



Assessment of preoperative anxiety and negative automatic thoughts in patients waiting for corneal transplantation

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ABSTRACT

Introduction and aim. In patients waiting for organ transplantation, increased waiting time can increase anxiety by creating negative automatic thoughts. The aim of this study is to examine the relationship between corneal transplant recipients' negative automatic thoughts and anxiety before organ transplantation.

Material and methods. The population of this correlational descriptive study consisted of 108 patients waiting for cornea transplantation in the Eye Bank unit of a hospital in the south east region of Türkiye. The data were obtained from the patients presented to the ophthalmology clinic for transplantation between September and December 2022. A patient information form, the Negative Automatic Thoughts Scale, and the Trait Anxiety Scale were used to collect the data. Percentage distribution, arithmetic mean, logistic regression and correlation analysis were used in the data analysis.

Results. It was determined that the mean score of the negative automatic thoughts of the transplant patients participating in the study was 100.69 ± 47.83 , and the trait anxiety mean score was 53.06 ± 6.07 . There was a positive relationship between negative automatic thoughts and trait anxiety at a moderate level, which was statistically significant ($p < 0.05$, $r = 0.53$).

Conclusion. It was determined in the study that the patients' negative automatic thoughts and trait anxiety were high, and their anxiety increased as the negative automatic thoughts increased.

Keywords. anxiety, corneal transplant, negative automatic thought

Introduction

Organ transplantation is now a routine advanced treatment method applied in many chronic organ diseases. Transplantation is generally defined as the transfer of tissues or organs. Since the number of patients needing transplantation is high and the organ donation is low, the future concerns and uncertainty about the transplantation have a negative effect on them. This general uncertainty causes psychosocial problems.^{1,2}

The cornea is a tissue improving the quality of the image on the retina in the human eye. It is a convex,

transparent, densely innervated, and sensitive membrane in the anterior part of the eyeball.^{3,4} Today, corneal transplant/keratoplasty is one of the most frequently performed transplants worldwide. However, there is still corneal blindness in 4.2 million people, which makes it the fourth leading cause of blindness according to the World Health Organization, and finding corneal donation is a significant challenge.⁵ The problem of finding corneal donations is a limiting factor for the total number of keratoplasty procedures performed every year. A global study reveals that 12.7 million people are waiting

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for a corneal transplant, and only one out of 70 will receive a cornea.⁶ There are Eye Banks in many provinces of Türkiye with 609 centers to provide corneal transplant services to patients waiting for the cornea. When the current data in Türkiye are examined, the corneal transplantation of a total of 33092 patients were performed, and 32679 patients were waiting for the corneal transplantation at the time of writing.⁷

The increase in the number of transplant candidates and the small number of donors are the reasons for the increased waiting time. Waiting can also lead to negative mental states such as anxiety, agitation, fear, anger, and helplessness.⁸⁻¹¹ The people waiting for organ transplantation are always anxious about facing possible medical issues that will negatively affect organ transplantation or even make it impossible.¹⁰ The increase in waiting time in patients waiting for transplantation creates negative automatic thoughts, which can increase anxiety.

Research questions

Q₁: What is the level of preoperative anxiety and negative automatic thoughts in patients waiting for corneal transplantation?

Q₂: Is there a relationship between preoperative anxiety and negative automatic thoughts in patients waiting for corneal transplantation?

Aim

This study aimed to examine the relationship between the organ transplantation recipients' negative automatic thoughts and anxiety before organ transplantation.

Material and methods

Study design and participants

This correlational descriptive research was performed to examine the relationship between negative automatic thoughts and anxiety states of organ transplantation recipients before corneal transplantation. This study was carried out in the Eye Bank unit of Dicle University Hospitals between September and December 2022. The population of the research consisted of 108 patients waiting for cornea transplantation. The study included the whole population with the non-probabilistic sampling technique, and was completed with 108 patients.

Data collection

The data were obtained via face-to-face interviews with the patients presented to the Ophthalmology clinic for transplantation. It took about 15 minutes to fill out the questionnaires and forms.

Data collection tools

Patient information form

The patient information form includes 10 items that cover the patient's descriptive characteristics (age,

occupation, income status, gender, education level, marital status, eye to be operated on, surgery history, waiting time for a donor, the reason for transplantation).

State and Trait Anxiety Scale (STAI)

It is a self-assessment questionnaire developed by Spielberger et al. and consists of short assessments. The STAI includes 40 four-point Likert-type items ranging from "None" to "Completely". The validity and reliability of the STAI in Türkiye were established by Öner and Le Compte. The STAI includes two separate scales, the State Anxiety Score (SAS) and the Trait Anxiety Score (TAS). The SAS requires the person to describe how they feel at a certain moment and under certain conditions and to respond by taking into account their feelings about the situation they are in.

On the other hand, the TAS requires the person to describe how they usually feel. There are two types of expressions in the STAI. While direct statements express negative emotions, reversed statements express positive emotions. The reversed statements in the SAS are the 1st, 2nd, 5th, 8th, 10th, 11th, 15th, 16th, 19th, and 20th items. The reversed statements in the TAS are the 21st, 26th, 27th, 30th, 33rd, 36th, and 39th items. The total score of the reverse statements is subtracted from the total score obtained for the direct statements. A predetermined and constant value is added to this number. This constant value is 50 for the SAS and 35 for the TAS. The last obtained value is the anxiety score of the individual. Higher scores indicate increased anxiety level. In the Turkish validity and reliability study, Cronbach's alpha reliability coefficients were between 0.83 and 0.87 for the TAS and between 0.94 and 0.96 for the SAS.¹²

Negative Automatic Thoughts Scale

The scale was developed by Holland and Kendall in 1980 and its Turkish validity and reliability were established first by Aydın and Aydın in 1990, and then Şahin and Şahin performed the validity and reliability study again in 1992. The scale has 5-point Likert type items. There are no reversed items in the scale. The score range of the scale is 30-150 points, and 67 points and above are evaluated as high for the negative automatic thoughts. The Cronbach alpha internal consistency coefficient of the scale is 0.96.¹³

Statistical analysis

Data analysis was performed using the SPSS 25 (IBM, Armonk, NY, USA) package program for Windows. In the study, statistical methods used in the analysis of data are presented in the Table 1.

Table 1. Statistical methods used in data analysis

Statistical Reasons	Statistical Methods
Distribution of patients' descriptive characteristics	The number, percentage, mean and standard deviation
Normal distribution of data	Test of normality, skewness and kurtosis values
Comparison scale means of between groups	Student T-test, One-Way Analysis of Variance Test
Examine relationship between two variables	Pearson Correlation
Estimate the association of categorical or continuous variables	Logistic Regression

Ethics approval

The ethics committee approval was obtained from Mardin Artuklu University Ethics Committee (#2022/66630), and clinical study permission was obtained from Dicle University Medical Faculty Hospital (#38948411-900-257595). Written informed consent was obtained from the participants after explaining that participation in the study was voluntary and participants who agreed to participate in the study were informed about the purpose, duration, and scope of the study.

Results

The mean age of the patients was 61.25±16.48 years. It was determined that 93.5% were married, 57.4% were male, 26.9% were retired, 80.6% had less income than expenses, 45.4% were primary school graduates (Table 2), 52.8% had surgery on their right eye, 68.5% had a surgery history, and 30.6% need transplantation due to pseudophakic corneal edema (Table 3).

When the descriptive and clinical characteristics of the patients and their mean scores of negative automatic thoughts and trait anxiety were examined, it was determined that the difference between the gender, income status, and negative automatic thought scale means were statistically significant (p<0.05) and the difference between the anxiety score means was not statistically significant (p>0.05). It was determined that the difference of anxiety scale mean scores in educational status was statistically insignificant (p<0.01). There was no statistically significant difference (p>0.05) between the mean scores of negative automatic thoughts and anxiety due to the marital status and occupation. There was no statistically significant relationship found between age and the transplantation waiting time and the mean scores of negative automatic thoughts and anxiety before transplantation (p>0.05) (Table 2).

When clinical characteristics of the patients and their mean scores of negative automatic thoughts and trait anxiety were examined, There was no statistically significant difference between the mean scores of negative automatic thoughts due to the operated eye, surgical history and reason for transplantation (p>0.05). It was determined that the difference of anxiety scale means in

the operated eye, surgical history and were statistically significant (p<0.05); but the difference of anxiety score means in the reasons for transplantation was not statistically significant (p>0.05) (Table 3).

Table 2. Mean scores of Negative Automatic Thought Scale and Anxiety Scale according to descriptive characteristics of the patients^a

Features	Number/percent		Negative automatic thought	Test and significance	Anxiety	Test and significance
	n	%	$\bar{x} \pm SD$		$\bar{x} \pm SD$	
Marital status						
Bachelor	7	6.5	91.85±55.07	t=-0.35	53.00±6.08	t=-0.11
Married	101	93.5	99.39±47.86	p=0.73	53.26±5.55	p=0.91
Gender						
Female	46	42.6	110.80±44.75	t=2.28	53.78±5.60	t=0.85
Male	62	57.4	90.08±48.96	p=0.02*	52.85±5.53	p=0.39
Occupation						
Retired	29	26.9	83.13±47.03		53.96±5.42	
Officer	2	1.9	105.00±63.63		53.50±7.77	
Farmer	6	5.6	72.00±40.49		49.33±4.88	
Self-employment	10	9.3	108.10±50.72	F=1.71	54.60±5.68	F=0.95
Not working	25	23.1	114.88±49.64	p=0.13	53.76±5.62	p=0.44
Housewife	36	33.3	102.11±45.35		52.58±5.61	
Income status						
Income less than expense	87	80.6	105.16±46.98	F=8.05	52.87±5.54	F=2.07
Income equals expense	21	19.4	73.00±44.92	p<0.05	54.80±5.47	p=0.15
Income more than expense	0	0				
Education status						
Illiterate	8	7.4	123.75±29.73		59	
Literate	38	35.2	95.71±45.38		51.76±5.36	
Primary school	49	45.4	104.95±50.88	F=2.27	52.34±5.43	F=6.09
High school	9	8.3	61.33±51.04	p=0.06	56.77±4.84	p<0.01
University	4	3.7	90		59	
$\bar{x} \pm SS$						
Age	61.25±16.48			r=-0.08		r=-0.03
				p=0.39		p=0.69
Transplantation waiting time	5.67±3.93			r=-0.15		r=-0.02
				p=0.10		p=0.81

a X – mean, SD – standard deviation, r – correlation, F – One Way Anova, t – student T

The negative automatic thought scale mean score of the transplant patients was 98.90±48.11, and the mean trait anxiety scale score was 53.25±5.55. There was a positive and medium-level relationship between the negative automatic thought and trait anxiety, which was statistically significant (p<0.01) (r=0.53) (Table 4).

The results of the logistic regression analysis regarding the negative automatic thoughts of the patients are shown in Table 4. Among the variables which were found to be significant, a decrease in educational status increased the negative automatic thoughts 0.66 times,

and a one-unit increase in the anxiety scale score increased the negative automatic thoughts 1.34 times ($p < 0.01$) (Table 5).

Table 3. Mean scores of Negative Automatic Thought Scale and Anxiety Scale according to clinical characteristics of the patients^a

Features	Number/percent		Negative automatic thought $\bar{x} \pm SD$	Test and significance	Anxiety	Test and significance $\bar{x} \pm SD$
	n	%				
Surgery eye						
Right	57	52.8	101.56±49.00	t=0.60	54.54±5.50	t=2.63
Left	51	47.2	95.94±47.41	p=0.54	51.80±5.30	p=0.01
Surgery history						
Yes	74	68.5	99.00±50.13	t=0.03	54.09±5.59	t=2.38
No	34	31.5	98.70±44.24	p=0.97	51.41±5.06	p=0.01
Reason for Transplantation						
Pseudophakia						
Corneal edema (PCE)	33	30.6	107.69±49.38		53.87±5.43	
Bullous Keratopathy						
	18	16.7	91.94±52.34		52.83±5.74	
Keratoconus						
	3	2.8	49.00±20.29		47.00±1.73	
Dystrophy						
	6	5.6	89.50±51.11		51.16±6.17	
Herpetic keratitis						
	5	4.6	100.20±47.69		49.60±5.41	
Graft rejection						
	11	10.2	76.54±45.02	F=1.32	54.00±5.74	F=1.26
Keratitis						
	5	4.6	122.20±38.65	p=0.22	54.60±6.18	p=0.26
Nephelion						
	6	5.6	105.00±36.74		51.83±5.56	
Foreign object penetration						
	5	4.6	138.00±26.83		56.80±4.91	
DMEK						
	12	11.1	101.16±48.99		55.08±5.01	
Melting (Ulcer)						
	4	3.7	80.33±62.05		50.75±5.50	

a X – mean, SD – standard deviation, F – One Way Anova, t – student T, DMEK – descemet membrane endothelial keratoplasty

Table 4. Examination of the relationship between negative automatic thought and anxiety in patients (n=108)^a

	Possible range	$\bar{x} \pm SD$	Actual range	Test and significance
Negative Automatic Thought	30–150	98.90±48.11	30–150	r=0.52
Anxiety Score	20–80	53.25±5.55	45–59	p<0.01

a X – mean, SD – standard deviation, r – correlation

Table 5. Results of logistic regression analysis on patients' negative automatic thought state^a

Features	B	p	Exp (β)	95% Confidence interval exp (β)	
				Lower	Upper
Gender	-0.32	0.54	0.72	0.25	2.06
Age	-0.01	0.34	0.98	0.95	1.01
Income status	-2.71	<0.01	0.06	0.01	0.33
Surgery history	0.99	0.09	2.70	0.8	8.61
Anxiety score	0.29	<0.01	1.34	1.17	1.54

^a B – Regression coefficient, Exp (β) – odds range (OR)

Discussion

This is the first study evaluating the levels of preoperative anxiety and negative automatic thoughts and the relationship between them in patients waiting for corneal transplantation. This study has three important results;

Although the anxiety level of the female patients was higher than that of male patients in our study, the relationship was insignificant. Esme et al. stated that there was no statistically significant relationship between gender and state and trait anxiety in their study conducted with lung cancer patients.¹⁴ Bhattacharjee and Banerjee stated in their study that although the trait anxiety of female cancer patients was statistically significantly higher than that of male cancer patients, no significant difference was found between the genders for state anxiety.¹⁵ Courtillié et al. stated that the state anxiety level of female kidney transplant patients was higher than that of male kidney transplant patients.¹⁶ Cardoso et al. also emphasize that being a female is a risk factor in terms of anxiety and depression. Our study result shows similarity with the literature.¹⁷ Bal et al. stated that the followings play a role in the fact that women have higher anxiety levels than men in the general population and that anxiety disorders are more common in women: some biological differences such as differences in the number and structure of serotonin receptors; social learning; attachment patterns; differences in expression of anxiety; and, some other psychosocial factors.¹⁸

No statistically significant relationship was found between the age and anxiety score mean scores of the pre-transplant patients in our study. Mystakidou et al. also mentioned that there was a negative relationship between age and anxiety.¹⁹ Similarly, Linden, Vodermaier, MacKenzie, and Greig stated that the emotional distress in some types of cancer was inversely proportional to age.²⁰ Sheppard, Harper, Davis, Hirpa, and Makambi state that there was a negative correlation ($r = -0.224$) between age and anxiety in their study they conducted with breast cancer patients.²¹ Moreover, Weiss Wiesel et al. stated that anxiety decreased with age in elderly individuals with cancer.²² Srivastava et al. also stated that the young age group, low monthly income, having less financial support, low education level, and being a bachelor were associated with anxiety and depression in cancer patients.²³ It can be said that our study result is different from the results in the literature because the average age of the patients was high and approximately three-quarters of them had a surgery history.

It was seen in our study that there was a positive, medium-level linear relationship between negative automatic thought and trait anxiety, which was statistically significant. In the literature, many studies conducted with different groups support the finding of a positive relationship between automatic thoughts and anxiety. For example, Beck et al. emphasized a positive, linear

significant relationship between anxiety symptoms and anxious automatic thoughts and that this relationship was stronger than the relationship between depressive symptoms and depressive automatic thoughts.²⁴ Torrente et al. (2014) also stated that there was a statistically significant positive linear high-level relationship between trait anxiety and automatic thoughts, similar to the finding of this study.²⁵ Alcalar et al. also noticed a positive linear relationship between the automatic thoughts of breast cancer patients and their depression and psychiatric mood disorders.²⁶ Kara and Acet stated that there was a positive linear significant relationship between the state of anxiety and sub-dimensions of astonishment, negative emotion, and hopelessness of the negative automatic thoughts.²⁷ Our study results show similarity with the literature.

Study limitations

This study was conducted only with patients in one university hospital in southeastern Türkiye; thus, the results cannot be generalized to the entire society. The present results may serve as a source for future research conducted with patients of different cultural backgrounds. Although it was shown that there is a clear relationship between anxiety and negative automatic thoughts in corneal transplant surgery, since this is an outpatient surgery, no intervention aimed at decreasing anxiety or negative automatic thoughts. This situation requires experimental research, such as a prospective education program.

Conclusion

As a result, it was determined that the negative automatic thoughts and trait anxiety levels of the patients waiting for the corneal transplantation were high. The anxiety increased as the negative automatic thoughts increased. Moreover, in our study, the anxiety level of the female patients was higher than that of the male patients. In the patients waiting for the corneal transplant, their anxieties can be reduced in parallel with providing psychosocial and emotional supports and eliminating negative thought states.

This is the first study evaluating the levels of preoperative anxiety and negative automatic thoughts and the relationship between them in patients waiting for corneal transplantation. In this context, it should be emphasized in training programs that psychological care should be given as much importance as physical care during the corneal transplant nursing care process. Moreover, appropriate nursing care plans should be created to reduce patients' anxiety and negative automatic thought levels during the corneal transplantation process. Finally, more studies should be done on the subject.

Declarations

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Author contributions

Conceptualization, S.T. and M.A.S.; Methodology, S.T.; Software, M.A.S.; Validation, H.G. and M.A.S.; Formal Analysis, H.G.; Investigation, S.T.; Resources, H.G.; Data Curation, M.A.S.; Writing – Original Draft Preparation, S.T.; Writing – Review & Editing, S.T. and M.A.S.; Visualization, S.T.; Supervision, S.T.; Project Administration, S.T. and H.G.; Funding Acquisition, M.A.S.

Conflicts of interest

The authors declare no conflict of interest.

Data availability

Data available on request from the authors.

Ethics approval

The study received ethical approval from Mardin Artuklu University Ethics Committee. Decision date and number: 07.01.2022/21.

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