disease, OSAS: Obstructive sleep apnea syndrome

Table 2. Symptoms of patients affected by an earthquake and reported to the chest diseases outpatient clinic

Symptom	n (%)
Cough	71 (51.8)
Breathlessness	49 (35.8)
Chest pain	28 (20.4)
Sputum	21 (15.3)
Constituinal symptoms	16 (11.7)
Rinitis	8 (5.8)
Sore throat	6 (4.4)
Fever	4 (2.9)
Other	1 (0.7)

>100% for patients with multiple diagnoses

When the smoking status of patients was analyzed, the rate of smoking among patients admitted to the chest diseases outpatient clinic was 28.5% in the second month after the earthquake compared with 24.1% before the earthquake. The number of daily cigarettes smoked by active smokers before and after the earthquake increased statistically significantly (p=0.048) (Tables 4 and 5).

When the 24 consultations requested from the emergency department were analyzed; the diagnoses were COPD/asthma exacerbation (n=21), trauma (three rib fracture, three general trauma, two pneumothorax an done hemothorax), carbon monoxide poisoning (n=5), pneumonia (n=3), gastrointestinal bleeding, cerebrovascular accident, acute bronchitis (n=2), food aspiration, myocardial infarction, hypertension, respiratory failure, pulmonary edema, intra-abdominal bleeding, and lumbar fracture (n=1).

Table 3. Treatment modalities applied in chest diseases outpatient clinic

Treatment	n (%)
Bronchodilator	56 (40.9)
Expectorant	47 (34.3)
Leukotriene antagonist/antihystaminic	16 (11.7)
Analgesics	15 (10.9)
Antibiotics	11 (8.0)
Antipyretics	5 (3.6)
Flu medicine	4 (2.9)
Interventional thoracentesis	3 (2.2)
Oral steroid	1 (0.7)
Emergency service intervention	21 (15.3)
Other	19 (13.9)
None	27 (19.7)
>100% for patients with multiple diagnoses	

Table 4. Smoking status of patients before and after the earthquake

	Before earthquake	After earthquake
Smoking	**n (%)**	**n (%)**
None	95 (69.3)	92 (67.2)
Stop	9 (6.6)	6 (4.4)
Active	33 (24.1)	39 (28.5)

Table 5. Amount of daily consumption of cigarette smokers before and after the earthquake

	Before the earthquake	After an earthquake	p
n of daily cigarette	14.45±9.89	20.62±15.02	0.048
Independent samples t-test was applied			

Discussion

Post-earthquake lung diseases are an important cause of morbidity and mortality. Preventive and protective measures are effective. Disaster preparedness and response teams should implement these solutions[1]. Intervention with mobile healthcare services, such as field hospitals and infirmaries, for direct pulmonary complications during earthquakes is essential for early intervention. Again, organization is necessary for outpatient or inpatient treatment of conditions such as PTE and lung infections, etc. that are expected to occur after the earthquake. On the other hand, a critical requirement is the identification, treatment, and follow-up of the current health status of patients with chronic lung diseases who have survived the earthquake. As a matter of fact, the high number of risk factors in earthquakes -cold, rainy weather conditions, inhalation of dust and particles from buildings that collapsed during the earthquake or collapsed because they were heavily damaged after the earthquake, nutrition with a single type of food, reduced water intake, and change in hygiene conditions- led to more unfavorable conditions for these patients.

People who are forced to leave their homes are forced to make use of temporary sleeping places such as mattresses, tents, awnings, etc., and all kinds of life support (food, clean water, cleaning supplies) can be provided to these people to a limited extent. In crowded mass living environments where people are temporarily housed, children and the wounded are especially at risk of lung infections. This risk can only be eliminated by ensuring healthy airflow through clean, appropriate ventilation and preventing the inhalation of high concentrations of respiratory particles[16]. Infectious agents of the Wenchuan, China earthquake were reviewed. As a result of culture analysis of wound site, blood, and sputum samples, the most frequently growing bacteria were *Acinetobacter baumannii*, *Escherichia coli*, *Enteric bacilli*, *Klebsiella pneumoniae*, and *Psedudomonas aeruginosa*[17].

In the second month after the earthquake in our country, the frequency of exacerbation of chronic lung diseases and acute upper and lower respiratory tract infections increased in applications to the chest diseases branch. Moreover, antibiotic use ranked first among the prescriptions issued. Life continues in crowded tents or containers, and the risk of lung infection persists. On the other hand, patient access to all types of medicines has been facilitated thanks to

pharmacy areas that have been established and actively operated by public and non-governmental organizations.

In the 2011 Van earthquake, the most common types of injuries were extremity fractures and thoracic injuries. Numerous costal fractures, lung contusion, and hemopneumothorax require intervention[4]. In our analysis, 37.5% of the admissions to the emergency department were due to thoracic trauma, and radiologic presentations with high mortality, including pneumothorax and hemothorax, were encountered even in the second month after the earthquake. It was observed that some patients were not aware of costal fractures, and callus was observed on radiological images at outpatient clinic presentation.

The number of patients newly diagnosed with PTE increased significantly after the Niigata earthquake in Japan. Sedentary life in temporary shelters has been reported to be an important risk factor[18]. In addition, sympathetic nervous system activation caused by psychological and physical stress triggers excessive coagulation, resulting in increased platelet activity[19].

The 2004 Chuetsu, Japan earthquake showed that people who stayed in vehicles for more than three nights were at great risk of deep vein thrombosis and PTE. Prolonged sitting, heat-related fluid loss, and decreased fluid intake are also risk factors[20]. PTE was diagnosed in one patient among 137 outpatient clinics and 24 emergency room visits included in our study. It was observed that only one patient stayed in an automobile, and the majority lived in tents. The region experienced cold weather in the first two months after the earthquake. When the situation in our country is considered from this point of view; it is thought that fluid losses will increase and PTE development will be seen more frequently with the warming of the weather in the regions affected by the earthquake and where people stay in temporary settlements.

After the 2011 Great East Japan earthquake, the prevalence of asthma was found to be 24.9% among individuals aged over 15 years who stayed in temporary mobile areas. Of these, 44.6% were diagnosed before the earthquake, 95% were in temporary accommodation, and 45.9% were diagnosed after moving to temporary housing. Attacks were reported in 71.4% of patients with asthma after moving to temporary homes. Allergic rhinitis or allergic conjunctivitis, family history of asthma, never smoking, and peripheral airway disease were risk factors. As a result, the earthquake increased mite allergen sensitization and attacks or caused asthma development in people over 15 years of age[10]. The COPD status of patients during the first six months of the same earthquake was analyzed. Patients who received long-term oxygen therapy at home were admitted to hospital within the first hour. The number of hospitalizations due to COPD exacerbation in the subacute period (between the first three and five weeks) increased significantly compared with the pre-earthquake period. Patients reported significantly less participation in activities of daily living upon admission. Six weeks after the earthquake, the COPD exacerbations returned to normal numbers[11].

During the 2011 Tohoku earthquake, in addition to the anticipated problems and tasks, unforeseen ones were also encountered. For example, "tsunami lung" and thoracic trauma were the most important problems encountered at the earliest stage. On the other hand, because it coincided with cold spring days, influenza virus endemicity and pneumonia created an additional burden. Lack of energy supply leads to severe respiratory problems in patients requiring oxygen therapy for chronic respiratory failure and continuous positive pressure ventilation due to obstructive sleep apnea syndrome. Various problems have emerged in the diagnosis, treatment, and management of patients with asthma, COPD, and interstitial pneumonia in the subacute and chronic periods[21]. After the 2009 L'Aquila earthquake, the number of admissions for respiratory diseases increased. It has been reported that silent or subclinical chronic conditions, such as COPD, are triggered by earthquakes[22].

In the 1999 Marmara earthquake, 34 people with chronic diseases were analyzed using the short form-(36) scale, and their scores related to the two basic elements of quality of life (physical and mental health) were found to be low. Individuals with chronic diseases that are among the risk groups in extraordinary situations, such as earthquakes, should be closely monitored and receive professional support. Quality of life can be improved by providing services to such individuals by a multidisciplinary professional team. In addition, it is recommended that units providing healthcare services after an earthquake structure their services for individuals with chronic diseases in a way to address their special and acute problems[23]. In the district where the study was conducted, health service provision was continued in the emergency department of the hospital belonging to the Ministry of Health in the early period, and a field hospital was established. Intense dust transport was observed from collapsed and heavily or moderately damaged buildings that began to be demolished during the earthquake. As a matter of

fact, it is expected that asthma, COPD, and chronic bronchitis attacks will take the first place in the treatment of the chest diseases branch. The supply of medicines, consumables, and home treatment devices that these patients would need most could be managed through mobile pharmacies established in the district and hospital facilities.

Study Limitations

The limitations of this study include the fact that data were collected in a single center and in a limited time period, analysis was performed with a limited number of patients, and some diagnostic methods, especially the pulmonary function test, could not be applied due to the inadequate post-earthquake facilities of the institution where data were collected.

Thanks to the information, problems, and experiences gained after the devastating earthquake, it is possible to fully define and plan the ideal early and late period health service provision to be provided after the earthquake. The lessons learned will undoubtedly determine success in the next disaster.

Conclusion

In the aftermath of the Kahramanmaraş earthquakes, exacerbation, medication, and device supply management were the primary early medical needs of patients with asthma and COPD. The provision of medication support, especially antibiotics and inhalers, by public institutions and non-governmental organizations in mobile settings ensured that the treatment and follow-up of chronic lung diseases were not interrupted in the early period. Patients are still living in crowded conditions, such as tents and containers, for an indefinite period and are exposed to adverse weather conditions. Therefore, they need to be managed properly in terms of lower respiratory tract infections, especially PTE, and asthma and COPD exacerbations. Compared with the pre-earthquake period, the rate of smoking and the number of cigarettes smoked per day have increased in patients with respiratory problems.

Footnote

Ethics Committee Approval: The research was approved by the İzmir Bakırçay University Non-Interventional Clinical Research Ethics Committee (decision no: 1008, date: 26.04.2023).

Informed Consent: The research that is the subject of our study was planned and carried out while I was working in the region after the earthquake. All the data used in the research is the anamnesis information transferred to the hospital records of the patients. No prospective information specific to the research was collected and used.

Authorship Contributions

Surgical and Medical Practices: A.E.E., Concept: A.E.E, M.O.G., Design: A.E.E, M.O.G., Data Collection or Processing: A.E.E, Analysis or Interpretation: M.O.G., A.A., Literature Search: M.O.G., A.A., Writing: A.E.E, M.O.G., A.A.

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