Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Transplant Immunology 69 (2021) 101479

Contents lists available at ScienceDirect

Transplant Immunology

journal homepage: www.elsevier.com/locate/trim

Research Article

Fear of COVID 19 and social effects in liver transplant patients

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ARTICLE INFO

Keywords:
Fear of Covid 19
Liver Transplant
Social Impact
Nurse

ABSTRACT

Background: This study was descriptively conducted to evaluate the fear of COVID 19 and its social effects on patients who had liver transplant.
Methods: The study was conducted between September 2020 and April 2021 in a liver transplant institute affiliated with a university hospital. The sample of the study was 135 patients. Personal Information Form, Fear of Covid 19 Scale, and Questionnaire of Social Impact of COVID 19 Pandemic were used to collect data.
Results: It was determined that the Fear of Covid 19 Scale mean score of the patients was 21.25 ± 6.99. As the fear of COVID 19 increases in patients who had liver transplant, it was determined that their desire to be in crowded environments, to prefer public transportation, to go to the doctor for examination and their focusing on various objectives were decreasing. Also, fear of COVID 19 increased the difficulty in sleep, storage of food and cleaning materials, washing hands frequently, using masks and gloves when going out, health concerns, doubts about disease symptoms, orientation towards healthy eating, worries about the future and questioning the meaning of life.
Conclusion: The results show that it is important for transplant centers to be able to provide guidance and psychological counseling services to liver transplant patients, who are significantly affected by COVID 19, through telemedicine or various technological opportunities.

1. Introduction

The coronavirus (COVID-19), which emerged in Wuhan, China in December 2019 and caused a pneumonia-like symptom, spread to many countries of the world in a short time and was declared as a pandemic by the world health organization [1]. In a short time, many people caught Covid 19 and died [2]. It is known that COVID-19, which has the potential to cause mortality and morbidity in many people, poses a higher risk for some groups. Among these groups, the elderly, diabetic patients, hypertensive patients, chronic kidney disease patients, obese individuals, coronary heart patients, chronic lung patients and those receiving chronic immunosuppression therapy are the leading ones. So much so that the case fatality rate has been reported to reach up to 49% in risky groups [3].

The COVID-19 pandemic has not only affected people physiologically, but suspicious information about virus transmission, incubation time, geographic coverage, number of infected and actual mortality has also caused serious psychological problems in the population. "Fear" has an important place among the main psychological problems [4–6]. Fear, defined as "an uncomfortable and negative feeling triggered by the perception of threat in the face of an uncertainty" increases various psychological symptoms and can also motivate a series of behaviors that reduce participation in risky behavior (for example, hand washing, social distancing) [1,5]. According to the motivation theories among the theories about fear, there is an inverse proportion between fear and behavior change, and it is suggested that more behavior changes will occur at a moderate level of fear [7]. The most recent of the fear item theories is Witte's Extended Parallel Process Model, which brings together classical fear item theories. According to this model, people's response to fear items is based on how they evaluate and perceive the threat. When evaluating the threat, the target audience considers the seriousness and severity of the threat, as well as the vulnerability and the possibility of its occurrence. If people do not believe they are at risk or see the health threat as serious, they will not respond to the message [7]. When people are afraid but can respond effectively to the threat, they accept the recommended action to control the danger. On the other hand, if the perception of threat exceeds the perception of competence (that is, if the recommended action is too difficult, too expensive, or they

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https://doi.org/10.1016/j.trim.2021.101479
Received 15 September 2021; Accepted 29 September 2021
Available online 7 October 2021

believe they are not enough to fend off the threat), people begin to focus on how to control their fears. They ignore the message, deny that they are at risk, make fun of the message or get angry with the source, and even increase their unhealthy behavior [5,8]. In a conducted study, it was found that there was a positive correlation between fear of COVID 19 and increase in behavior change [1]. In another study, it was found that patients who received more intense immunosuppression therapy had higher fear of COVID 19 and changes have occurred in many healthy or unhealthy behaviors [6].

Liver transplant recipients are known to represent vulnerable patient groups at high risk of infection [6]. When the literature is reviewed, only one study examining the fear of COVID-19 in liver transplant patients, a group at high risk for COVID-19, and the social effects of this fear was found [6]. As it is known, nurses are a professional group that deals with individuals with their biological, psychosocial dimensions and environment, and is in constant interaction with the healthy / sick individual, and undoubtedly, they have an important place in the process of feeling and managing the tension, panic feelings and fears of patients [9,10]. Little is known about the COVID-19 fear and social impact of the COVID-19 pandemic in vulnerable patient groups [11]. In this context, the study was conducted to determine the COVID-19 fears of liver transplant patients and the social effects of this fear. It is thought that the research will contribute to the literature as there is a limited number of studies on the subject.

2. Materials and methods

2.1. Objective and type of the study

This study was conducted descriptively to evaluate the COVID 19 fear and social impact of this fear in liver transplant patients.

2.2. Place and time of the study

The study was conducted between September 2020 and April 2021 in the outpatient clinics of a liver transplant institute affiliated to a university hospital. The liver transplant institute has 5 polyclinic rooms, 12 operating rooms, 3 intensive care units with a total of 36 beds, 7 patient services with a total of 116 beds, a radiology unit and a gastroenterology-ERCP unit. Approximately 270 patients receive liver transplantation annually at the institute.

2.3. Population and sample of the study

The population of the study consisted of all patients who were followed up after liver transplantation in outpatient clinics of the liver transplant institute. The sample of the study consisted of the patients who came to the outpatient clinic for control and met the inclusion criteria. The sample group was calculated using power analysis. According to the calculation, the sample size was determined as 111 with 0.30 effect size, 0.05 error margin, 0.95 confidence level, and 0.95 population representation power. 135 patients were included in the study.

2.4. Inclusion criteria for the study

- Being over the age of 18
- Being discharged after liver transplant
- No obstacle in communication
- Not having any psychiatric diagnosis

2.5. Exclusion criteria for the study

Patients who caught COVID 19 were excluded from the study.

2.6. Data collection

Study data were collected between 01.10.2020 and 25.02.2021 by the researcher using face-to-face interview method (following mask, distance, hygiene rules). The researcher met the patients when they came to the outpatient clinic, gave information about the research, and recorded the answers given by the patients by asking the questions in the questionnaires and scales. Each meeting lasted about 20 min.

2.7. Data collection instruments

Personal Information Form, Fear of Covid 19 Scale, and Questionnaire of Social Impact of COVID 19 Pandemic were used to collect data.

Personal Information Form: This sociodemographic data form created by the researchers by reviewing the literature [2–4,6] has a total of 14 questions questioning the characteristics of the patient (age, gender, education status, marital status, health insurance, economic status, profession, reason for transplant, presence of another disease, passed time after the transplant, donor type, place of residence, family structure and any friend or relative having COVID 19).

Fear of Covid 19 Scale: The Turkish validity and reliability of this scale created by Ahorsu et al. in 2020 was conducted by Satıcı et al. The scale consists of 7 items in total. There is no reverse item in the scale. The total score obtained from all items of the scale reflects the level of fear of coronavirus (COVID-19) experienced by the individual. The scores that can be obtained from the scale range between 7 and 35. A high score from the scale means experiencing a high level of coronavirus fear. The Cronbach's alpha value of its scale is 0.84 [9,10]. The Cronbach's alpha value in this study was calculated as 0.847 [12,13].

Questionnaire of Social Impact of COVID 19 Pandemic: It was created by Karataş by benefiting from the "Research of Epidemic Disease Fear Related to Coronavirus". It consists of 17 statements aimed at identifying the decline or increase of certain behaviors to learn how the daily habits of the participants have changed after the COVID-19 epidemic in Turkey. In the questionnaire form, it was aimed to determine the decrease and increase in the attitudes and behaviors of the participants like "being in a crowded environment, preferring public transportation, desire to storage food and cleaning materials, desire to washing hands frequently, wearing a mask or gloves when going out, desire to go to the doctor for examination, concerns about health, doubts about symptoms of the disease, healthy eating efforts, desire to following news, willingness to use social media, sleeping problems, concerns about the future, questioning the meaning of life, focusing on goals, belief in the influence of modern medicine, trust in government institutions" [8].

2.8. Analysis of the data

After the data were coded by the researchers, the statistical analysis of the data was performed using SPSS 25.0 (Statistical Package for The Social Sciences) statistical software. In the statistical evaluation of the data, its suitability to normal distribution was tested with the Shaphiro Wilk test, and it showed a normal distribution. Descriptive features in the study are presented with number (n), percentage (%), mean (x), standard deviation (SD), median, minimum, and maximum values. In the comparison of scales and descriptive characteristics, independent *t*-test and ANOVA were performed. Bonforrenia analysis was used to determine the difference in multiple comparisons. Correlation and linear regression analysis (stepwise method) were performed to determine the relationship between scales. Scale Reliability Coefficient was determined in terms of Cronbach's Alpha. In evaluating the results obtained, 95% confidence interval and $p < 0.05$ error level were considered.

2.9. Ethical aspects of the study

Ethics committee approval required to conduct the research (Decision Number: 2020/974) and institutional permission were obtained.

Verbal consent was obtained from the individuals participating in the study, and the individuals were informed that their information would not be shared with others, that they were free to participate in the study and that they could leave the study whenever they wanted. Thus, the ethical principles of "protection of patient rights", "confidentiality" and "informed consent" were complied with.

2.10. Limitations of the study

The limitations of the study are the fact that the sample consists of patients receiving treatment in only one hospital and the sample was determined by the improbable random method. Study results cannot be generalized to all liver transplant patients.

3. Results

It was determined that the average age of the patients was 47.39 ± 15.24, 66.7% of the patients were male, 48.9% had primary school graduation, 83% were married, 95.6% had health insurance, 48.1% had equal income to their expenses, 34.8% were retired, 63.7% were living in the city center and 73.3% had core family structure. Also, it was determined that 72.6% of the patients had chronic liver failure, 56.6% had no other disease, 89.6% had transplant from a living donor, the average time after the transplant was 39.33 ± 41.57, and 51.1% had COVID 19 patients around them (Table 1).

It was determined that the average Fear of Covid 19 Scale score of the patients was 21.25 ± 6.99 (min: 7-max: 35) and was high. When Table 1 was examined, it was seen that while a statistical difference was determined between Gender and the Fear of Covid 19 Scale average score, the average of women was higher than the average of men (Table 1; Fig. 1).

The average score obtained from Fear of Covid 19 Scale in patients with acute liver failure due to transplantation is higher than the others, and the difference between them is statistically significant (Table 1; Fig. 2).

Patients having people who had COVID 19 around have a high average score on the Fear of Covid 19 Scale, and the difference is significant (Table 1; Fig. 3).

Table 2 shows that, being in crowded environment decreased by 80.7% and preferring public transportation decreased by 77.8% in participants. While the patients' desire to storage food and cleaning materials did not change at a rate of 45.9%, desire to washing hands frequently increased by 87.4% and wearing a mask or gloves when going out increased by 86.7%. The desire to go to the doctor for examination remained unchanged at 43.7% and doubts about symptoms of the disease at 45.2%. While concerns about health increased by 45.2%, healthy eating efforts increased by 53.3% and the desire to follow news increased by 64.4%. Their willingness to use social media remained unchanged at 55.6%, and while patients' sleeping difficulties, one of their daily routines, remained unchanged by 76.3%, their concerns about the future increased by 51.1%. While focusing on their goals decreased by 37.8%, questioning the meaning of life increased by 40%. In this process, 39.3% of the patients have increased their belief in the effect of modern medicine and 40.7% of them have increased their trust in state institutions.

Table 2 shows the Comparison of Patients with the Social Impacts of the COVID-19 Pandemic and the Fear of COVID-19. The statistical difference between the desire of the patients to be in a crowded environment and the Fear of Covid 19 Scale average score is significant. As a result of the Bonferroni analysis, it was determined that this difference was between "very reduced" and "unchanged", "very reduced" and "reduced". The statistical difference between the desire of the patients to prefer public transportation and the Fear of Covid 19 Scale average score is significant. As a result of the Bonferroni analysis, it was determined that this difference was between "very reduced" and "reduced". The statistical difference between the food and cleaning materials storage status of the patients and the Fear of Covid 19 Scale average score is significant. As a result of the Bonferroni analysis, it was found that this difference was between "not changed much" and "much increased", "increased" and "much increased". The statistical difference between the frequent washing of the hands of the patients and the Fear of Covid 19 Scale average score is significant. As a result of the Bonferroni analysis, it was determined that this difference was between "increased" and "much increased". The statistical difference between the use of masks and gloves while going out and the average Fear of Covid 19 Scale score is significant. As a result of Bonferroni analysis, it was determined that this difference was between "increased" and "much increased". The statistical difference between the patients' going to the doctor for examination and the Fear of Covid 19 Scale average score is significant. The Bonferroni analysis result found that the difference is between "very reduced" and "unchanged." The statistical difference between the health concerns of the patients and the Fear of Covid 19 Scale mean score is significant. As a result of Bonferroni analysis, it was determined that this

Table 1
Descriptive information of the patients.

	n	%	FCS(Mean ± SS)	Statistics
Gender				
Female	45	33.3	23.06 ± 6.28	$t = 2.151$
Male	90	66.7	20.35 ± 7.18	$p = 0.033$
Educational Status				
None	17	12.6	22.05 ± 6.30	F = 0.509
Primary School	66	48.9	20.74 ± 7.21	$p = 0.676$
High School	32	23.7	20.96 ± 7.09	
University and Higher	20	14.8	22.75 ± 6.88	
Marital Status				
Married	112	83	21.32 ± 6.98	$t = 0.227$
Single	23	17	20.95 ± 7.18	$p = 0.821$
Health Insurance				
Yes	129	95.6	21.30 ± 6.83	$t = 0.331$
No	6	4.4	20.33 ± 10.70	$p = 0.742$
Income Status				
High	22	16.3	21.18 ± 5.62	F = 0.030
Equivalent Income to Expenses	65	48.1	21.13 ± 7.03	$p = 0.970$
Low	48	35.6	21.45 ± 7.61	
Profession				
Housewife	22	16.3	23.00 ± 6.81	
Worker	5	3.7	21.60 ± 5.85	F = 0.729
Civil Servant	11	8.1	23.00 ± 7.28	$p = 0.630$
Self-employment	12	8.9	18.83 ± 6.69	
Retired	47	34.8	20.38 ± 6.32	
Unemployed	29	21.5	21.75 ± 8.37	
Student	9	6.7	20.88 ± 7.09	
Living Place				
City Center	86	63.7	21.73 ± 7.40	F = 0.575
District	40	29.6	20.30 ± 5.98	$p = 0.564$
Village/Town	9	6.7	21.00 ± 7.48	
Family Structure				
Core	99	73.3	21.14 ± 7.26	$t = -0.323$
Extended	36	26.7	21.58 ±6.28	$p = 0.747$
Transplant Reason				
Acute liver failure	12	8.9	25.50 ± 7.16	F = 3.135
Chronic liver failure	98	72.6	20.23 ± 6.79	$p = 0.028$
Metabolic diseases	7	5.2	21.71 ± 6.31	
Malignancy	18	13.3	23.83 ± 6.99	
Presence of Another Disease				
Yes	60	44.4	21.71 ± 7.05	$t = 0.678$
No	75	55.6	20.89 ± 6.97	$p = 0.499$
Donor Type				
Living Donor	121	89.6	21.59 ± 6.81	$t = 1.650$
Deceased Donor	14	10.4	18.35 ± 8.07	$p = 0.101$
Presence of individuals with COVID 19 in the environment				
Y es	69	51.1	22.91 ± 6.83	$t = 2.884$
No	66	48.9	19.53 ± 6.79	$p = 0.005$
	Min-Max		Mean ± SS	FCS
Age	18–72		47.39 ± 15.24	−0.123/ 0.157
Time passed after transplant	1–168		39.33 ± 41.57	−0.062/ 0.473

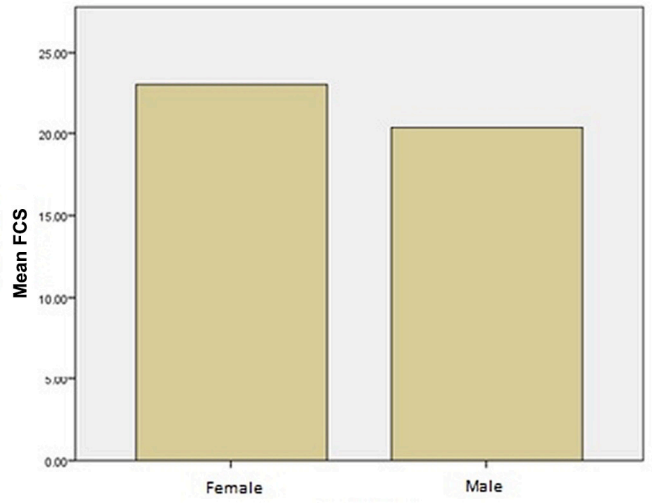

Fig. 1. Gender.

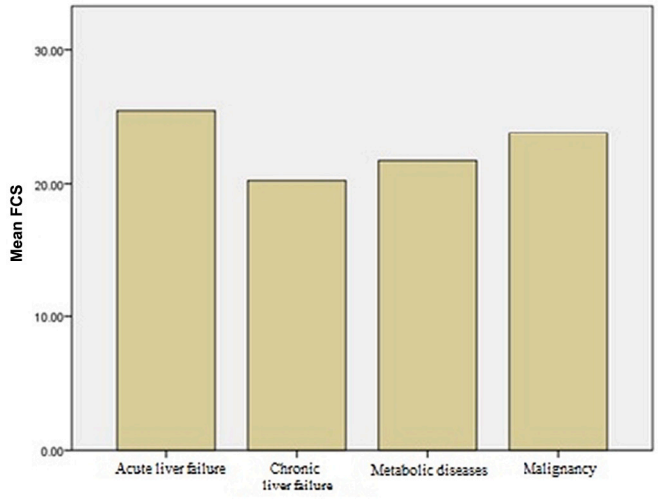

Fig. 2. Transplant Reason.

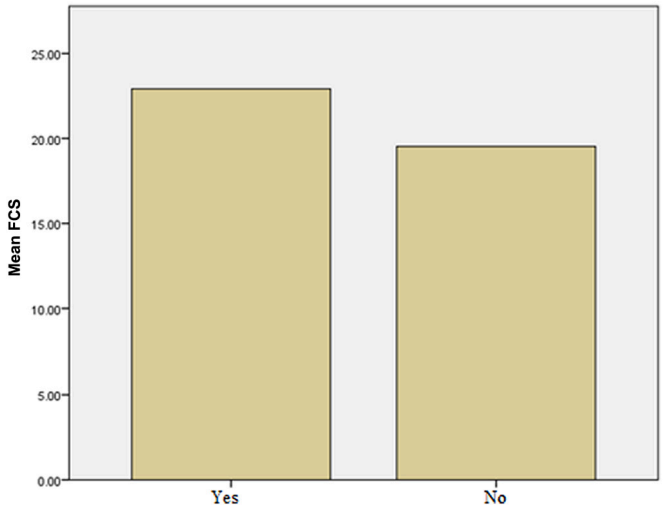

Fig. 3. Presence of Individuals with COVID-19 in the Environment.

Table 2
Social Impacts of the COVID-19 Pandemic and Comparison with the Fear of COVID-19 Affecting the Patients.

	n	%	Mean ± SS	Statistics
Being in a crowded environment				
Much decreased	109	80.7	22.51 ± 6.70	F = 13.679
Decreased	23	17.0	17.08 ± 5.14	*p* = 0.000
Unchanged	3	2.2	7.66 ± 1.15	
Preferring public transportation				
Much decreased	105	77.8	22.25 ± 6.73	F = 5.105
Decreased	23	17.0	17.69 ± 5.91	*p* = 0.007
Unchanged	7	5.2	18.00 ± 10.06	
Desire to storage food and cleaning materials				
Unchanged	62	45.9	19.33 ± 6.77	F = 10.061
Increased	44	32.6	20.88 ± 6.83	p = 0.000
Much Increased	29	21.5	25.93 ± 5.62	
Desire to washing hands frequently				
Unchanged	2	1.5	27.00 ± 1.41	F = 4.174
Increased	15	11.1	16.80 ± 6.28	*p* = 0.017
Much Increased	118	87.4	21.72 ± 6.92	
Wearing a mask or gloves when going out				
Unchanged	3	2.2	23.00 ± 7.00	F = 4.439
Increased	15	11.1	16.33 ± 7.81	*p* = 0.014
Much Increased	117	86.7	21.84 ± 6.69	
Desire to go to the doctor for examination				
Much Decreased	36	26.7	23.77 ± 6.79	F = 3.168
Decreased	31	23.0	20.00 ± 7.13	*p* = 0.027
Unchanged	59	43.7	19.96 ± 6.65	
Increased	9	6.7	24.00 ± 7.10	
Concerns about health				
Unchanged	27	20	13.74 ± 5.79	F = 41.683
Increased	61	45.2	21.01 ± 5.75	p = 0.000
Much Increased	47	34.8	25.89 ± 5.01	
Doubts about symptoms of the disease				
Unchanged	61	45.2	17.31 ± 5.95	F = 32.803
Increased	41	30.4	22.31 ± 6.25	p = 0.000
Much Increased	33	24.4	27.24 ± 4.63	
Healthy eating efforts				
Unchanged	30	22.2	17.13 ± 6.92	F = 15.471
Increased	33	24.4	18.93 ± 6.38	p = 0.000
Much Increased	72	53.3	24.04 ± 6.07	
Desire to following news				
Much Decreased	10	7.4	24.40 ± 6.63	
Decreased	8	5.9	23.37 ± 6.02	F = 2.229
Unchanged	14	10.4	17.14 ± 8.97	*p* = 0.069
Increased	16	11.9	19.75 ± 6.54	
Much Increased	87	64.4	21.64± 6.64	
Willingness to use social media				
Much Decreased	14	10.4	25.57 ± 7.56	
Decreased	8	5.9	19.25 ± 7.00	F = 2.583
Unchanged	75	55.6	19.98 ± 6.91	*p* = 0.040
Increased	11	8.1	22.63 ± 6.72	
Much Increased	27	20	22.59 ± 6.19	
Sleeping problems				
Much Decreased	1	0.7	18.00	F = 11.487
Unchanged	103	76.3	19.58 ± 6.59	p = 0.000
Increased	30	22.2	26.66 ± 5.12	
Much Increased	1	0.7	35.00	
Concerns about the future				
Unchanged	26	19.3	12.69 ± 4.07	F = 48.099
Increased	69	51.1	21.84 ± 5.78	p = 0.000
Much Increased	40	29.6	25.82 ± 5.31	
Focusing on goals				
Much Decreased	35	25.9	25.97 ± 5.03	
Decreased	51	37.8	22.80 ± 6.58	F = 21.257
Unchanged	41	30.4	15.90 ± 5.30	p = 0.000
Increased	8	5.9	18.25 ± 6.04	
Questioning the meaning of life				
Unchanged	50	37	17.78 ± 6.41	F = 14.465
Increased	54	40	22.09 ± 6.77	p = 0.000
Much Increased	31	23	25.41 ± 5.57	
Belief in the influence of modern medicine				
Much Decreased	8	5.9	21.50 ± 5.90	
Decreased	26	19.3	20.73 ± 6.94	F = 0.471
Unchanged	23	17.0	20.86 ± 8.44	*p* = 0.757
Increased	53	39.3	22.20 ± 6.84	
Much Increased	25	18.5	20.08 ± 6.48	

(*continued on next page*)

Table 2 (*continued*)

	n	%	Mean ± SS	Statistics
Trust in government institutions				
Much Decreased	8	5.9	21.50 ± 5.90	
Decreased	25	18.5	20.28 ± 6.69	F = 0.620
Unchanged	22	16.3	20.36 ± 8.78	$p = 0.649$
Increased	55	40.7	22.36 ± 6.90	
Much Increased	25	18.5	20.52 ± 6.20	

difference was between "unchanged" and "increased", "not changed" and "much increased", "increased" and "much increased". The statistical difference between the doubts of the patients about the symptoms of the disease and the Fear of Covid 19 Scale average score is significant. As a result of the Bonferroni analysis, it was determined that this difference was between "unchanged" and "increased", "not changed" and "much increased", "increased" and "much increased". The statistical difference between the patients' orientation to healthy nutrition and the Fear of Covid 19 Scale mean score is significant. As a result of the Bonferroni analysis, it was found that this difference was between "unchanged" and "much increased", "increased" and "much increased". The statistical difference between the difficulty of sleeping and the Fear of Covid 19 Scale mean score is significant. As a result of the Bonferroni analysis, it was determined that this difference was between "increased" and "much decreased", "not changed". The statistical difference between the patients' concerns about the future and the Fear of Covid 19 Scale average score is significant. As a result of the Bonferroni analysis, it was determined that this difference was between "unchanged" and "increased", "not changed" and "much increased", "increased" and "much increased". The statistical difference between focusing on the goals of the patients and the Fear of Covid 19 Scale average score is significant. As a result of the Bonferroni analysis, it was found that this difference was between "much decreased" and "unchanged", "much decreased" and "increased", "decreased" and "unchanged". The statistical difference between the patients questioning the meaning of life and the Fear of Covid 19 Scale average score is significant. As a result of the Bonferroni analysis, it was determined that this difference was between "unchanged" and "increased", "unchanged" and "much increased".

In Table 3, the Self-Management Predictors are analyzed according to the regression analysis. As a result of the Linear Regression Stepwise method analysis, it is seen that the first predictor of COVID-19 fear is concerns about the future (38%) and has a significant effect ($p < 0.001$). Predictors such as Concerns about the future, doubts about symptoms of the disease, focusing on goals, sleeping problems, being in a crowded environment, concerns about health, desire to storage food and cleaning materials affect Fear of COVID-19 by 63% ($p < 0.001$).

4. Discussion

COVID-19 creates an important fear in the society due to its rapid spreading feature and causing serious morbidity-mortality. The resulting fear also brings various social effects [14]. It is difficult to determine the need for education and prevention programs without knowing the level of fear that may vary depending on certain variables and its social effects [14]. When the literature is reviewed, only one study has been found that examines the fear of COVID-19 and its social effects in liver transplant patients in the risk group [6]. Therefore, the study results were discussed together with similar literature findings.

In this study, it was determined that liver transplant patients experienced high levels of fear of COVID-19. In another study conducted with liver transplant patients, 64% of the patients stated that they were afraid

Table 3.
Covid-19 fear predictors according to regression analysis ($n = 135$).

Model		Unstandardized Coefficients		Standardized Coefficients					
		B	Std. Error	Beta	t	p	F	Sig.	R^2
1	(Constant)	−4.513	2.846		−1.586	0.115			
	Concerns about the future	6.280	0.684	0.623	9.184	0.000	84.349	0.000	0.388
2	(Constant)	−7.985	2.773		−2.880	0.005			
	Concerns about the future	4.434	0.761	0.440	5.826	0.000			
	Doubts about symptoms of the disease	2.913	0.651	0.338	4.473	0.000	58.204	0.000	0.469
3	(Constant)	1.882	3.675		0.512	0.609			
	Concerns about the future	3.436	0.769	0.341	4.468	0.000			
	Doubts about symptoms of the disease	2.583	0.625	0.300	4.131	0.000			
	Focusing on goals	−2.090	0.542	−0.264	−3.856	0.000	47.834	0.000	0.523
4	(Constant)	−6.176	4.246		−1.455	0.148			
	Concerns about the future	3.244	0.741	0.322	4.375	0.000			
	Doubts about symptoms of the disease	2.189	0.612	0.254	3.576	0.000			
	Focusing on goals	−1.877	0.525	−0.237	−3.576	0.000	41.742	0.000	0.562
	Sleeping problems	3.066	0.896	0.212	3.423	0.001			
5	(Constant)	−1.467	4.296		−0.341	0.733			
	Concerns about the future	2.941	0.717	0.292	4.100	0.000			
	Doubts about symptoms of the disease	1.932	0.592	0.224	3.261	0.001	38.636	0.000	0.600
	Focusing on goals	−1.614	0.510	−0.204	−3.167	0.002			
	Sleeping problems	3.288	0.862	0.227	3.813	0.000			
	Being in a crowded environment	−3.105	0.895	−0.206	−3.469	0.001			
6	(Constant)	−4.450	4.331		−1.027	0.306			
	Concerns about the future	1.544	0.866	0.153	1.782	0.077			
	Doubts about symptoms of the disease	1.620	0.589	0.188	2.750	0.007	35.064	0.000	0.622
	Focusing on goals	−1.459	0.500	−0.184	−2.914	0.004			
	Sleeping problems	3.388	0.842	0.234	4.023	0.000			
	Being in a crowded environment	−2.966	0.875	−0.196	−3.391	0.001			
	Concerns about health	2.187	0.799	0.228	2.737	0.007			
7	(Constant)	−8.331	4.624		−1.802	0.074			
	Concerns about the future	1.501	0.854	0.149	1.758	0.081			
	Doubts about symptoms of the disease	1.453	0.586	0.168	2.480	0.014	31.621	0.000	0.635
	Focusing on goals	−1.391	0.494	−0.176	−2.815	0.006			
	Sleeping problems	3.217	0.834	0.222	3.859	0.000			
	Being in a crowded environment	−2.524	0.886	−0.167	−2.850	0.005			
	Concerns about health	2.277	0.789	0.237	2.887	0.005			
	Desire to storage food and cleaning materials	1.115	0.510	0.125	2.184	0.031			

of COVID-19 [6]. Considering the studies conducted in cancer patients, it is seen that the level of fear of the patients is high [3,15,16]. Similar results are found in studies conducted with a healthy population [5,17]. The study results show that the vast majority of people, whether they are in the risk group or not, suffer from the fear of COVID-19. The high level of fear in many groups is thought to be related to the easy transmission and prevalence of COVID-19 and the ongoing increase in mortality [5,6].

In this study, it was determined that women experienced higher levels of fear of COVID-19. In Reuken's study, it was determined that female liver transplant recipients experienced higher fear of COVID-19 [6]. Similar results are found when looking at other studies [17,18]. This reality may be related to women feeling more vulnerable or perceiving high risk. In fact, there is information in the literature that demographic variables are effective on perceived risk [18]. In addition, it is stated that women express their feelings of fear, etc. more easily [19].

Patients with acute liver failure as the reason for transplantation were found to have higher fear of COVID-19 (Table 1; Fig. 2). In another study, it was observed that the underlying liver disease did not make a difference in the COVID-19 score [6]. It is thought that this situation may be related to the traumatic events during the period when the patients experienced acute liver failure. It was found that patients with individuals around whom had COVID-19 experienced higher fear of COVID-19. Similarly, in another study, it was shown that those who live in areas with high COVID-19 cases experience more fear [17]. Hearing the news of people who are constantly caught or died of COVID-19 can increase the fear of COVID-19 by causing a higher perceived risk.

Ideally, fear motivates effective and protective actions [20]. But it doesn't always have this effect. For example, it has been stated that behaviors related to fear during the EBOLA epidemic in the past increased the rates of psychiatric symptoms and indirectly caused deaths [4]. For these reasons, it is considered to be of great importance to determine the fear and social effects associated with the COVID-19 pandemic.

It was determined that, after the COVID-19 pandemic, liver transplant recipients' preference for being in crowded places and public transportation decreased significantly (Table 2), and this reality was associated with the increase in fear of COVID-19. In Reuken's study, it was determined that most of the liver transplant recipients left their homes less frequently than before the COVID-19 pandemic [6]. In another study, it was found that one of the most preferred methods of preventive behavior by people is avoiding public transport [18]. Research results can be evaluated as positive. Because it is known that "distance" is one of the most important issues to be considered since the beginning of the COVID-19 pandemic [21].

In this study, food and cleaning material storage status of patients increased in more than half of the patients, and this increase is associated with the fear of COVID 19. It is observed that this situation is similar in the general population [8]. Modes of the transmission of COVID-19, result in individuals increasing their personal hygiene measures, and it is expected that the food / cleaning material shopping has increased [8]. Patients' frequent washing of their hands and wearing masks or gloves while going out has increased considerably and is associated with the fear of COVID-19. In other studies, it is seen that hand washing and using protective equipment increased [6,18]. In Reuken's study, patients who reported their fear of being infected with COVID-19 tend to use personal protective equipment and wash their hands more frequently [6]. It is known that hand washing, wearing a mask and using personal protectors are of great importance in protecting against COVID-19 [21]. Therefore, the research results can be described as gratifying.

In this study, the rate of going to a doctor for examination decreased in about half of the patients, and healthy eating efforts increased in most of the patients. As the fear of COVID-19 increased, the situation of going to the doctor decreased and their tendency towards healthy eating increased. In Reuken's study, a large proportion of patients stated that they were afraid of going to the hospital and were more likely to skip or postpone medical visits, and it was found that this situation increased in relation to the fear of COVID-19 [6]. In another study, while efforts for healthy eating increased in more than half of the individuals in the general population, their willingness to go to a doctor for examination decreased significantly [8]. While the increase in healthy nutrition effort is a positive result for liver transplant patients, the decrease in the rate of going to the doctor for examination can be considered as a negative result. It is known that a strong immune system is important in protecting against COVID-19. Therefore, nutrition is important [22,23]. On the other hand, liver transplant patients must undergo regular checkups, and the decrease in hospital checks associated with catching COVID-19 may adversely affect the health status of the patients.

It has been determined that the health concerns of liver transplant patients have increased significantly and associated with the fear of COVID-19. The increase in health anxiety is thought to be related to immunosuppression. In a study conducted by Reuken, it was determined that a patient discontinued immunosuppressive treatment without a doctor's recommendation [6]. As a result of the study, it was determined that some of the liver transplant patients had trouble sleeping and this situation was related to the fear of COVID-19. It is also supported by the literature that fear triggers insomnia by causing anxiety [24,25]. It is known that insomnia weakens the immune system and increases susceptibility to infection [26,27]. Therefore, it should be an issue that should be focused on especially in organ transplant patients.

5. Conclusion

It was determined that the mean Fear of Covid 19 Scale score of the patients was 21.25 ± 6.99 (high). It has been determined that as the fear of COVID-19 increases in patients with liver transplantation, their desire to be in a crowded environment, their desire to prefer public transportation, going to the doctor for examination, having trouble sleeping and focusing on their goals decrease. Also, it was determined that the storage of food and cleaning materials, washing their hands frequently, using masks and gloves when going out, health concerns, doubts about the symptoms of the disease, their orientation to healthy eating, their worries about the future and questioning the meaning of life increased. Lastly, it was determined that the first predictor of COVID-19 fear was concerns about the future and had a significant impact. In line with these results, for the solution of problems such as insomnia and disrupting physician control that may arise in transplant centers related to the fear of COVID-19, regular communication with patients by using telemedicine facilities, referral of patients with high levels of fear to psychologists and/or psychiatrists in order to prevent psychological complications that may develop due to fear, organizing education programs to contribute to preventive behaviors of patients, and conducting similar studies in larger groups can be suggested. The result of the study is thought to be beneficial for nurses and healthcare professionals.

Authors' contributions

The authors declare that their contribution to the work is equal.

The compliance to the research and publication ethics

This study was carried out in accordance with the rules of research and publication ethics.

Contributions

Study design: EKS, RD; acquisition of the data: RD, NB; data analysis: EKS; drafting of the article: EKS, RD, NB.

Ethical approval

All procedures performed were in accordance with the ethical standards of the national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Declaration of Competing Interest

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

Acknowledgements

We would like to thank all the patient who took part in the study.

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