Original Article

Is The COVID-19 Pandemic Reason, Shortage Result? A Survey Study on Drug Shortages in Turkish Oncology Clinics

COVID-19 Pandemi Nedeni, Kıtlık Sonucu mu? Türk Onkoloji Kliniklerinde İlaç Eksikliği Üzerine Bir Araştırma Çalışması

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ABSTRACT

Aim: The rapid development of the drug industry led to a great spectrum of medical treatment, especially in oncology practice. The prescribed drug alternations increased three times in the United States. Also, the increased drug numbers led to drug shortages, which doubled during this period in the oncology era. In this study, we try to evaluate the oncology clinics' drug supply last year in the eyes of oncology practitioners

Methods: We conducted an online questionnaire via Google Forms on the drug shortages which are faced last year by oncologists in Turkey. Our study is a cross-sectional study.The SPSS 25 software was used for statistical analysis

Results: Eighty-nine percent of the participants declared they had a drug shortage last year. The most affected drug groups were chemotherapeutics (61,4%), biologic agents (anti-VEGF, anti-EGFR agents, etc.) (56,8%), immunologic drugs (available anti-PD1 drugs) (54,5%), and supportive medicines (Folinic acid, GCSF, etc.) (42%). 61 percent of the oncologists referred their patients to other clinics to get over the drug shortage. The most common reasons were supply problems (70%), drug company-related concerns due to exchange rates (68%), hospital budget problems (48%), and bureaucratic procedures (47%). There was a significant difference between drug shortage and participants' hospitals. Also, the shortage has significantly lasted longer in university hospitals.

Conclusion: Our study showed an extensive drug shortage in oncology clinics last year independent of drug types. University hospitals had reported worse results compared with other organizations. There is an urgent need for further evaluation of drug shortages and the availability of oncologic drugs and the prognostic effect of this phenomenon..

Key words: COVID-19, Pandemic, Drug shortages, Oncology

ÖZET

Amaç: İlaç endüstrisinin hızlı gelişimi, özellikle onkoloji pratiğinde geniş bir tıbbi tedavi yelpazesine yol açmıştır. Amerika Birleşik Devletleri'nde 2005 ile 2011 yılları arasında reçete edilen ilaç değişimleri üç kat arttı. Ayrıca artan ilaç sayıları, onkoloji çağında bu dönemde ikiye katlanan ilaç kıtlığına yol açtı. Bu çalışmada onkoloji pratisyenlerinin gözünden onkoloji kliniklerinin geçen yılki ilaç arzını değerlendirmeye çalıştık.

Yöntemler: Türkiye'de onkologların geçtiğimiz yıl yaşadığı ilaç kıtlığı ile ilgili Google Forms üzerinden online bir anket gerçekleştirdik. Çalışmamız kesitsel bir çalışmadır. İstatistiksel analiz için SPSS 25 programı kullanıldı. Tanımlayıcı istatistikler frekans dağılımı olarak sunuldu Bu çalışmada, iki yönlü istatistiksel analizler yapıldı ve $p<0.05$ istatistiksel olarak anlamlı kabul edildi.

Bulgular: Katılımcıların yüzde seksen dokuzu geçen yıl ilaç sıkıntısı yaşadıklarını beyan ettiler. En çok etkilenen ilaç grupları kemoterapötikler (%61,4), biyolojik ajanlar (%56,8), immünolojik ilaçlar (%54,5) ve destekleyici ilaçlar (%42) idi. Onkologların yüzde 61'i hastalarını ilaç sıkıntısından kurtulmak için

First Received: 19.06.2023, Accepted: 19.09.2023 doi: 10.5505/aot.2023.14471

başka kliniklere yönlendiriyor. En sık nedenler tedarik sorunu (%70), döviz kurundan kaynaklanan ilaç firmaları kaygısı (%68), hastane bütçe sorunları (%48) ve bürokratik işlemler (%47) idi. İlaç sıkıntısı ile katılımcıların hastaneleri arasında anlamlı bir fark vardı. Ayrıca, üniversite hastanelerinde açık önemli ölçüde daha uzun sürmüştür

Sonuç: Çalışmamız, ilaç türlerinden bağımsız olarak geçen yıl onkoloji kliniklerinde yaygın bir ilaç sıkıntısı olduğunu gösterdi. Üniversite hastaneleri, diğer kuruluşlara kıyasla daha kötü sonuçlar bildirmişti. İlaç kıtlığının ve onkolojik ilaçların mevcudiyetinin ve bu fenomenin prognostik etkisinin daha fazla değerlendirilmesine acil bir ihtiyaç vardır.

Anahtar kelimeler: COVID-19, Pandemi, İlaç kıtlığı, Onkoloji

Introduction

The rapid development of the drug industry led to a great spectrum of medical treatment, especially in oncology practice. The prescribed drug alternations increased three-fold between 2005 and 2011 in the United States. Also, the increased drug numbers led to drug shortages, which doubled during this period in the oncology era [1]. The shortages in oncology practice may be related to serious damage to patient survival altered dosing, treatment gaps, and inferior protocols. Specific precautions were exercised in this era [2]. Although some studies tried to elucidate this area, the consequences of drug shortages are still inconclusive. Most of the studies are based on specific drugs or hospitals. Some studies tried to explain the situation with surveys [3,4].

After the start of the COVID-19 pandemic, multiple problems occurred in cancer treatment, consisting of increased workload, decreased supply of medical professionals, and materials with increased patient problems. Multiple studies showed the changes in oncology practice during the time of the COVID-19 pandemic. Increased workload, and decreased patient adherence due to COVID-19 fear and social regulations. [5,8]. The economic problems of countries and states are also evaluated during the pandemic and may be one of the problems leading to drug shortages [9]. During the pandemic period, drug shortages are foreseen with the overwhelming healthcare system. The breakdown of the supply-demand chain is speculated to have a great impact on medical drugs [10].

In this study, we try to evaluate the oncology clinics' drug supply last year in from the perspective of oncology practitioners.

Materials and Methods

We conducted an online questionnaire via Google Forms on the drug shortages which are faced last year by oncologists in Turkey. Of more than seven hundred, 95 oncologists answered the survey. Two follow-up emails and reminders were sent in 2 weeks to increase the number of responders and the study was completed. The survey was voluntary.

The survey had 3 questions about the position, experience, and work conditions of the participants. The questionnaire was consisting of fifteen questions to determine drug types had a shortage, time, reasons, solutions, and the most affected diagnosis in terms of effect and complications. Also, the difference between current optimal medical treatments and available practice was questioned. (see Supplemental Appendix 1 in the online version)

The SPSS 25 software was used for statistical analysis. Descriptive statistics were presented as frequency distribution and percentage. The chi-square or Fisher’s Exact tests were used to compare independent categorical variables. In this study, two-way statistical analyses were performed, and $p<0.05$ was considered statistically significant.

Table 1: The features of the study population

Age (years)	30-40	41-50	51-60	61-70	
n (%)	39 (41,1)	34 (35,8)	17 (17,9)	5 (5,3)	
Experience(years)	5 or less	6-10	11-20	21-30	
n (%)	25 (26,3)	26 (27,4)	27 (28,4)	17 (17,9)	
Affiliation	State H.	University H.	E & R Hospital	Private H.	City H.
n (%)	3 (3,2)	39 (41,1)	19 (20)	27 (28,4)	7 (7,4)
Academic Position	Fellow	Specialist/Assistant Professor	Associated Professor	Professor	
n (%)	19 (20)	21 (22,1)	28 (29,5)	27 (28,4)	

H.: Hospital; E&R: Education and Research;

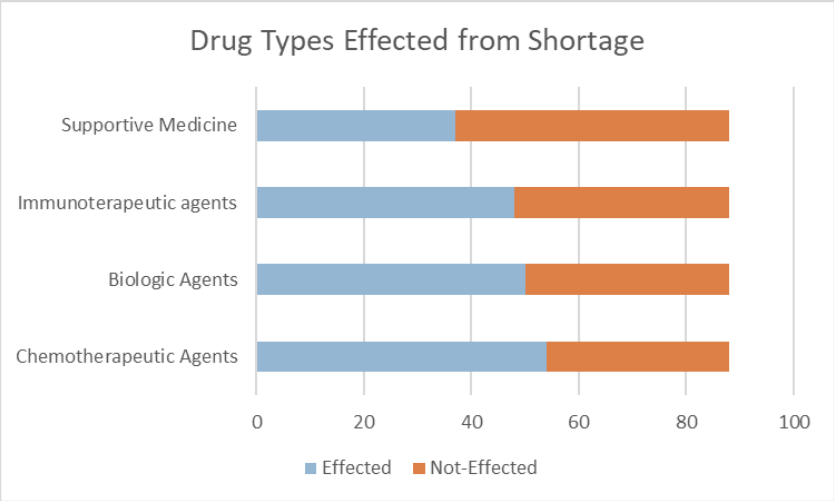

Figure-1: The drug types had shortage according to oncologists

The study was approved by the ethics committee at Afyonkarahisar Health Sciences University Faculty of Medicine and carried out by the Declaration of Helsinki principles and all applicable regulations. (Date & Number:01.07.2022 & 2022/8). An informed consent form was obtained from all patients.

Results

Ninety-five oncologists were included in the study. Forty-one percent of the participants were aged between 30 and 40. The three groups were stratified by experience, had roughly the same number of participants, and did not differ significantly. (5 or less; 6 to 10 and 11-20 years) The most frequent academic positions were associated professors and professors with nearly thirty percent. Approximately forty percent of the oncologists were working in a university followed by private hospitals with 28 percent. (Table-1)

Eighty-nine percent of the participants declared they had a drug shortage last year. The most affected drug groups were chemotherapeutics (61,4%), biologic agents (anti-VEGF, anti-EGFR agents, etc.) (56,8%), immunologic drugs (available anti-PD1 drugs) (54,5%), and supportive medicines (Folinic acid, GCSF, etc.) (42%). Sixty-one percent of the oncologists referred their patients to other clinics to get over the drug

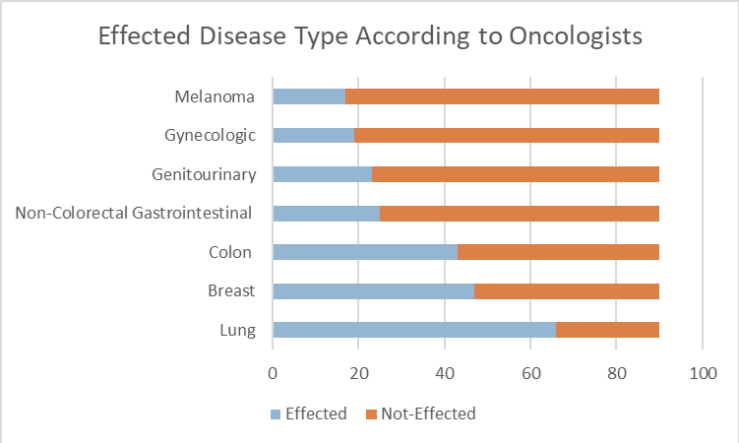

Figure-2: Most affected diseases from shortage according to oncologists

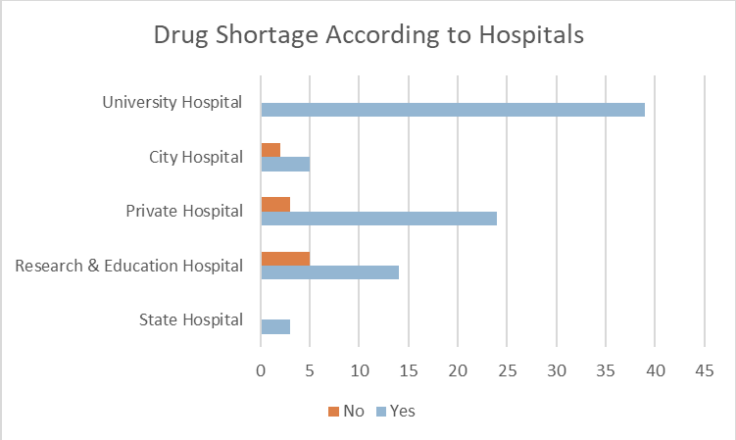

Figure-3: Drug shortage rates according to hospital types

shortage. (Figure-1) Nearly half of the participants selected alternative treatment options and 17 percent had to choose inferior treatments. Eighty-three percent of the study population declared the drug shortage lasted three months. The most common reasons were supply problems (70%), drug company-related concerns due to exchange rates (68%), hospital budget problems (48%), and bureaucratic procedures (47%).

Two-thirds of the oncologists thought that the survival of the patients was affected negatively, and nearly fifty percent were concerned about increased complication rates. Leading patient groups affected by shortages were lung, breast, and colon cancer patients respectively. (73,3%; 52,2%; 47,8%)

Ninety percent of the participants did not think current optimal practice fit their daily practice and over ninety percent thought that most of the incompetence was in lung cancer. Seventy-five percent of the oncologists foreseen the difference in optimal treatment and daily practice in Turkey will increase.

There was a significant difference between drug shortage and participants' hospitals. (p=0,047) (Figure-2) Also the shortage has significantly lasted longer in university hospitals. (p= 0,013) (Figure-3)

Discussion

This study showed there was a high-rate drug shortage in Turkey in oncology practice last year. Although the most affected drug types were chemotherapeutic agents, biologic and immunotherapy drugs have high rates of shortages. Our study represented nearly ten percent of the Turkish Oncology Society. Also, most of the participants had an academic

degree which may be related to control of the department in terms of drug recipients of the unit.

Turkish oncology association tried to take preventive causations via publishing guidelines like many other associations. No specific precautions were exercised for preventing drug shortages during this period by authorities [11]. Some studies showed minimal effect on outcomes of chemo-therapeutic agents' shortages. Most of the drugs that had shortages in studies were Fluorouracil, doxorubicin, and cytarabine [3,12]. However, it is stated that there may be a shortage of cisplatin and carboplatin recently. For this, it is emphasized that medical oncologists should be in constant communication globally and the importance of early detection [13]. In another study, an increase occurs in the shortage of sedative analgesics during the covid-19 pandemic. This phenomenon may also influence the cancer treatment especially in ICUs and operation rooms [14]. Although tocilizumab was used in a case study to prevent the limitations of mechanical ventilators and other drugs used in the treatment of covid, it caused an increase in the drug limitation in rheumatoid arthritis [15]. Although we did not perform a drug specification, it is possible to have the same drug shortages in Turkey. was limited data on shortages of biological and immunotherapy drugs used in oncology. We only know about There the BCG shortage in bladder cancer in the COVID-19 Era [16]. Although a shortage cannot be determined for these groups of drugs, most of the immuno-therapeutic agents have limitations in several countries due to their costs including Turkey. Prior studies evaluated nationwide or hospital-based drug shortages. Reasons and potential solutions for unavailability of agents evaluated [3,17]. On the other side, some studies evaluate the effect of drug shortages on patients. The alternative strategies were discussed with patients by oncologists, physicians, and pharmacists [18]. Although we don't know the attitudes of patient relations in our study, high rates of referral of patients to other hospitals may be related to informing patients about drug shortages.

Our study showed that oncologists are concerned about increased toxicity with unfamiliar drug utility or alternative treatment. Also, a study showed increased toxicity of alternative drug combinations due to altered doses or lack of knowledge about unfamiliar drugs [12]. The drug shortages are affecting both oncology and hematology as well as the adult and pediatric population [19,20]. Our study only showed results of adult solid organ malignities as Turkish oncologists are mainly responsible for treating this population excluding a few multi-disciplinary facilities. Also, a few centers that are treating oncology patients, including pulmonary medicine and gynecology clinics cannot be assessed by our survey study. This group of practitioners is very small and doesn't have the permission of using several targeted therapies which makes their evaluation inconclusive.

Different from other studies we also named another issue, which originated from different hospital types. University hospitals in Turkey are known to have low funds compared to private and ministry of Health-funded hospitals. The possible results of long and deep drug shortages in university hospitals may be related to this reason. To our knowledge, this is the first study evaluating the drug shortage in the oncology area in the pandemic era.

The data in this study are presented based on the statements of the oncologists participating in the study and are not official data. Inclusion of the subjective opinions of the authors is one of the limitations of our study. Although the study was a cross-sectional survey yet it could only evaluate the last year which was the second year of the pandemic. In addition, the

lack of any previous survey or analytical study evaluating the oncological drug shortage in Turkey was the reason why our study could not compare with the shortage situation in the pre-pandemic period. The COVID-19 pandemic had multiple effects on the Turkish health care system, especially via economic end-points. We found high rates of drug shortage by survey, but this might be related to low survey response rates of physicians who had not faced drug shortages.

Our study showed an extensive drug shortage of over fifty percent in oncology clinics last year independent of drug types. University hospitals had reported worse results compared with other organizations and may need more attention for drug supply. There is an urgent need for further evaluation of drug shortages and the availability of oncologic drugs and the prognostic effect of this phenomenon. The oncologists think the shortage of oncologic drugs will be a long lasting problem and optimal treatment may not be delivered in near future in Turkey.

REFERENCES

[1] U.S.G.A. Office, Drug shortages: FDA's ability to respond should be strengthened, Natl Drug Shortages Trends FDA Response. 2012; 1–50.

[2] M.L. Gatesman and T.J. Smith, The Shortage of Essential Chemotherapy Drugs in the United States, N Engl J Med. 2011; 365: 1653–1655.

[3] A. McBride, L.M. Holle, C. Westendorf, M. Sidebottom, N. Griffith, R.J. Muller and J.M. Hoffman, National survey on the effect of oncology drug shortages on cancer care, Am J Heal Pharm. 2013; 70: 609–617.

[4] K.L. Kehl, S.W. Gray, B. Kim, K.L. Kahn, D. Haggstrom, M. Roudier and N.L. Keating, Oncologists' experiences with drug shortages, J Oncol Pract. 2015; 11: e154–e162.

[5] B. Akagunduz, M. Ozer, C. Karacin, M.M. Atcı, H.C. Yıldırım and E. Unver, Impact of coronaphobia on treatment and follow-up compliance of cancer patients, Futur Oncol. 2021; 17: 2621–2629.

[6] C. Karacin, I. Bilgetekin, F. B Basal, O.B. Oksuzoglu. How does COVID-19 fear and anxiety affect chemotherapy adherence in patients with cancer, Futur Oncol. 2020; 16: 2283–2293.

[7] I. Beypinar, The effect of COVID-19 on oncology practice in Turkey, J BUON. 2021; 26: 1659–1662.

[8] D.C. Guven, B.Y. Aktas, M.S. Aksun, E. et al. COVID-19 pandemic: Changes in cancer admissions, BMJ Support Palliat Care. (2020), bmjspcare-2020-002468.

[9] B. Lui, M. Zheng, R.S. White and M. Hoyler, Economic burden of lives lost due to COVID-19 in New York State, J Comp Eff Res. 2021; 10: 893–897.

[10] A.G. Shuman, E. Fox and Y. Unguru, Preparing for COVID-19-related Drug Shortages, Ann Am Thorac Soc. 2020; 17: 928–931.

[11] A.T. Sümbül, Ş. Yalçin, A. Özet, et al. Turkish Medical Oncology Society COVID-19 Pandemic Advisory Board Recommendations for Cancer Patients and Medical Oncologist, J Oncol Sci. 2020; 6: 1–4.

[12] R. Kaakeh, B. V. Sweet, C. Reilly, C. Bush, S. DeLoach, B. Higgins, A.M. Clark and J. Stevenson, Impact of drug shortages on U.S. health systems, Am J Heal Pharm. 2011; 68: 1811–1819.

[13] Cisplatin/Carboplatin Shortages Underscore Need for Strategies to Prevent Future Cancer Drug Disruptions, (n.d.). https://www.onclive.com/view/cisplatin-carboplatin-shortages-underscore-need-for-strategies-to-prevent-future-cancer-drug-disruptions (accessed August 12, 2023).

[14] E.R. Fox, A.I. Stolbach and M. Mazer-Amirshahi, The Landscape of Prescription Drug Shortages During the COVID-19 Pandemic, J Med Toxicol. 2020; 16: 311.

[15] A.A. Verma, M. Pai, S. Saha, S. Bean, M. Fralick, J.L. Gibson, R.A. Greenberg, J.L. Kwan, L. Lapointe-Shaw, T. Tang, A.M. Morris and F. Razak, Managing drug shortages during a pandemic: tocilizumab and COVID-19, CMAJ. 2021; 193: E771–E776.

[16] N. Brooks, S. Nagaraju, J. Matulay, X.Y. Han and A.M. Kamat, Bacillus Calmette-Guérin Retains Clinically Relevant Viability for up to 72 Hours After Reconstitution: Potential Implications for Clinical Practice in Times of Shortage, Eur Urol Oncol. 2021; 4: 826–828.

[17] S. Shukar, F. Zahoor, K. Hayat, A. et al. Drug Shortage: Causes, Impact, and Mitigation Strategies, Front Pharmacol. 2021; 12: 693426.

[18] A. Hantel, F.J. Hlubocky, M. Siegler, C.K. Daugherty, A Qualitative Analysis of Oncology Patient Awareness of Medication Shortages and Their Preferences for How Shortages Should Be Managed, JCO Oncol Pract. 2020; 16: e1098–e1111.

[19] A. Cherif Chefchaouni, Y. Moutaouakkil, B. Adouani, Y. Tadlaoui, J. Lamsaouri, Y. Bousliman, Impact of anti-cancer drugs shortages in oncology and hematology departments in a Moroccan hospital, J Oncol Pharm Pract. 2022; 28: 822-826.

[20] T. Bauters, B.O.M. Claus, K. Norga, I. Huys, S. Simoens and G. Laureys, Chemotherapy drug shortages in paediatric oncology: A 14-year single-centre experience in Belgium, J Oncol Pharm Pract. 2016; 22: 766–770.

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Doi: 10.5505/aot.2023.14471

