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The evaluation of vaccination status and the factors affecting vaccination in cancer patients

Kanser hastalarında aşılanma durumu ve aşılanmayı etkileyen faktörlerin değerlendirilmesi

Muslih Urun[1*], Ismail Beypinar[2], Sena Ece Davarcı[3], Hacer Demir[3], Meltem Baykara[3]

1.Department of Medical Oncology, Eskişehir City Hospital, Eskişehir, Turkey
2.Alanya Alaaddin Keykubat University Department of Medical Oncology Antalya, Turkey
3.Department of Medical Oncology, Afyonkarahisar Health Sciences University, Afyon, Turkey

ABSTRACT

Aim: Coronavirus disease 2019 (COVID-19) pandemic increased the mortality of cancer patients by causing direct infection or collateral damage to the healthcare system. After the development of effective vaccines against COVID-19 infection, mortality rates declined. In this study, we try to investigate the vaccination among cancer patients.
Methods: A survey was applied to patients with cancer in order to investigate the attitudes towards vaccination and the factors effecting vaccination in two medical oncology centers in Turkey.
Results: 271 patients were included in the study. No difference was observed in the attitudes of patients towards vaccination according to cancer type. 83% of the patients were vaccinated against COVID-19. In 75% of the study population, vaccine was administered in the earliest available time. Receiving chemotherapy was the most significant reason to avoid vaccination among the study group (p=0,002). There was no significant difference in terms of treatment type for COVID-19 between patients with or without adequate vaccination. The most negative factor affecting vaccination was active chemotherapy treatment. Social relations and traditional media were the most positive factors for vaccination.
Discussion: Vaccination is of vital importance for patients who are treated or on remission. Even if patients are to receive chemotherapy, they should be informed about vaccination and should be encouraged for vaccination.

Keywords: COVID-19, vaccine, cancer

ÖZ

Amaç: COVID-19 pandemisi, doğrudan enfeksiyona yol açarak veya sağlık sisteminde aksamayla beraber sekonder olarak kanser hastalarının ölüm oranını artırdı. SARS-CoV-2'nin yol açtığı enfeksiyona karşı etkili aşıların geliştirilmesinden sonar ölüm oranları düştü. Bu çalışmada kanser hastalarının aşı olup olmadığını incelemeye çalıştık.
Yöntemler: Türkiye'de iki medikal onkoloji merkezindeki hastaların aşıya yönelik tutumları ve aşılamayı etkileyen faktörleri araştırmak amacıyla kanserli hastalara anket uygulandı.
Bulgular: Çalışmaya iki yüz yetmiş bir hasta dahil edildi. Hastaların aşıya yönelik tutumlarında kanser türüne göre farklılık gözlenmedi. Hastaların %83'ü COVID-19'a karşı aşılanmıştı. Çalışma popülasyonunun %75'ine mümkün olan en kısa sürede aşı uygulanmıştı. Çalışma grubunda aşıdan kaçınmanın en önemli nedeni kemoterapi almaktı (p=0,002). Yeterli dozda aşısı olan ve olmayan hastalar arasında COVID-19 tedavisinin türü açısından anlamlı bir fark yoktu. Aşılamayı etkileyen en olumsuz faktör aktif kemoterapi tedavisiydi. Sosyal ilişkiler ve geleneksel medya aşılama için en olumlu etkenlerdi.
Sonuç: Tedavi gören veya remisyonda olan hastalar için aşılanma hayati önem taşımaktadır. Hastalar kemoterapi alacak olsalar bile aşı konusunda bilgilendirilmeli ve aşı için teşvik edilmelidir.

Anahtar kelimeler: COVID-19, aşı, kanser

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*Corresponding Author: Muslih Urun. Eskişehir City Hospital, Medical Oncology Department, 71 Evler, 26080 Odunpazarı/ Eskişehir/Türkiye. +905307753838, muslihurun@gmail.com

ORCID: 0000-0002-9883-3398

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INTRODUCTION

Infectious diseases have existed throughout human history and have remained one of the main causes of death for many years, along with wars. At the end of 2019, a new type of coronavirus was identified as the cause of numerous pneumonia cases in Wuhan, a city in China's Hubei Province. This virus spread rapidly and caused a global pandemic. The disease was named COVID-19, meaning ''coronavirus disease 2019''. Coronaviruses can cause infections in both humans and animals. Animal coronavirus diseases involve multiple body systems, such as gastrointestinal, respiratory, and central nervous systems. Clinical symptoms in animals are varying from encephalomyelitis, nephritis, and hepatitis to peritonitis [1]. Human coronavirus diseases' clinical symptoms can range from asymptomatic to severe pneumonia that can lead to multi-organ dysfunction [2].

The World Health Organization (WHO) has declared the new type of COVID-19 as a Public Health Emergency of International Concern (PHEIC) on January 30, 2020, and subsequently announced COVID-19 disease as a pandemic on March 11, 2020. Cancer is the most common cause of death after cardiovascular diseases in developed and developing countries. According to the GLOBOCAN database, approximately 19.3 million new cancer cases were reported globally in 2020 [3]. More attention should be paid to cancer patients, because they are usually older and have multiple comorbidities.

The susceptibility of cancer patients to infection with the influenza virus was known before the SARS-CoV-2 virus emerged [4]. Influenza increases the risk of hospital admission about four-fold and the risk of death about ten-fold in cancer patients compared to healthy individuals [5].

When the data of COVID-19 disease in cancer patients from 14 different hospitals in China's Hubei province were evaluated, there was an almost three times higher death rate in COVID-19 patients with cancer disease than in non-cancer counterparts. The mortality rate was particularly high in patients with hematological malignancies, lung cancers, and stage IV malignancies, independent of cancer type [6]. The mortality in cancer patients is affected by direct and indirect effects of the COVID-19 pandemic, such as infection and treatment interruptions [7]. Although these patients were susceptible to infection, the factors effecting vaccination were not evaluated in detail. Every country has its own dynamics that might affect patient behavior; however, there are limited data regarding the potential reasons which can affect the vaccination status in Turkish cancer patients.

Most of the studies regarding COVID-19 vaccines have excluded patients who had cancer disease or those receiving systemic anti-cancer therapy, hence the data on safety and efficacy of vaccines in such patients are currently limited. However, based on the data from current studies and safety profiles of other vaccines, expert panels and national guidelines strongly recommend the vaccination in cancer patients, even if the data regarding safety and efficacy are limited. As of February 2022, SARS-CoV-2 infection has caused approximately 400 million infections and 5.8 million deaths worldwide. In Turkey, it caused 13 million cases and 90,000 deaths [8].

Based on the results from clinical trials, the FDA has approved three types of COVID-19 vaccines as follows; Pfizer-BioNTech/BNT162b2 (mRNA) [9], Moderna/mRNA 1273 (mRNA) [10], and Janssen/Ad26.COV-2 (viral vector) [11].

We developed a questionnaire consisting of 13 questions in order to analyze the 'perspectives of cancer patients' towards the vaccines that have been proven to be effective against the COVID-19 and are allowed to be used in our country, including the percentages of vaccination, the reasons for vaccination, the reasons for refusal, and the severity of patients who are infected with COVID-19.

In this study, we aimed to show the different attitudes on vaccination against COVID-19 in Turkish cancer patients, emphasizing the positive and negative factors affecting vaccination, with the goal of giving information to authorities, physicians, and patients to better control and manage future health crisis or pandemic.

MATERIAL AND METHODS

Study participants

Patients with cancer diagnosis receiving active treatment who applied to the department of medical oncology outpatient clinic of Eskişehir City Hospital and Afyonkarahisar Health Sciences University were enrolled if they had the following criteria; 18 years and over, having literacy and good cognitive functions, and those who wanted to fill the questionnaire. Patients who don't know reading and writing, who had died from COVID-19 infection or don't want to fill the questionnaire were excluded. The survey applied for two months between the 1st of October and the 1st of November 2021. We have prepared a questionnaire form for determining the vaccine status and clarifying the opinions about the vaccination of cancer patients. The questionnaire form is available in the appendix.

Statistical analyses

Statistical analysis of the study was performed using SPSS version 22.0. Descriptive data were calculated using median, frequency, and means. The Chi-square test was used for categorical data. The continuous data were evaluated with parametric or non-parametric tests according to whether they were equally distributed or not. P value of less than 0.05 was considered statistically significant

RESULTS

A total of 271 patients, 173 (63.8%) from Afyon Health Sciences University Hospital and 98 (36.2%) from Eskişehir City Hospital, were included. Of the patients, 57.2% were female and 42.8% were male. The percentages of the patients by cancer types with decreasing order were as follows; breast cancer 33.6%, lung cancer 15.5%, colon cancer 15.5%, gastric cancer 6.6%, ovarian cancer 5.2%, pancreas cancer 2%, and others (21.8%). Considering the type of cancer, there was no significant difference among patients in terms of vaccination rates (p=0.23).

Among 271 patients, 71.6% were receiving chemotherapy and 81.2% were infected with COVID-19. Of the patients with COVID-19 disease, 83.7% survived without hospitalization, 14.3% required hospitalization, and 2% were treated in the intensive care unit.

Of the patients participating in the survey, 83.8% were vaccinated against COVID-19. Of the patients who underwent vaccination, 74.4% were vaccinated right after the vaccine was developed, 13% were vaccinated within 3 months of the vaccine development, and 12.6% were vaccinated within 3 to 6 months after the vaccine was developed. The rate of not getting vaccinated was significantly higher in patients receiving active chemotherapy (p=0.002). There was no significant difference in the severity of COVID-19 infection between patients receiving chemotherapy and those not receiving treatment.

Of the patients getting vaccinated, the percentages of patients with the number and type of vaccination were as follows; 1 dose of Sinovac in 3.4%, 2 doses of Sinovac in 18.4%, 3 doses of Sinovac in 12%, 1 dose of BioNTech in 3.4%, 2 doses of BioNTech 22.2%, 2 doses of Sinovac+1 dose of BioNTech in 18%, 2 doses of Sinovac+2 doses of BioNTech in 3%, 1 dose of Sinovac+2 dose of BioNTech in 0.4%, and 3 doses of BioNTech in 3.4%. The rate of patients who received at least 2 doses of vaccine was 76%. When patients were compared according to the number of vaccinations as <2 vs. ≥2, there was no significant difference among groups in terms of having COVID-19 infection or its severity (p=0.61 and p=0.31, respectively).

Of the 44 patients who did not receive the vaccine, the reasons for refusal were as follows; 22.7% did not believe in its effect, 9.1% thought it would have side effects, 4.5% waited to see its long-term effects, 61.4% refused because of having received chemotherapy, and 1 patient did not state a reason as seen inTable-1.

Negative factors leading to not getting vaccinated were found as family and friends in 29.5%, television (TV) and radio in 4.5%, social media, and internet in 6.8%, chemotherapy in 50%, no reason in 4.5%, family and friends + TV and radio in 4.5% as seen in Table-2.

Among patients getting vaccinated, 79.9% believed in its effect, 8.7% thought it would not have any side effect, and 11.4% both believed in its effect and thought it would not have any side effect (Table-1).

Positive reasons leading to patients getting vaccinated were as follows; family and friends in 24.1%, TV and radio in 24.6%, social media, and internet in 2.7%, physician advice in 18.3%, family and friends+ TV and radio in 14.7%, family and friends + physician advice in 7.1%, TV and radio + physician advice in 3.1%, and all reasons in 5.4% (Table-2).

Table 1. The decision of patients for vaccination according to vaccinated and unvaccinated groups

Decision	Vaccinated N (%)	Decision	Unvaccinated N (%)
Believe in Effect	175 (79,9)	Disbelieve in Effect	10 (22,7)
Lack of Adverse Effect	19 (8,7)	Fear of Adverse Effect	4 (9,1)
None	-	Wait to see long term effect	2 (4,5)
All	25 (11,4)	Ongoing Chemotherapy	27 (61,4)
		None	1 (2,3)
		All	-
Total	219	Total	44

N: Number, (%): Percentage

Table 2. The source of influence for both negative and positive ways for vaccination

Source of influence	Positive for vaccination N (%)	Negative for vaccination N (%)
Family and Friends	54 (24,1)	13 (29,5)
TV and Radio	55 (24,6)	2 (4,5)
Social Media	6 (2,7)	3 (6,8)
Ongoing Chemotherapy	N/A	22 (50)
Physician Advice	41 (18,3)	N/A
None	N/A	2 (4,5)
Combined	56 (24,9)	2 (4,5)
All	12 (5,4)	0 (0)
Total	224	44

TV: Television, N/A: Not Available, N: Number, (%) Percentage

DISCUSSION

After the vaccination program started in our country, citizens were classified according to risk groups. The risk groups and the order of vaccination were published on the website of the Ministry of Health and updated periodically [12]. As in the rest of the world, the priority for vaccination was given to healthcare workers, elderly individuals, and those with chronic diseases.

Despite the devastating consequences of the COVID-19 pandemic, there is still a group of skeptical people who deny the existence of the disease, do not believe in vaccines, and refuse to adhere to preventive strategies [13-14]. Although it is an excellent method to prevent infectious diseases, vaccination has often aroused suspicion, giving rise to anti-vaccine ideology and anti-vaccine movements. Some negative attitudes towards the vaccine, possible side effects, and fear of needles can be counted among the reasons for refusing the vaccine [15]. The development of new vaccines within a relatively short time and with new techniques has raised some questions about the vaccine in a particular part of society. The main fears for cancer patients towards vaccines are the risk of side effects and safety [16].

Even before the SARS-CoV-2 pandemic, there were several barriers to vaccination programs among cancer patients as demonstrated in a study by Ariza-Heredia et al. [17]. Despite clear recommendations to vaccinate patients receiving chemotherapy against preventable infections such as influenza, vaccination rates in these groups always remained low [18-19].

With the start of vaccination, there have been a great deal of information flow in written, visual, and social media, some of which had no scientific basis about the vaccine. As in other vaccines that are in the vaccination calendar, some part of society has begun to hesitate about getting vaccinated. People's hesitance towards vaccines may block COVID-19 vaccines from reaching large masses, hence prolonging the pandemic. However, there is limited data on the rate of vaccination and patients' point of view towards COVID-19 vaccines. In a multicenter survey study on Korean cancer patients, 61.8% of the participants stated that they were willing to receive the COVID-19 vaccine [20].

Our aim in this study was to evaluate the vaccination rates and perspectives of cancer patients towards the vaccine. Various vaccines have been developed against SARS-CoV-2, and as of February 16, 2022, more than ten billion doses of COVID-19 vaccines have been administered worldwide.

Only 16.2% of our patients were not vaccinated, 3.4% received only 1 dose of Sinovac, and 3.4%

received 1 dose of BioNTech. The rate of patients who received at least 2 doses of vaccine was 76%. As of February 2022 in our country, 84.75% of individuals (over the age of 18) were reported to receive at least 2 doses of vaccine [21]. Although our survey could not provide clear information about the timing, almost 25% of our patients were vulnerable to COVID-19 infection. Considering the time elapsed after the 2 doses of vaccination in cancer patients, this rate is likely to be higher.

In general, our patients' perspective on the vaccine was positive. More than half of the unvaccinated patients, the reason for refusal was active chemotherapy treatment. The second most common cause of not getting vaccinated was that patients did not believe in the effect of the vaccine (22.7%). Contrary to expectations, in our study group, the negative effect of the close environment was more remarkable than that of social media. Of the patients who received the vaccine, the reason for undergoing vaccination in 79.9% was that they believed in its effect. Family-friends and media organs were the most effective factors in getting vaccinated. According to our study, we see that the encouragement of our surroundings and media organs is effective in vaccination. The future concept of vaccination encouragement can be organized through health authorities in these circumstances. In addition, some actions in social media can be taken against the disinformation about vaccines in special patient populations

In our study, the vaccination rate of cancer patients was lower than the normal population. The most important reason for not getting vaccinated in this group was that more than half of the patients were receiving active chemotherapy treatment. In addition, the rate of patients who had fears of having side effects or did not believe in its effect was also quite high. This study may have a mainstream effect on the prevention of cancer patients from misinformation in the time of social health crisis, such as pandemic or epidemic. The results of the study may demonstrate some solutions to health authorities, society leaders, and members of press or social media about how to cope with misinformative issues on cancer patients. Additionally, this study is important in terms of indicating the different social dynamics in Turkey comparing with other countries in terms of vaccination and pandemic.

Limitations: One of the main limitations was that it could not be known whether patients with COVID-19 infection were infected before or after the vaccination. Moreover, the requirement of reminder dose for patients who received two doses of vaccine could not be questioned.

Conclusion

In conclusion, patients with cancer tend to have more severe COVID-19 infections than normal individuals. In addition, the development of antibodies via vaccine is less common in cancer patients than in the normal population. The most important reason for being against the vaccination is receiving active chemotherapy in our study. For these reasons, vaccination is of vital importance for patients who are treated or on remission. Even if patients are to receive chemotherapy, they should be informed about vaccination and should be encouraged for vaccination.

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ORCID and Author contribution: **M.U. (0000-0002-9883-3398):** Concept and Design, Data collection, Literature search, Analysis and Interpretation, Manuscript Writing, Critical Review. **I.B. (0000-0002-0853-4096):** Concept and Design,Literature search, Analysis and Interpretation, Critical Review. **S.E.D.(0000-0003-1142-9411):** Data collection, Literature search H.D. (0000-0003-1235-9363): Manuscript Writing, Critical Review. **M.B. (0000-0003-3291-8134):** Manuscript Writing, Critical Review

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