TURKISH JOURNAL OF INTERNAL MEDICINE

ISSN:2687-4245

Medical Oncology

Earthquake disaster impact on health care of cancer patients: Single-centre experience

Oktay Ünsal , Ozan Yazıcı , Nuriye Özdemir , Gözde Savaş , Ahmet Özet

Department of Medical Oncology, Gazi University, Faculty of Medicine, Ankara, Turkey

ABSTRACT

Background The earthquakes in February 2023 in Turkey had a major impact on Turkey's health system, causing damage to hospitals and health centres in the affected areas. Cancer patients are one of the groups that are highly influenced by the disaster. The aim of this study was to evaluate some of the demographic and clinical characteristics of cancer patients who are getting health care in earthquake-affected areas.

Material and Methods Fifty cancer patients who lived in 11 cities of Turkey affected by the earthquake and were admitted to Gazi University Department of Medical Oncology after the earthquake between 15 February 2023 and 15 March 2023 were included in the study. Data such as demographic characteristics, cancer diagnosis, time of cancer treatment, and earthquake history were taken retrospectively from nationally-linked electronic records (E-nabız).

Results Breast cancer was the most common diagnosis of these patients. Most of the patients were taking active treatment (60%). Chemotherapy and hormonotherapy were the most common treatment modalities (20% and 18%, respectively). The median delay in the active treatment of 14 cancer patients was 24 days (2-60).

Conclusions The earthquake disaster has led to important impacts on cancer patients' care in most affected areas. The human, financial and medical resources should be improved. Especially if detailed nationally-linked electronic records are provided, cancer patients will not have difficulty seeking health care. This disaster should be an important stimulus for hospitals and healthcare systems to improve the care of patients during disasters.

Turk J Int Med 2023;5(4):234-239
DOI: 10.46310/tjim.1327111

Keywords: *Cancer patients, earthquake, healthcare, Turkey.*

Received: *July 13, 2023;* ***Accepted:*** *September 1, 2023;* ***Published Online:*** *29 October 2023*

How to cite this article: *Ünsal O, Yazıcı O, Özdemir N, Savaş G, Özet A. Earthquake disaster impact on health care of cancer patients: Single-centre experience Turk J Int Med 2023;5(4):234-239. DOI: 10.46310/tjim.1327111*

Address for Correspondence:
Oktay Ünsal, Department of Medical Oncology, Gazi University Faculty of Medicine, Ankara, Turkey
E-mail: oktayunsal@gazi.edu.tr

INTRODUCTION

After the earthquakes of 7.7 and 7.6 magnitudes on the Richter scale, originating from the Kahramanmaraş centre on February 2023, a large geographic area, including Turkey and also many countries such as Syria, Lebanon, Cyprus, Iraq and Israel, is affected. In Turkey, Kahramanmaraş, Hatay, Gaziantep, Malatya, Diyarbakır, Kilis, Şanlıurfa, Osmaniye, Adıyaman, Adana, Elazığ were among the most commonly affected cities.[1] The disaster affected many daily activities and systems, including the health care system.

The earthquakes had an impact on Turkey's health system. Some problems have been observed in the delivery of health services.[2] Cancer patients, who experience many economic and psychological difficulties during the treatment process, are one of the vulnerable groups that might be affected by the disaster. This patient population had several challenges and many needs during and after a disaster. They have encountered many physical traumas, such as amputations, fractures, dehydration, crush syndrome, and acute kidney injury. Furthermore, psychological traumas caused by the disaster, such as loss of life in family relatives and migration, were some of the difficulties experienced by cancer patients in the process. Komuro et al. [3] also showed that Patients diagnosed with cancer are at risk of exposure to intense short- and long-term psychological stress following a disaster. It was reported that patients had questions regarding interruption of their treatment and drug therapy.

As a result of the natural disaster, many cancer patients who might migrate from disaster areas to other regions throughout the process were re-evaluated and followed up in the treatment centres they applied to. In this case, nationally-linked electronic records and backup had become critical. In Turkey, at this point, the national electronic patient (E-Nabız) database, accessible all over the country, was significant for the healthcare continuum. The literature showed that disruption of cancer treatment can worsen patients' prognosis and survival outcomes.[4-6] A meta-analysis demonstrated that patients with a diagnosis of colorectal cancer who have a delay to adjuvant chemotherapy after surgery have worse survival outcomes.[7] Also, studies with prostate cancer patients and glioblastoma demonstrated poor survival outcomes after delay, interruption, and absence of treatments.5-8 In this study, we evaluated some demographic and clinical characteristics of cancer patients getting health care in earthquake-affected areas.

MATERIAL AND METHODS

Patient population

Cancer patients who lived in 11 cities of Turkey affected by the earthquake and were admitted to Gazi University Department of Medical Oncology after the earthquake between 15 February 2023 and 15 March 2023 were included in the study.

Data collection

We retrospectively searched the hospital electronic data system of the 3168 cancer patients admitted to Gazi University Department of Medical Oncology between 15 February 2023 to 15 March 2023. The 50 cancer patients with a history of being affected in earthquake disasters and adequate data were enrolled in the study. Their data, such as demographic characteristics, cancer diagnosis and stage, type of cancer treatment, and earthquake history, were taken from nationally-linked (E-Nabız) electronic records. The study was initiated with the ethics committee's approval (Date: 2023, Decision No: 479). All procedures were carried out according to the ethical rules and the principles of the Declaration of Helsinki.

Statistical analysis

The SPSS software version 23 was used during the data process. The variables are examined for normal distribution using visual and analytical methods (Kolmogorov–Smirnov or Shapiro–Wilk test). Descriptive analyses were performed using medians for non–normally distributed and ordinal variables. Categorical data such as gender, cancer diagnosis, histological subtype, stage of the disease, the types of treatment, the cities that patients came and the presence of injury were presented in counts and percentages.

RESULTS

A total of 50 cancer patients who were admitted to our clinic after the earthquake disaster with adequate data were included in this study. The median age of the patients were 56 (23-75) years. The demographic and clinical characteristics of the patients are shown in Table 1. Most of these patients were female (70%). Breast cancer was the most common diagnosis of these patients, and this diagnosis was followed

by gastrointestinal tract cancers, head and neck cancers and lung cancers. The most common histological breast cancer subtype was invasive ductal carcinoma (66.7%). Colon carcinoma (50%) was the most common gastrointestinal tract malignancy. Thirty-four per cent of the patients had stage IV disease on admission. When the to our clinic, most had ECOG (Eastern Cooperative Oncology Group) performance score 1 (Table 1). The laboratory findings revealed acute kidney injury in 2 patients. There were no patients with neutropenia. While twenty-eight patients (56%) had grade 1 anaemia, 7 had grade 2 anaemia.

Table 1. Demographic and clinical characteristics of the patient population (n: 50).

Age (years)	56 (23:75)
Female gender	35 (70)
Cancer diagnosis	
Breast	18 (36)
Gastrointestinal tract	8 (16)
Head and neck	7 (14)
Lung	6 (12)
Genitourinary system	3 (6)
Pancreas	3 (6)
Central nervous system	2 (4)
Hepatobiliary system	2 (4)
Gynecological	1 (2)
The city of Turkey that patients came from	
Hatay	13 (26)
Malatya	12 (24)
Gaziantep	6 (12)
Kahramanmaraş	5 (10)
Adıyaman	5 (10)
Adana	5 (10)
Diyarbakır	1 (2)
Elazığ	1 (2)
Osmaniye	1 (2)
Şanlıurfa	1 (2)
Presence of any injury after earthquake	
Staying under a dent	1 (2)
Crush syndrome	1 (2)
No	48 (96)
Type of active treatment	
Chemotherapy	10 (20)
Hormonotherapy	9 (18)
Targeted therapy	6 (12)
Immunotherapy	4 (8)
Chemoradiotherapy	1 (2)
No treatment	20 (40)
Tumor stage at diagnosis	
I	3 (6)
II	14 (28)
III	16 (32)
IV	17 (34)
ECOG performance score	
0	10 (20)
1	34 (68)
2	6 (12)

ECOG: Eastern Cooperative Oncology Group.
The values were expressed as n (%) and (minimum: maximum).

The cancer patients had been chiefly coming from Hatay and Malatya. One patient had stayed under a dent for 32 hours, fractured his foot, and suffered crush syndrome. One female patient with a cancer diagnosis also suffered from crush syndrome after earthquakes. These two patients were followed in the intensive care unit before being admitted to our hospital. Other patients were followed in outpatient clinics.

Most patients were taking active treatment (60%) during an earthquake. Chemotherapy and hormonotherapy were the most common treatment modalities (20% and 18%, respectively). Also, 18% of the patients took adjuvant therapy when admitted to our hospital. Fourteen patients were evaluated by radiodiagnostic methods during the follow-up period. One patient had a recurrent disease, and one had the disease in progression. Among the patients taking active treatment, no delay was recorded in 16 patients. The median delay in the active treatment of 14 cancer patients was 24 days (2-60). Furthermore, imaging and examination planning was delayed in only two patients not taking active medicine.

DISCUSSION

To the best of our knowledge, the current preliminary data is the first for evaluating some demographic and clinical characteristics of the cancer patients who lived in 11 cities of Turkey affected by the earthquake and were admitted to another clinic a month after the earthquake. We observed that the study population were taking mostly active treatment, and the median delay in active treatment of 14 cancer patients was 24 days (2-60) after the earthquake. Ozaki *et al.*[9] analysed 120 patients with breast cancer after the triple disaster in Fukushima, Japan, 2011. In this analysis, patients with ≥ 1-year delay increased statistically significantly after the disaster. Most of the patients were presented with late-stage disease (stages 3 and 4), associated with poor prognosis. In our study, we examined the patients for a month, so we could not evaluate the survival outcomes of the patients. Also, Jacqueline *et al.*[10] showed that after the earthquake in Mex-

ico, 6% of the cancer patients had difficulty getting health care and delay in treatment was seen. These findings show the earthquake's impact on access to cancer care. In addition, as soon as possible, the Turkish Society of Medical Oncology created a telephone on-duty medical oncologist list to support the doctors living in affected cities to support oncology patient care. After that, voluntary medical oncologists made rotations to affected cities to continue oncology patient care chemotherapy regimens.

In the literature, it was shown that delays in treatment modalities are associated with worse survival outcomes.[4-8] Our study has a short follow-up period for evaluating survival outcomes, but further studies with larger patient populations and more extended follow-up periods should be planned for analysing the survival outcomes.

Patients with chronic diseases like cancers may have many challenges and needs during disasters.[11] As well as cancer patients might have many economic and psychological problems during the process, they might also have many difficulties in their cancer care. Destroyed communication systems, damaged transport services and loss of functionality of many medical services can lead to disruption of medical services for cancer patients.[12] After the earthquake, outpatient and inpatient clinics, radiation oncology units, and pathology laboratories are all described in the medical literature about the delivery of oncology care. In addition, medication can be lost or left behind. Cancer patients, especially those who are socially isolated, elderly and those with insufficient knowledge of their medications, are at higher risk for a worse prognosis.[13,14]

Man *et al*.[12] emphasised that the healthcare infrastructures, the healthcare workforce, data dispersion, and patient relocation are among the problems that patients with cancer and healthcare givers face after a disaster. Especially lack of treatment history (past cycles, plans, staging details, histological diagnosis, and others), drug protocols, clinical trials, and research documents in cancer patients may be encountered during and after disasters.[15,16] Patients should accompany their treatment records.[11] In this case, national electronic databases of medical history reports of radiology, laboratory, and pathology can help physicians. In our practice, we had no difficulty getting information about the history of cancer treatment due to adequate and current nationally-linked electronic records (E-nabız). In addition, it is essential to educate cancer patients about their disease and treatment.

Porzio *et al*.[17] studied cancer patients in the region where three earthquakes occurred in Italy. The researchers maintained contact with patients through in-person visits or regular phone communication. Initially, the patients received continuous care, and it was observed that the rates of anxiolytic therapy, drug consumption, and patient compliance did not increase compared to the pre-earthquake period. However, among the cancer patients who had to evacuate the city but later returned, an increase in the frequency of post-traumatic stress disorder (PTSD) was observed. Furthermore, six months after the earthquake, an increase in the frequency of anxiety disorders, sleep disorders, and depression were reported among the cancer patients included in the study. Based on their findings, the authors suggested that patients exposed to earthquakes should be monitored for at least two years. Unfortunately, we cannot present similar data due to the limited duration of our study's follow-up period. Nonetheless, we are conducting close follow-ups and observation of 50 patients in our clinic.

Our study has some limitations. Firstly, the sample size is small because, especially in the study, we wanted to evaluate the cancer patients a month after the earthquake disaster. Also, we could not examine the survival outcomes of the patients due to the short follow-up period.

Continuity is essential in oncological care. Treatment schemas are individualised within specific periods. Also, it requires multidisciplinary management. It is known that earthquakes can be associated with worse outcomes for cancer patients. Disasters can cause psychological distress to both patients and caregivers. In conclusion, it is essential to formulate plans to support and help cancer patients in these difficult circumstances.

CONCLUSIONS

The earthquake has greatly impacted cancer patients' care in most affected areas. Health care for cancer patients must continue during and after a disaster. Healthcare systems of countries with a known high risk for disasters should consider the continuity of cancer patient care and establish referral systems. The human, financial and medical resources should

be provided. This disaster should be an essential stimulus for hospitals to improve the care of patients during disasters.

Conflict of Interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical Approval

The protocol of the study was approved by the Medical Ethics Committee of Gazi University, Ankara, Turkey. (Decision number: 07, date: 4.4.2023).

Authors' Contribution

Study Conception: OÜ, AÖ; Study Design: OÜ, NÖ, AÖ; Literature Review: OÜ, GS; Critical Review: OÜ, NÖ, AÖ; Data Collection and/or Processing: OÜ, GS,; Analysis and/or Data Interpretation: OÜ, OY; Manuscript preparing: OÜ, OY.

REFERENCES

1. Kahramanmaraş'ta meydana gelen depremler Hk. Basın Bülteni– 26. T.C. İçişleri Bakanlığı. Afet ve Acil Durum Yönetimi Başkanlığı. Available at: https://www.afad.gov.tr/kahramanmarasta-meydana-gelen-depremler-hk-basin-bulteni-26.
2. United Nations Population Fund (UNFPA). Turkiye Earthquake Situation Report #1. 10 Feb 2023. Available at: https://reliefweb.int/report/syrian-arab-republic/turkiye-earthquake-situation-report-1-10-february-2023.
3. Komuro R. A report of medical support for disaster victims in east Japan earthquake and tsunami. [Poster]. Wiley Online Library 2011:112-3.
4. Barton MB, Keane TJ, Gadalla T, Maki E. The effect of treatment time and treatment interruption on tumour control following radical radiotherapy of laryngeal cancer. Radiother Oncol. 1992 Mar;23(3):137-43. doi: 10.1016/0167-8140(92)90323-m.
5. Blumenthal DT, Won M, Mehta MP, Gilbert MR, Brown PD, Bokstein F, Brachman DG, Werner-Wasik M, Hunter GK, Valeinis E, Hopkins K, Souhami L, Howard SP, Lieberman FS, Shrieve DC, Wendland MM, Robinson CG, Zhang P, Corn BW. Short delay in initiation of radiotherapy for patients with glioblastoma-effect of concurrent chemotherapy: a secondary analysis from the NRG Oncology/Radiation Therapy Oncology Group database. Neuro Oncol. 2018 Jun 18;20(7):966-74. doi: 10.1093/neuonc/noy017.
6. Ohri N, Rapkin BD, Guha C, Kalnicki S, Garg M. Radiation therapy noncompliance and clinical outcomes in an urban academic cancer center. Int J Radiat Oncol Biol Phys. 2016 Jun 1;95(2):563-70. doi: 10.1016/j.ijrobp.2016.01.043.
7. Guetz GD, Nicolas P, Perret G-Y, Morere J-F, Uzzan B. Does delaying adjuvant chemotherapy after curative surgery for colorectal cancer impair survival? A meta-analysis. Eur J Cancer. 2010 Apr;46(6):1049-55. doi: 10.1016/j.ejca.2010.01.020.
8. D'Ambrosio DJ, Li T, Horwitz EM, Chen DYT, Pollack A, Buyyounouski MK. Does treatment duration affect outcome after radiotherapy for prostate cancer? Int J Radiat Oncol Biol Phys. 2008 Dec 1;72(5):1402-7. doi: 10.1016/j.ijrobp.2008.03.011.
9. Ozaki A, Leppold C, Tsubokura M, Tanimoto T, Saji S, Kato S, Kami M, Tsukada M, Ohira H. Social isolation and cancer management after the 2011 triple disaster in Fukushima, Japan: A case report of breast cancer with patient and provider delay. Medicine (Baltimore). 2016 Jun;95(26):e4027. doi: 10.1097/MD.0000000000004027.
10. Alcalde-Castro J, Hernandez-Gilsoul T, Dominguez-Rosado I, Chavarri-Guerra Y, Soto Perez-de-Celis E. Cancer care after the 2017 Central Mexico earthquake. J Glob Oncol. 2018 Jul:4:1-4. doi: 10.1200/JGO.18.00146.
11. Gorji HA, Jafari H, Heidari M, Seifi B. Cancer patients during and after natural and man-made disasters: A systematic review. Asian Pac J Cancer Prev. 2018 Oct 26;19(10):2695-2700. doi: 10.22034/APJCP.2018.19.10.2695.
12. Man RX, Lack DA, Wyatt CE, Murray V. The effect of natural disasters on cancer care: A systematic review. Lancet Oncol. 2018 Sep;19(9):e482-99. doi: 10.1016/S1470-2045(18)30412-1.
13. Tomio J, Sato H, Mizumura H. Interruption of medication among outpatients with chronic conditions after a flood. Prehosp Disaster Med. 2010 Jan-Feb;25(1):42-50. doi: 10.1017/s1049023x00007652.
14. Ochi S, Hodgson S, Landeg O, Mayner L, Murray V. Disaster-driven evacuation and medication loss: a systematic literature review. PLoS Curr. 2014 Jul 18:6:ecurrents.dis.fa417630b566a0c7dfdbf945910edd96. doi: 10.1371/currents.dis.fa417630b566a0c7dfdbf945910edd96.
15. David-West G, Musa F, Frey MK, Boyd L, Pothuri B, Curtin JP, Blank SV. Cross-sectional study of the

impact of a natural disaster on the delivery of gynecologic oncology care. Disaster Med Public Health Prep. 2015 Dec;9(6):605-8. doi: 10.1017/dmp.2015.83.
16. Susman E. Unforeseen challenges after hurricane devastation. Lancet Oncol. 2005 Oct;6(10):744-6. doi: 10.1016/S1470-2045(05)70379-X.
17. Porzio G, Aielli F, Verna L, Aloisi P, Guadalupi F, Cannita K, Ricevuto E, Ficorella C. Home care for cancer patients after an earthquake: the experience of the "L'Aquila per la Vita" Home Care Unit. J Pain Symptom Manage. 2011 Sep;42(3):e1-4. doi: 10.1016/j.jpainsymman.2011.06.004.