Investigation of Anxiety Sensitivity Levels of Cancer Patients In Terms of Covid 19 Vaccine: A Cross-Sectional Study

GÖKÇE İŞCAN (✉ dr_gokcedilek@yahoo.com)

  Suleyman Demirel University: Suleyman Demirel Universitesi   https://orcid.org/0000-0003-0848-5201

BÜLENT ÇETİN

  Suleyman Demirel University: Suleyman Demirel Universitesi

FARUK KILIÇ

  Suleyman Demirel University: Suleyman Demirel Universitesi

HAKAN KALAYCI

  Suleyman Demirel University: Suleyman Demirel Universitesi

AYŞEGÜL KALAYCI

  Suleyman Demirel University: Suleyman Demirel Universitesi

Abstract

Introduction:

The goal of our research was to look into the perspectives of cancer patients who had not yet been vaccinated, aged from 21 to 88 years old and had applied to Süleyman Demirel University's oncology outpatient clinic in May and June, as well as their anxieties and concerns about vaccination.

Methods

The goal of this descriptive cross-sectional study was to investigate cancer patients' perceptions of Covid vaccination. We applied 3 questionnaires, one of them prepared by us, the other two questionnaires were The State-Trait Anxiety Inventory (STAI) form and Anxiety Sensitivity index to a total of 497 participants. Chi-Square, Spearmen correlation test, multivariable multinomial logistic regression tests were used when comparing.

Results

Our participants were between the ages of 21 and 88, with a mean age of 61,38 (SD = 11,68). 48,6% (n=251) of all participants were female. We discovered that 79.1% (n=408) of respondents were not afraid of getting the COVID-19 vaccine. 27,7 % (n=143) of this population's respondents were concerned about the COVID-19 vaccine's negative effects and 24,2% (n=125) were afraid of its side effects with their treatments. 91,1% (n=470) of the patients did not know which vaccine they would have and the type of the vaccine. Due to the high level of anxiety in women in general, it was thought that anxiety scores were higher in patients with breast and ovarian cancer, which are important cancers in women during the pandemic period, while anxiety scores were lower in patients with prostate cancer since it was seen in men. Special patient groups should not be neglected during this vaccine season, and their concerns should be addressed. When a new vaccine is found, it can have long-term effects, which should not be ignored.

Background

The novel coronavirus, even described as SARS-Cov-2 or COVID-19, has emerged as a global health threat. The World Health Organization (WHO) announced a coronavirus disease 2019 (COVID-19) pandemic on March 11, 2020, and the scale of the outbreak has only grown since then(1). Looking at May 8, according to the data of the World health organization (WHO), there are more than 156 million definite cases and more than 3 million people who died due to Covid 19 in the world (2). Although COVID-19 preventive behaviors such as wearing a mask and social distancing are effective in preventing the spread of the virus, it has been understood that the long-term control of the COVID-19 pandemic will only be possible with the development of the appropriate vaccine (3).

It is believed that patients with chronic diseases are more likely to develop viral infection complications (4). Patients with cancer had a higher risk of extreme events (intensive care unit admission, intrusive ventilation, or death) than patients without cancer, according to a newly reported Chinese cohort (39 percent vs 8 percent, p = 0.0003) (5). When compared to the general population, cancer patients had a double higher risk of COVID-19 infection in a study of 1,524 cancer patients (6). Because of regular care and evaluation in the hospital, cancer patients are at risk of contracting COVID-19, and their immunity has been suppressed as a result of chemotherapy and radiotherapy. Cancer patients, on the other hand, need continuous monitoring and medical tests or treatments are not a luxury, whereas COVID-19 exposures can be extremely dangerous and even fatal. Understanding the characteristics of cancer patients infected with the novel coronavirus, overcoming diagnostic and therapeutic barriers, and implementing guidelines to protect this vulnerable population from disease progression caused by test and treatment delays, as well as virus contamination, are all being pursued. Patients with cancer are considered a high-priority subgroup for COVID-19 vaccination due to the seriousness of the disease and the increased risk of death. The "American Association for Cancer Research (AACR)", the "American Society of Clinical Oncology (ASCO)", and the "Association of American Cancer Institutes (AACI)" have called on the "Centers for Disease Control and Prevention (CDC)" to make COVID-19 vaccination a top priority for cancer patients (7). The "COVID-19 Vaccination Advisory Committee of the European Society for Medical Oncology (ESMO)", the "Society for Immunotherapy of Cancer (SITC)", and the "National Comprehensive Cancer Network (NCCN)" have issued tentative guidelines promoting vaccination in all cancer patients, including those on active treatment (8, 9).

Vaccines (also called immunizations or vaccinations) are used to help a person's immune system recognize and protect the body against certain infections and they are usually not prescribed during chemo or radiation treatments, with the flu shot being the only exception. This is because vaccines require an immune system response to function, which you do not receive during cancer treatment (10). And now it is available to protect against COVID-19 with vaccines. There are three types of vaccines that can be used. Messenger RNA (mRNA) is a type of genetic material found in the Pfizer-BioNTech and Moderna vaccines. The Johnson & Johnson (Janssen) vaccine contains an adenovirus (a form of the virus that is not the same as the coronavirus that causes COVID-19) that's been genetically modified to produce the gene for the COVID-19 virus's spike protein. CoronaVac/Sinovac vaccines are containing an inactivated virus that does not cause disease but produces an immune response (Inactive vaccines). All four vaccines have been shown to substantially reduce the risk of contracting COVID-19. If you are infected with COVID-19, they have also been shown to be very effective at lowering the risk of developing a serious illness, being hospitalized, or dying from it (11).

Anxiety is described as a feeling of unease, worry, or fear about a current or potential situation. It is important to consider anxiety and take action to mitigate or prevent it from worsening. Anxiety is a common concern in patients who have been diagnosed with cancer. Cancer patients, their families, and caregivers can experience fear and anxiety at various times during treatment and recovery (12).

The fear of cancer patients, whose diagnosis and treatment process is quite weary, increases with every new need. While COVID 19 and its vaccines created general uneasiness even in the normal population, so in this study, it was aimed to determine the anxiety sensitivity of cancer patients and their immediate and continuous anxiety levels at the decision stage regarding COVID 19 vaccines.

Matherials And Methods

Research Design

We applied 3 questionnaires, one of them prepared by us, the other two questionnaires were The State-Trait Anxiety Inventory (STAI) form and Anxiety Sensitivity index. The research was carried out at the Suleyman Demirel University in Isparta, Turkey.

Ethical Consideration

The study was authorized by the researchers' Suleyman Demirel University School of Medicine Ethical Committee with a decision no 10/186 and dated 26.04.2021.

Study Population

Patients who applied to the Suleyman Demirel University Oncology outpatient clinic between May and June 2021, who had not yet been vaccinated against Covid-19, were included in the study. The following are the requirements for inclusion: non-selected patients who were older than 18 years old, had a type of cancer, had completed the questionnaires adequately, and gave written informed consent to participate in the study. All of the patients who applied had a previous diagnosis of cancer and were followed up here (n=516). Volunteering was used as a criterion for inclusion in the study. Incomplete questionnaires and the participants who had a psychiatric disorder diagnosis (n=19) before were not taken into account. The questionnaire was administered to all patients face-to-face to totally 497 patients with a consecutive sampling. With G*Power (13) a power of .95 with a medium effect size (f 2 =.30) and a significance of =.05 and sample size was found 488.

Data Collection Tools

We employed a four-part questionnaire for this study. The first form was consist of sociodemographic questions, the second and third part was Spielberger State-Trait Anxiety Inventory questionnaires, last part was Anxiety Sensitivity Index-3.

Form for collecting sociodemographic data

The first 15 questions are the questions we prepared ourselves to learn the demographic and descriptive characteristics of the participants like age, gender, year of study, type of cancer, type of cure.

Spielberger State-Trait Anxiety Inventory

40-item State-Trait Anxiety Inventory (STAI) both state (STAI-S) and trait anxiety (STAI-T) forms were used to examine anxiety symptoms in this questionnaire (14). The STAI, with the STAI-S subscale measuring anxiety at the time of scoring, is the gold standard for measuring anxiety and stress (15). The items are added together per scale and converted into scores ranging from 20 to 80. STAI-S and STAI-T both have 20 items with four-point Likert scales on each. Thus, scores range from 20 to 80, with 20 representing a moderate amount of anxiety and 80 indicating a high level of anxiety. Anxiety symptoms have been linked to a score of 40 or above (16, 17). The scale's adaptation to Turkish, validity and reliability studies were carried out by Öner and Le Comte (1983). Alpha reliability was between .83 and .87, test-retest. reliability ranges between .71 and .86, and item reliability varies between .34 and .72 (18, 19).

Anxiety Sensitivity Index-3

The Anxiety Sensitivity Index-3 is an 18-item self-report designed to gauge concern about anxiety-related symptoms' potential harmful repercussions. Some objects from the original ASI are included in the scale. The overall score is calculated by summing the responses on a 5-point Likert scale ranging from 0 (very little) to 4 (very much). The possible range of points for a Likert style evaluation is 0 to 72. Physical concerns, cognitive concerns, and social concerns are the three subscales of the ASI-3. The ASI-3 has previously been shown to have good psychometric qualities as a reliable evaluation of anxiety sensitivity, with acceptable to good internal consistency for the total score and each of the subscales (20, 21). The cut-off score was not calculated in the Turkish adaptation study, and high scores indicate increased anxiety sensitivity. Turkish Cronbach's alpha values in the validity and reliability study; for the physical, social and cognitive sub-dimensions, 0.89, 0.82, 0.88, and 0.93 for the whole scale, respectively (22).

Statistical Analyses

The age, gender, type of cancer, treatment, educational background, and chronic condition of each participant were all considered in the demographic analysis. Metrics from scales were translated to z scores and reverse-scaled, resulting in positive numbers as the greatest possible scores for all measurements. Categorical variables were described as numbers and percentages, whereas continuous variables were represented as the mean and standard deviation in the event of a normal distribution or median and interquartile range in the case of a skewed distribution.

Categorical variables were also analyzed by the chi-squared test. A value of $P < .05$ was examined significantly. Spearman Correlation was used to look for relevant relationships between different evaluation instruments. The connection of socio-demographic, cancer-related, and COVID-19-related factors with general attitude toward vaccination and refusal or uncertainty regarding COVID-19 vaccination was investigated using a multivariable multinomial logistic regression model. A "positive"

attitude was defined as a reference category in the model, and it was compared to "negative" and "neutral" attitudes.

Socioeconomic Status, marital status, type of cancer, treatment, smoking, chronicle disease, and educational background were all used as predictors in these studies. SPSS25® software was used for statistical analysis.

Results

Study Population

A total of 516 people responded to the survey, with 497 of them being included in the study. Because 19 of these participants were previously diagnosed with a psychiatric illness. Our participants ranged in age from 21 to 88 years old, with a mean age of 61,38 years (SD = 11,68). 48,6% (n=251) of all participants were female; 51,4% (n=261) of them were male. The majority of the respondents (42,4%) lived in a city, while 25,1% lived in villages. The majority of those who took part had primary education (73%), were housewives (42,9%), and were married (42,9%). When evaluated according to their smoking status, 6,4 % (n= 33) of the participants were smoking, 56,8% (n=293) did not. %36,8 (n=190) had quit.

Breast cancer was diagnosed in the majority of responders (25,7%), followed by colon-rectum cancer (14,6%), lung cancer (14,3%), and gastric cancer (6,7%). 51,2% of the participants had at least one ailment, with cardiovascular disease being the most frequent.

When we examined the questions in the survey part of our study, where we evaluated the fear and knowledge of the covid vaccine; ıt was analyzed that 79,6 % (n= 359) of the participants were afraid of being COVID.12,2% (n=73) of the participants were afraid of being vaccinated against COVID and 8,7% (n=45) of them were indecisive. While 74% of the participants thought that the COVID vaccine would be effective, 91,1% (n=470) of the participants stated that they had no idea about the vaccine to be made. It should also be noted that 38.9% (n=201) of the participants stated that they were afraid of side effects with the treatments they received. Table 1 shows the socio-demographic characteristics of the study population in detail.

Table 1
Socio-demographic characteristics of the study population.

Gender	n	%
Female	251	48,6
Male	265	51,4
Living place		
Town	130	25,2
District	167	32,4
City	219	42,4
Marital Status		
Single	18	3,5
Married	434	84,1
Divorced	64	12,4
Education		
No reading no writing	37	7,2
Primary Education	377	73,0
High School	63	12,2
University	39	7,6
Smoking		
Yes	33	6,4
No	293	56,8
Quit	190	36,8
Working Status		
Student	3	0,6
Housewife	222	43,0
Unemployed	21	4,1
Employed	43	8,3
Retired	227	44,0
Mothly İncome	222	43,0
No income		

Gender	n	%
Minimum wage	13	2,5
Twice the minimum wage	236	45,7
Three times the minimum wage and more	40	7,8

General Attitudes and Opinions about COVID 19 and COVID 19 Vaccination

Participants were asked to rate many statements on a Likert scale to gauge their general view of covid and covid vaccination (Table 2).

When we examined these questions according to gender, we saw that those who participated in the questions were more women, and those who did not agree were men except for questions 1,10,11. This shows that the men who participated in our study are more courageous about Covid 19.

We decided to dig deeper into the responses of patients who objected to the SARS-CoV-2 vaccine to better understand their viewpoints on immunizations. We asked about attitudes toward COVID-19 immunizations in the survey's final section. We discovered that 79,1% of respondents were not afraid of getting the COVID-19 vaccine. None of the participants had already been vaccinated against COVID-19 at the time of the study. The majority of this population's respondents were concerned about the COVID-19 vaccine's negative effects (27,7%) and its side effects with their treatments (24,2%). Most of the patients did not know which vaccine they would have and the type of the vaccine (91,1%). Furthermore, nearly 20% of participants were concerned about vaccination adverse effects, 14,9% were afraid that the vaccine would cause disease composition, and 16,5% would advance their disease (see Table 2).

Table 2
Cancer patients' general opinions on covid and covid vaccinations.

Question	Answer n(%) n=497		
	Agree (Likert Scale 1–2)	Neither Disagree Nor Agree (Likert Scale 3)	Disagree (Likert Scale 4–5)
1.I'm afraid of being a Covid 19 patient	359 (69,6)	8 (1,6)	149 (28,9)
2.I'm afraid of getting the Covid 19 vaccine.	63 (12,2)	45 (8,7)	408 (79,1)
3. I'm afraid that the Covid 19 vaccine will cause the disease.	77 (14,9)	52 (10,1)	387 (75)
4. I'm afraid the covid 19 vaccine will have side effects.	103 (20)	71 (13,8)	342 (66,3)
5. The Covid 19 vaccine is new and I do not believe that this vaccine will protect against the disease.	59 (11,4)	75 (14,5)	382 (74)
6. Covid 19 is not as a bad disease as mentioned, I do not see the need to be vaccinated.	37 (7,2)	74 (14,3)	405 (78,5)
7.I'm afraid the Covid 19 vaccine will advance my disease.	85 (16,5)	88 (17,1)	343 (66,5)
8. I'm afraid that the Covid 19 vaccine will have side effects with the treatments I take.	125 (24,2)	76 (14,7)	315 (61)
9. I am afraid that the vaccine will cause serious illness in me because I have low immunity.	143 (27,7)	64 (12,4)	309 (59,9)
10. I don't think I need to be vaccinated because I have Covid 19.	41 (7,9)	73 (14,1)	402 (77,9)
11. I have no idea what type of vaccine I'll get.	470 (91,1)	19 (3,7)	27 (5,2)

We built a first multivariable multinominal logistic regression model to find characteristics that predict afraid of vaccination or indecisive attitudes (model goodness-of-fit Cox and Snell pseudo-R square 0.118, Pearson Chi-square p = 0.205) about demographical values. The only significant factor was your family status (p=0,005) in Likelihood Ratio testing. A second multivariable multinominal logistic regression model to find characteristics that predict afraid of vaccination or indecisive attitudes (model goodness-of-fit Cox and Snell pseudo-R square 0.120, Pearson Chisquare p = 0.998) about cancer type, current treatment, and stage of cancer and smoking. In this model, the only significant factor was smoking status (p=0,028) (see Table 3 and Table 4).

Table 3
Using multivariable multinominal logistic regression, predictors of negative and neutral attitudes about immunization. The most important aspects are highlighted in bold.

Factor	Afraid of Covid Vaccination		Indecisive of Covid Vaccination	
	OR	95% CI	OR	95% CI
Female (ref. Male)	2,958	0,957-9,140	0,879	0,176-4,384
Education (ref. İlliterate)				
Primary	0,570	0,228-1,428	1,171	0,349-3,927
Secondary	0,891	0,204-3,897	NA	NA
High School	0,789	0,226-2,747	1,048	0,210-5,242
University	0,749	0,173-3,238	1,832	0,323-10,40
Place of living (ref. Village)				
Town	0,815	0,377-1,760	**0,415**	**0,178-0,966**
City	0,998	0,477-2,085	0,514	0,233-1,134
Marital Status (ref. Single)				
Widow	NA	NA	0,641	0,098-4,204
Married	**44359785**	**11553049-170326514**	1,188	0,151-9,344
Occupational Status (ref.retired)				
Student	NA	NA	NA	NA
Housewife	1,071	0,318-3,609	1,685	0,311-9,131
Unemployed	1,199	0,225-6,378	1,227	0,281-5,360
Employed	1,974	0,679-5,736	0,534	0,105-2,728
Family Status (ref. Alone)				
Other	1,311	0,320-5,364	0,830	0,186-3,698
Extended Family	0,512	0,076-3,436	0,408	0,059-2,822
Nuclear family	1,183	0,218-6,412	0,773	0,125-4,772
With wife/husband	0,420	0,079-2,222	0,209	0,035-1,239

Table 4
Using multivariable multinominal logistic regression, predictors of negative and neutral attitudes about immunization. The most important aspects are highlighted in bold.

Factor	Afraid of Covid Vaccination		Indecisive of Covid Vaccination	
	OR	95% CI	OR	95% CI
Cancer type (ref. Other)				
Lung cancer	0,603	0,192-1,900	1,815	0,431-7,652
Breast cancer	1,962	0,781-4,932	3,317	0,851-12,92
Colon-Rectum Cancer	0,891	0,307-2,586	2,287	0,575-9,107
Ovarian Cancer	1,309	0,378-4,531	3,794	0,768-18,73
Gastric Cancer	NA	NA	**5,450**	**1,054-28,16**
Prostate Cancer	0,659	0,133-3,256	**5,344**	**1,254-22,78**
Treatment (Ref. No treatment)				
Chemotherapy	2,178	0,953-4,981	1,797	0,730-4,420
Targeted therapy	1,827	0,568-5,876	0,820	0,152-4,411
Hormonal therapy	1,204	0,399-3,631	1,056	0,307-3,626
Immunotherapy	NA	NA	NA	NA
Smoking Status (ref. No)				
Yes	2,796	0,974-8,027	**4,973**	**1,564-15,81**
Quit	0,685	0,302-1,556	1,006	0,415-2,438

When we analyzed with Kruskal Wallis the patients who were not afraid of getting the Covıd 19 vaccine, State Anxiety Scale score was the statistical difference from the patients who were afraid or indecisive (p=0,001; p=0,015).

No statistically significant correlation was found between the anxiety sensitivity index and the STAI form scale scores (r=0,041 p=0,358; r=-0,081 p=0,067).

Table 5
Spearmen Correlation results between ASI-3, Strait and trait Anxiety Scores

		Anxiety Sensitivity Index-3	State Anxiety Score	Trait Anxiety Score
Spearman's rho	Anxiety Sensitivity Index	1,000		
	Stait Anxiety Score	0,041	1,000	
	Trait Anxiety Score	-0,081	0,296**	1,000
**. Correlation is significant at the 0.01 level (2-tailed).				

Table 6
STAI-S, STAI-T, and ASI-3 scores based on the participants' sociodemographic variables.

Sociodemographic Characteristics	STAI-T Mean±Sd	p	STAI-S Mean±Sd	p	ADI-3 Mean±Sd	p
Gender						
Female	32,43±0,25	0,521	41,44±0,36	<0,01	22,31±0,84	0,013
Male	32,13±0,25		39,02±0,32		19,52±0,76	
Place of living						
Village	32,75±0,35	0,404	41,30±0,45	0,006	19,11±1,24	0,007
Town	31,98±0,31		40,25±0,45		23,06±0,98	
City	32,21±0,27		39,51±0,37		20,26±0,82	
Marital Status						
Married	32,33±0,19	0,494	40,05±0,27	0,107	21,35±0,61	0,061
Single	32,88±0,70		39,33±1,35		21,55±2,67	
Widow	31,72±0,52		41,42±0,65		17,51±1,71	
Education						
Illiterate	32,51±0,74	0,128	41,49±0,89	0,035	20,41±2,25	<0,01
Primary	31,99±0,22		40,54±0,30		22,76±0,68	
Secondary	33,20±0,75		39,32±1,01		13,52±2,14	
High School	33,14±0,40		39,00±0,63		17,17±1,54	
University	32,56±0,59		38,36±0,83		15,05±1,87	
Ocuupational Status						
Student	34,00±0,58	0,068	40,00±2,00	<0,01	15,67±8,41	0,001
Housewife	32,37±0,27		41,49±0,38		23,36±0,88	
Unemployed	32,24±0,75		38,33±1,07		21,95±3,41	
Employed	33,35±0,51		40,19±0,81		15,67±1,91	
Retired	31,95±0,27		39,11±0,35		19,41±0,79	
Monthly Income						

Kruskal Wallis

Sociodemographic Characteristics	STAI-T Mean±Sd	p	STAI-S Mean±Sd	p	ADI-3 Mean±Sd	p
No income	32,54±0,26		41,45±0,37		22,87±0,91	
Under Minimum wage	31,23±1,71	0,067	42,69±1,64	<0,01	22,15±3,77	0,022
Minimum Wage	31,88±0,26		39,18±0,34		19,53±0,75	
Minimum Wagex2	33,17±0,58		38,47±0,82		17,05±2,32	
Minimum Wagex3 and more	34,40±1,50		39,80±1,56		23,20±8,06	
Family Status						
Alone	31,54±0,66	0,005	40,00±0,89	0,197	18,39±2,28	<0,01
With wife/husband	32,04±0,24		39,79±0,32		22,77±0,67	
Nuclear family	33,25±0,33		40,90±0,51		18,00±1,36	
Extended Family	33,28±0,65		40,67±0,88		13,85±3,00	
Other	31,35±0,60		41,14±0,88		19,59±2,11	
Cancer type						
Lung cancer	31,86±0,44	0,148	38,80±0,66	0,004	18,33±1,40	0,445
Breast cancer	32,61±0,33		41,37±0,48		20,80±1,11	
Colon-Rectum Cancer	32,58±0,50		40,78±0,66		22,35±1,61	
Ovarian Cancer	32,50±0,69		41,40±0,96		24,40±2,60	
Prostate Cancer	30,69±0,68		37,94±0,76		19,12±1,87	
Gastric Cancer	31,86±0,65		39,28±0,86		22,00±2,17	
Other	32,39±0,36		39,97±0,46		20,96±1,11	
Treatment						
Chemotherapy	32,27±0,28	0,659	39,75±0,39	0,461	19,66±0,86	0,067
Targeted therapy	31,93±0,58		40,49±0,79		23,88±1,90	
Hormonal therapy	32,55±0,38		40,64±0,56		19,68±1,45	
Immunotherapy	30,40±1,50		38,80±1,98		31,60±4,84	
No treatment	32,27±0,31		40,53±0,42		21,79±0,98	
Kruskal Wallis						

Women had considerably higher mean state anxiety (p <0.01) and Anxiety Sensitivity Index-3 (p =0.013) scores than men. According to marital status and treatments, there were no statistically significant difference in state (p=0,107), trait anxiety levels (p=0,107) and ASI-3 (p=0,061) scores. When we examine the scores according to education, the STAI-S score average was the highest among illiterates (p=0,035), while the ASI-3 score was the lowest among university graduates (p<0,01). Unemployed patients have the lowest scores about STAI-S (p<0,01) and ASI-3 scores of housewives were statistically significantly high (p=0,001). There was a significant difference in STAI-S scores between extended family and another living type. STAI-S scores were the highest (p= 0,005) and ASI-3 scores were the lowest in the extended family (p<0,01). This was a statistical difference from another family status. According to the cancer type in Breast and Ovarian Cancer patients had highest, Prostate cancer patients had the lowest STAI-S scores and this was statistically different from other types of cancer (p=0,004). When we analyze the scores according to income level, the anxiety levels of people working below the minimum wage were found to be significantly higher (p<0,01), while the sensitivity to anxieties was found to be significantly higher in those earning 3 times the minimum wage or higher (p=0,022).

Discussion

Excep our work another study looked into cancer patients' fears about vaccination, the usage of programs to aid their education, and the need of all country units cooperating (23). Physicians and care providers can better address patients' needs and promote and encourage COVID-19 vaccines by studying their perceptions of the vaccine. There were various barriers to successful immunization programs among cancer patients even before the SARS-CoV-2 epidemic (24). Vaccination rates among cancer patients remained low despite clear advice to protect patients taking anti-cancer medication against preventable diseases such as influenza (25–27). Furthermore, the majority of patients actively seek information on the vaccine and place a high value on their physicians' advice in this area. Both of the aforementioned studies corroborate this finding, emphasizing the importance of clinical oncologists in promoting vaccine acceptance among patients (23, 28). Other vaccines, such as influenza, have indicated the importance of professionals' support in patients' decisions (29, 30). According to data from influenza studies, a patient's provider's suggestion leads to a 7-fold higher likelihood of vaccination (27). Our survey, on the other hand, revealed the grim reality of the COVID-19 pandemic, in which clinical oncologists with limited time and resources frequently fail to address patients' requirements for COVID-19 vaccine information. 91.1% of the patients participating in our study did not have an idea about the type of vaccine. This, however, can be explained in part by the fact that the mRNA vaccine has just started to be implemented in our country at the time we conducted the study and the questionnaire was applied before the doctor's meeting when people came to get vaccinated. Oncological patients in Turkey were just included new type of vaccine in the national vaccination program at the time of the survey. The latter emphasizes the physician's critical role in patient education and the formation of vaccination attitudes. A history of influenza vaccination appears to be a reliable predictor of COVID-19 vaccine uptake (23), as evidenced by studies in both cancer patients and the general population (31, 32) .

The primary concerns expressed by cancer patients with negative attitudes about the vaccination, according to our poll, were fear of side effects, causing serious illness, increasing the severity of the disease, and a lack of knowledge. Previous polls of cancer patients' attitudes toward the influenza vaccine indicated very identical results (33). It's worth noting that all of the aforementioned worries can be effectively handled through educational techniques. Research evaluating the impact of a SARS-CoV-2 webinar on cancer patients recently confirmed this (28). Because past influenza vaccines influenced the adoption of the COVID-19 vaccine, these educational efforts may help to shape long-term vaccination attitudes and lead to higher vaccination rates for future infectious diseases.

Although a moderate correlation was found between the STAI-T/S and ASI scales in the study of Sandin et al., no correlation was found in our study (r=-0,049 p=0,269/r=0,078 p=0,079 respectively) (34).Only there was a weak correlation between STAI-T and STAI-S and it was statistically different (r=0,296 p<0,01).

When we analyzed the STAI scale results according to demographic data, it was found to be higher in women, illiterate people, extended families, in people diagnosed with breast and ovarian cancer, low-income, and patients living in villages. Chen et all found that STAI scores did not alter significantly according to marital status. Patients with a high school diploma showed significantly greater anxiety levels than those with the other patients who had lower education as our study (35). It was thought that due to the high level of anxiety in women in general, anxiety scores were higher in patients with breast and ovarian cancer, which are important cancers in women, while anxiety scores were lower in patients with prostate cancer that was seen in men. And also the high STAI-T scores in extended families during the pandemic period were due to contamination risks as a result of crowded life, and the low ASI-3 score was thought to be due to the situation of getting used to this stress.

A few limitations should be considered when evaluating the findings of this study. The bulk of the patients were graduated from primary school who lived in cities and were retired.

Conclusions

Overall, we found that people have positive opinions concerning immunizations and most of them are not afraid of getting vaccinated against COVID-19 in our study. Notably, a large percentage of patients believe they are under-informed on the type of vaccine, efficacy, and adverse effects. This is a significant element in vaccination apprehension. Given that COVID-19 and cancer are the most serious risks to human health today, additional efforts should be made to educate patients about immunization. Several parts should be involved, including physicians of all specialties, nurses, patient organizations, stakeholders, and the media. It's worth noting that COVID-19 immunization in cancer patients not only protects them from infection and serious consequences but also allows them to continue and finish their oncological therapy as planned, resulting in superior long-term outcomes. The first reactions to anything new can be considered normal, to break the vaccine resistance here, the known side effects of the vaccine, the way of action should be explained in detail, and people's concerns should be tried to be resolved. It should not be

forgotten that this microorganism is also new and incomprehensible to science. Finally, we'd like to point out that a generally positive attitude toward vaccination predicts a greater likelihood of COVID-19 vaccine uptake. If a new vaccination against another potentially life-threatening disease becomes available, this finding could have long-term ramifications.

Declarations

References

1.   Han G, Zhou YHJJomv. Possibly critical role of wearing masks in general population in controlling COVID-19. 2020,

2.   Organisation WH. WHO Coronavirus (Covid-19) Dashboard 2021 [Available from: https://covid19.who.int/.

3.   Cohen MS, Corey L. Combination prevention for COVID-19. American Association for the Advancement of Science; 2020.

https://doi/10.1126/science.abc5798

4.   Haybar H, Kazemnia K, Rahim F. Underlying chronic disease and COVID-19 infection: a state-of-the-art review. Jundishapur Journal of Chronic Disease Care. 2020;9(2),

5.   Liang W, Guan W, Chen R, Wang W, Li J, Xu K, et al. Cancer patients in SARS-CoV-2 infection: a nationwide analysis in China. The lancet oncology. 2020;21(3):335-7.https://doi.org/10.1016/S1470-2045(20)30096-6

6.   Yu J, Ouyang W, Chua ML, Xie C. SARS-CoV-2 transmission in cancer patients of a tertiary hospital in Wuhan. MedRxiv. 2020.https://doi.org/10.1101/2020.02.22.20025320

7.   Ribas A, Sengupta R, Locke T, Zaidi SK, Campbell KM, Carethers JM, et al. Priority COVID-19 vaccination for patients with cancer while vaccine supply is limited. Cancer discovery. 2021;11(2):233-6.https://doi.org/10.1158/2159-8290.CD-20-1817

8.   Cancer SfIo. (SITC) Statement on SARS-CoV-2 Vaccination and Cancer Immunotherapy 2020 [Available from: https://www.sitcancer.org/aboutsitc/press-releases/2020/sitc-statement-sars-cov-2-vaccination-cancer-immunotherapy.

9.   Network NCC. COVID-19 Vaccination and Cancer Patients 2021 [Available from: https://www.nccn.org/covid-19.

10.   Society AC. COVID-19 Vaccines in People with Cancer 2021 [Available from: https://www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/low-blood-counts/infections/covid-19-vaccines-in-people-with-cancer.html

11.   Desai A, Gainor JF, Hegde A, Schram AM, Curigliano G, Pal S, et al. COVID-19 vaccine guidance for patients with cancer participating in oncology clinical trials. Nature Reviews Clinical Oncology. 2021;18(5):313-9.https://doi.org/10.1038/s41571-021-00503-2

12.   Society AC. Emotional, Mental Health, And Mood Changes 2021 [Available from: https://www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/emotional-mood-

changes/anxiety.

13.	Faul F, Erdfelder E, Buchner A, Lang A-G. G* Power Version 3.1. 7 [computer software]. Uiversität Kiel, Germany. 2013,

14.	Speilberger C. Manual for the State Trait Anxiety Inventory (Form Y) Consulting Psychologists Press: Palo Alto. CA; 1983,

15.	Moerman N, van Dam FS, Muller MJ, Oosting H. The Amsterdam preoperative anxiety and information scale (APAIS). Anesthesia & Analgesia. 1996;82(3):445-51,

16.	Tsuboi N, Ernandez T, Li X, Nishi H, Cullere X, Mekala D, et al. Regulation of human neutrophil Fcγ receptor IIa by C5a receptor promotes inflammatory arthritis in mice. Arthritis & Rheumatism. 2011;63(2):467-78.https://doi.org/10.1002/art.30141

17.	Jiang H, Lu N, Chen K, Yao L, Li K, Zhang J, et al. Predicting brain age of healthy adults based on structural MRI parcellation using convolutional neural networks. Frontiers in neurology. 2020;10:1346.https://doi.org/10.3389/fneur.2019.01346

18.	Öner N, Le Compte A. Süreksiz durumluk/sürekli kaygı envanteri el kitabı (2. Baskı). İstanbul: Boğaziçi Üniversitesi. 1998,

19.	Aydemir Ö, Koroglu E. Clinical scales used in psychiatry. Ankara: Hekimler Yayin Birligi. 2000:33-41,

20.	Taylor S, Zvolensky MJ, Cox BJ, Deacon B, Heimberg RG, Ledley DR, et al. Robust dimensions of anxiety sensitivity: development and initial validation of the Anxiety Sensitivity Index-3. Psychological assessment. 2007;19(2):176.https://doi.org/10.1037/1040-3590.19.2.176

21.	Peterson R, Reiss S. Anxiety sensitivity index: Lawrence Erlbaum Associates; 1992.

22.	Mantar A. Anksiyete Duyarlılığı İndeksi-3'ün Türkçe formunun geçerlik ve güvenilirlik çalışması: Dokuz Eylül Üniversitesi Tıp Fakültesi; 2008.

23.	Barrière J, Gal J, Hoch B, Cassuto O, Leysalle A, Chamorey E, et al. Acceptance of SARS-CoV-2 vaccination among French patients with cancer: a cross-sectional survey. Annals of Oncology. 2021;32(5):673-4.https://doi.org/10.1016/j.annonc.2021.01.066.

24.	Ariza-Heredia EJ, Azzi J, Shah DP, Nesher L, Ghantoji SS, Michailidis L, et al. Influenza vaccination in patients with cancer: Factors associated with vaccination practices for patients and their household members. infection control & hospital epidemiology. 2015;36(10):1239-41. Https://doi.org/10.1017/ice.2015.150

25.   Poeppl W, Lagler H, Raderer M, Sperr WR, Zielinski C, Herkner H, et al. Influenza vaccination perception and coverage among patients with malignant disease. Vaccine. 2015;33(14):1682-7.https://doi.org/10.1016/j.vaccine.2015.02.029

26.   Loulergue P, Mir O, Alexandre J, Ropert S, Goldwasser F, Launay O. Low influenza vaccination rate among patients receiving chemotherapy for cancer. Annals of Oncology. 2008;19(9):1658.https://doi.org/10.1093/annonc/mdn531

27.   Vollaard A, Schreuder I, Slok-Raijmakers L, Opstelten W, Rimmelzwaan G, Gelderblom H. Influenza vaccination in adult patients with solid tumours treated with chemotherapy. European journal of cancer. 2017;76:134-43.https://doi.org/10.1016/j.ejca.2017.02.012

28.   Kelkar AH, Blake JA, Cherabuddi K, Cornett H, McKee BL, Cogle CR, editors. Vaccine Enthusiasm and Hesitancy in Cancer Patients and the Impact of a Webinar. Healthcare; 2021: Multidisciplinary Digital Publishing Institute.

29.   Vinograd I, Baslo R, Eliakim-Raz N, Farbman L, Taha A, Sakhnini A, et al. Factors associated with influenza vaccination among adult cancer patients: a case–control study. Clinical Microbiology and Infection. 2014;20(9):899-905.https://doi.org/10.1111/1469-0691.12625

30.   Akin S, Dizdar O, Karakas Y, Ozisik L, Tanriover MD, Kamisli S, et al. Vaccination perception and attitudes among patients with cancer receiving chemotherapy. Annals of Oncology. 2016;27:vi514.https://doi.org/10.1093/annonc/mdw390.52

31.   Paul E, Steptoe A, Fancourt D. Attitudes towards vaccines and intention to vaccinate against COVID-19: Implications for public health communications. The Lancet Regional Health-Europe. 2021;1:100012.https://doi.org/10.1016/j.lanepe.2020.100012

32.   Soares P, Rocha JV, Moniz M, Gama A, Laires PA, Pedro AR, et al. Factors associated with COVID-19 vaccine hesitancy. Vaccines. 2021;9(3):300.https://doi.org/10.3390/vaccines9030300

33.   Urun Y, Akbulut H, Demirkazik A, Senler FC, Utkan G, Onur H, et al. Perception about influenza and pneumococcal vaccines and vaccination coverage among patients with malignancies and their family members. Age. 2013;57:18-90,

34.   Sandin B, Chorot P, McNally RJ. Anxiety sensitivity index: normative data and its differentiation from trait anxiety. Behaviour research and therapy. 2001;39(2):213-9.https://doi.org/10.1016/S0005-7967(00)00009-7

35.   Chen L, Zhao H, Razin D, Song T, Wu Y, Ma X, et al. Anxiety levels during a second local COVID-19 pandemic breakout among quarantined people: A cross sectional survey in China. Journal of psychiatric research. 2021;135:37-46.https://doi.org/10.1016/j.jpsychires.2020.12.067

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- STROBEchecklistv4combined.docx