



Preoperative and postoperative levels of anxiety according to the visual acuity of patients undergoing cataract surgery

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Abstract

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Aim: To evaluate preoperative and postoperative levels of anxiety according to visual acuity and sociodemographic characteristics in patients undergoing cataract surgery.

Materials and Methods: The study included 100 patients who were planned to undergo cataract surgery because of reduced vision. One day preoperatively and at one month postoperatively, all the patients were administered the sociodemographic data form and the Spielberger State-Trait Anxiety Inventory (STAI TX-1 and TX-2). All the patients underwent a detailed preoperative and postoperative ophthalmological examination. Visual acuity was evaluated with a logMAR Chart.

Results: The visual acuity on the LogMAR chart of the patients was mean 1.1 ± 0.3 preoperatively and 0.1 ± 0.1 postoperatively. Visual acuity was determined to have significantly increased postoperatively and the STAI FORM TX-2 points significantly decreased ($p=0.04$). The postoperative decrease in the LogMAR chart was statistically significant ($p<0.001$). A significant positive correlation was determined between the preoperative STAI FORM TX-1 points and the preoperative STAI FORM TX-2 points. The mean STAI FORM TX-1 points of the patients with an education level of middle school or below were found to be significantly higher than those of patients educated to university level or higher ($p=0.012$). The visual acuity (LogMAR) of patients who had previously received psychiatric treatment were found to be significantly lower than those of patients who had not received any psychiatric drug treatment ($p=0.027$).

Conclusion: Patients with cataracts are anxious in a general sense, independently of surgery. The increase in vision after cataract surgery is important in respect of decreasing levels of trait anxiety.



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Introduction

Cataract is an eye disease that causes reduced vision as a result of deterioration of the lens transparency [1]. The frequency of this disease increases together with ageing and the prevalence has been reported to be as high as 92.6% in individuals aged ≥ 80 years. It is the most common cause of blindness worldwide [2,3]. As cataracts cause loss of vision that can advance as far as blindness, the quality of life of the individual is significantly affected [4]. Loss of vision is measured with a visual acuity test, the aim of which is to determine the clarity or acuity of the vision. This process evaluates many ways that light reaches the retina with appropriate refraction, evaluation in the vision centre, and retinal health. Visual acuity is examined in many eye diseases, including cataract [5]. There are many

visual acuity evaluation methods, and the LogMAR Chart, which refers to the logarithm of the smallest angle ($MAR = \text{minimum angle of resolution}$) that can be differentiated, is a widely used method to show visual acuity, especially in academic studies [6].

With appropriate intra-ocular lens implantation in cataract surgery, an improvement is seen in both visual acuity and in refractive errors such as myopia and hypermetropia [7]. Although cataract operations have become more comfortable and shorter with advances in technology [8], patients can experience anxiety before the procedure, just as in all operations [9]. Anxiety can be seen in patients preoperatively related to fear of deterioration in health, feeling pain, and about complications that may develop [10]. In this way, the discharge of catecholamines in a patient with preoperative anxiety can cause tachycardia and hypertension [11]. Preoperative anxiety has an effect not only before the surgery but also during the procedure and

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afterwards [12]. Intraoperative hemodynamic problems and the need for analgesia, and delayed wound healing in the postoperative period can prolong the length of stay in hospital by increasing the need for analgesia [13-15]. In a review that evaluated fear and anxiety in adults related to cataract surgery under local anesthesia, there was reported to be a higher level of fear and anxiety in hypochondriac and anxious individuals [16]. Another study that investigated the preoperative fear of cataract surgery in elderly patients found that although patients with higher visual acuity were more anxious, previous experience of a safe and pain-free cataract operation decreased the level of fear [17].

Visual acuity can affect the mental status of an individual and therefore, the severity of anxiety can be different in the preoperative and postoperative periods. The aim of the current study was to examine anxiety levels according to sociodemographic characteristics and visual acuity before and after cataract surgery in patients with cataract that was diminishing quality of life by reducing vision.

Materials and Methods

Approval for the study was granted by the Non-Interventional Clinical Research Ethics Committee of Firat University (decision no: 02-34, dated: 01.02.2024). All the study procedures were in compliance with the ethical standards stated in the 2013 revision of the Helsinki Declaration. All the study participants provided written informed consent. The study included 113 patients aged 40-65 years who presented at the Ophthalmology Department Polyclinic of Elazığ Fethi Sekin City Hospital, were planned to undergo cataract surgery, and met the study criteria. Patients aged >65 years were not included as it was thought they might experience difficulties in completing the forms. Patients who were admitted for cataract surgery, who had a history of psychiatric treatment but had no psychiatric complaints in the past year, who had no hearing or speech impairment that would prevent them from answering the questions, and who had no neurologic disease were included in the study. Other exclusion criteria were defined as the presence of another eye disease other than cataract, currently receiving psychiatric treatment, the use of alcohol or substances in the last 6 months, or the presence of dementia and/or any other neurological disease. A further 13 patients were later excluded as they did not wish to continue in the study.

All the patients underwent a detailed ophthalmological examination one day before the cataract surgery and in the first month postoperatively. Visual acuity and intra-ocular pressure were measured and biomicroscopic and detailed fundus examinations were performed by the same ophthalmologist in the ophthalmology polyclinic. A LogMAR chart was used in the measurement of visual acuity. The sociodemographic data form, prepared by the researchers, and the Spielberger State Anxiety Scale (STAI FORM TX-1) and the Spielberger Trait Anxiety Scale (STAI FORM TX-2) were also applied to the patients one day before the cataract surgery and in the first month postoperatively.

Logmar Chart: The LogMAR notation refers to the logarithm of the smallest angle (MAR= minimum angle of

resolution) that can be differentiated. As a result of significant advantages, this has become the standard method of showing visual acuity in clinical research and in conditions when visual acuity must be repeatable [18].

Sociodemographic and Clinical Data Form: This form was prepared by the researchers and used for the patients in this study. It is a semi-structured form containing sociodemographic information such as age, gender, and marital status, and clinical data such as duration of the disease.

State and Trait Anxiety Scale (STAI FORM TX-1, TX-2): These forms, developed by Spielberger et al, have undergone Turkish adaptation, reliability and validity studies. The STAI FORM TX-1 evaluates how an individual feels at a certain time under certain conditions and the STAI FORM TX-2 evaluates how an individual feels in general, regardless of the conditions they are in. Each form consists of 20 items, with total scores ranging from 20-80 points. The anxiety scores are evaluated as 20-39 points: mild anxiety, 40-59 points: moderate anxiety, 60-79 points: severe anxiety, and 80 points: panic [19,20].

Power analysis

While making the calculations of the study, G*Power 3.1.9.2 program was used and the study "Pain and anxiety during cataract surgery: comparison between first eye and second eye fusion" was taken as reference. Accordingly, it was determined that at least 62 patients should be reached with a 95% confidence interval and 99% power.

Statistical analysis

Data obtained in the study were analyzed statistically using SPSS vn. 22 software (Statistical Package for Social Sciences; SPSS Inc., Chicago, IL, USA). Descriptive statistics were reported as mean±standard deviation (SD) values for categorical variables and as number (n) and percentage (%) for categorical variables. Conformity of continuous variables to normal distribution was assessed with the Kolmogorov-Smirnov test. In the comparisons of paired groups, the Student's t-test was used, and in the comparisons of preoperative and postoperative data, the t-test was used in independent groups. Pearson correlation analysis was applied to the examination of relationships between continuous variables. A value of $p < 0.05$ was accepted as the level of statistical significance.

Results

Evaluation was made of 100 patients, comprising 45 (45%) females and 55 (55%) males with a mean age of 61.27 ± 5.14 years (range, 46-65 years), and mean disease duration of 3.0 ± 2.0 years. Of the whole patient group, 82% were married, and 18% were widowed/divorced, education level was recorded as middle school or lower for 66% and high school or higher for 33%, 20% lived in a rural environment, and 22% were employed. There was a history of psychiatric treatment in 18%. A history of attempted suicide was recorded for 2% of the patients and 24% were active smokers. There was a history of cataract surgery in 39% of the patients (Table 1).

Table 1. Sociodemographic and clinical characteristics of the patients.

		n	%
Gender	Female	45	45.0
	Male	55	55.0
Age (years) mean±SD		61.27±5.14 (95%CI =60.3-62.3)	
Marital status	Married	82	82.0
	Widowed/divorced	18	18.0
Education Level	Middle school and lower	66	66.0
	High school and higher	34	34.0
Place of residence	Rural	20	20.0
	Urban	80	80.0
Employment status	Employed	22	22.0
	Not employed	78	78.0
Disease duration (years)		3.0±2.0 (95%CI =2.6-3.4)	
History of psychiatric treatment	Yes	18	18.0
	No	82	82.0
History of attempted suicide	Yes	2	2.0
	No	98	98.0
Smoker	Yes	24	24.0
	No	76	76.0
History of cataract surgery	Yes	39	39.0
	No	61	61.0

The visual acuity of the patients was mean 1.1±0.3 logMAR preoperatively and 0.1±0.1 logMAR postoperatively. Visual acuity was determined to have significantly increased postoperatively and the STAI FORM TX-2 points significantly decreased (p=0.04). The postoperative decrease in the LogMAR visual acuity was statistically significant (p<0.001). A significant positive correlation was determined between the preoperative STAI FORM TX-1 points and the preoperative STAI FORM TX-2 points. No significant change was seen in the STAI FORM TX-1 points postoperatively (Table 2).

Table 2. Comparisons of preoperative and postoperative visual acuity values and STAI scores.

	Preop Mean±SD	Postop Mean±SD	p*
Visual acuity (logMAR)	1.1±.3 (95%CI =1.0-1.1)	0.1±0.1 (95%CI =0.07-0.12)	<0.001
STAI-1	35.7±9.6 (95%CI =33.8-37.6)	36.6±11.0 (95%CI =34.4-38.8)	0.610
STAI-2	42.5±10.2 (95%CI =40.5-44.6)	39.9±9.6 (95%CI =38.0-41.8)	0.04

*t-test applied in independent groups.

A statistically significant positive correlation was determined between the preoperative STAI FORM-TX 1 points and the preoperative STAI FORM-TX 2 points of the patients (Table 3).

Table 3. Correlation analysis.

		Visual acuity (logMAR)	STAI-1	STAI-2	Age
STAI-1	r	-.078			
	p	.441			
STAI-2	r	-.101	.454		
	p	.318	.000		
Age	r	-.092	.079	.010	
	p	.362	.436	.922	
Disease duration	r	.130	.060	.020	.099
	p	.199	.555	.841	.329

The STAI FORM-TX 1 points of patients with an education level of middle school and lower were determined to be significantly lower than those of the patients educated to the level of university and higher (p=0.012). The visual acuity (logMAR) of patients who had previously received psychiatric treatment was seen to be statistically significantly lower than that of those who had not received psychiatric treatment (p=0.027) (Table 4).

Discussion

The results of this study demonstrated that anxiety was at a moderate level in cataract patients. Independently operated cataract surgery and the level of anxiety reduced together with the increase in visual acuity after cataract surgery. Although the anxiety present preoperatively in patients with cataract improved in the postoperative period, it can be said that as the level of education decreased, patients were more anxious about cataract surgery.

The aim of cataract surgery is to remove the lens with deteriorated transparency and place a new intra-ocular lens [21]. Patients who are hospitalized and especially those who are to undergo a surgical intervention are known to be anxious [22]. Preoperative anxiety has been reported in 45.3% of patients hospitalized in surgical patient groups [23]. As visual acuity is reduced in cataract patients, a decrease in physical activities and socialization affects the mental status [24,25]. Diminished vision in patients who are to undergo cataract surgery has been associated with depression and anxiety symptoms. Although this has a negative effect on operation success, there has been shown to be an improvement in the mental status of patients after cataract operations [26].

The Hamilton Anxiety Grading Scale was applied to 385 cataract patients and it was reported that 325 patients experienced mild anxiety before cataract surgery, 36 experienced anxiety at a moderate level and 24 at a severe level [27]. In another study in Pakistan the STAI FORM-TX was applied to 100 cataract patients to evaluate preoperative anxiety levels. The results of that study showed that most patients (72%) had little or no anxiety and 28% had anxiety at a moderate level. Fear of subjective sensations during the surgical procedure was determined to be the most important cause of anxiety in patients who were to undergo surgery [28].

Table 4. Comparisons of preoperative visual acuity (logMAR) and STAI points according to various parameters.

		Visual acuity (logMAR)		STAI-1		STAI-2	
		Mean±SD (95%CI)	p*	Mean±SD (95%CI)	p*	Mean±SD (95%CI)	p*
Gender	Female	1.1±.3 (1.0-1.2)	0.305	37.5±9.2 (34.8-40.3)	0.095	43.9±10.8 (40.6-47.1)	0.246
	Male	1.0±.3 (0.9-1.1)		34.3±9.8 (31.6-36.9)		41.5±9.7 (38.8-44.1)	
Marital status	Married	1.1±.3 (1.0-1.2)	0.333	35.0±9.7 (32.9-37.2)	0.118	41.6±9.7 (39.5-43.8)	0.052
	Widowed/divorced	1.0±.2 (0.9-1.1)		38.9±8.7 (34.6-43.3)		46.8±11.7 (40.9-52.6)	
Education Level	Middle school and lower	1.1±.3 (0.9-1.2)	0.618	37.3±10.2 (34.8-39.8)	0.012	43.6±10.5 (41.0-46.2)	0.145
	High school and higher	1.1±.4 (0.9-1.2)		32.7±7.6 (30.0-35.3)		40.5±9.4 (37.2-43.8)	
Place of residence	Rural	1.1±.2 (1.0-1.2)	0.595	34.4±10.7 (29.3-39.4)	0.477	40.2±8.5 (36.2-44.2)	0.252
	Urban	1.1±.3 (1.0-1.2)		36.1±9.4 (33.9-38.2)		43.1±10.6 (40.8-45.5)	
Employment status	Employed	1.1±.4 (1.0-1.3)	0.346	32.3±8.7 (28.4-36.1)	0.056	39.1±7.4 (35.8-42.4)	0.072
	Not employed	1.1±.3 (1.0-1.2)		36.7±9.7 (34.5-38.9)		43.5±10.7 (41.1-45.9)	
History of psychiatric treatment	Yes	0.9±.3 (0.8-1.1)	0.027	39.3±9.6 (34.5-44.1)	0.084	46.6±11.0 (41.1-52.0)	0.066
	No	1.1±.3 (1.0-1.2)		35.0±9.5 (32.9-37.0)		41.7±9.9 (39.5-43.8)	
Suicidery	Yes	0.9±.2 (0.8-1.1)	0.334	42.5±7.8 (27.4-112.4)	0.318	39.5±9.2 (43.1-122.1)	0.672
	No	1.1±.3 (1.0-1.2)		35.6±9.7 (33.7-37.5)		42.6±10.3 (40.6-44.7)	
Smoker	Yes	1.0±.3 (0.9-1.2)	0.386	34.5±9.1 (30.6-38.3)	0.461	42.5±10.8 (37.9-47.0)	0.960
	No	1.1±.3 (1.0-1.2)		36.1±9.8 (33.9-38.4)		42.6±10.1 (40.3-44.9)	
History of cataract surger	Yes	1.1±.3 (1.0-1.2)	0.936	34.7±9.8 (31.6-37.9)	0.416	41.3±9.2 (38.3-44.3)	0.334
	No	1.1±.4 (0.9-1.2)		36.4±9.5 (33.9-38.8)		43.3±10.8 (40.6-46.1)	

*Student's t-test was applied.

In another study, the STAI FORM TX-1 (state anxiety) and STAI FORM TX-2 (trait anxiety) mean points were reported to be between 36 and 41 showing a moderate level of anxiety of patients before cataract surgery [29]. Socea et al. examined the relationship between pain and preoperative anxiety in 103 cataract patients, and it was determined that patients were anxious in the preoperative period and this was associated with pain. Emphasized that there is need to reduce preoperative anxiety in these patients [30]. Ramirez et al. evaluated surgical fear in 61 cataract patients with the Surgical Fear Questionnaire, and reported that the patients were anxious especially about the thought of the operation and of remaining blind because of the surgery [31]. The fact that the STAI-

FORM-TX-1 scale scores of the patients in the preoperative and postoperative period did not differ in our study suggests that cataract surgery did not directly affect the anxiety of the patients. The advancement of technology in ophthalmic surgery and the fact that ophthalmologists have gained experience in cataract surgery due to the frequency of cataract surgeries today may have led patients to think that cataract surgery is a comfortable and safe operation.

Unlike previous studies, the current study evaluated the relationship between the change in visual acuity and the anxiety levels of patients in the preoperative and postoperative periods of patients undergoing cataract surgery. It

was observed that cataract surgery did not directly stimulate anxiety in the patients but the anxiety levels decreased with an increase in visual acuity postoperatively. With the effect of developments in technology, the success rate of cataract surgery is high and this was not seen to cause anxiety about the operation. It was determined that a high level of anxiety in the preoperative period increased the level of anxiety after cataract surgery even if visual acuity increased. Therefore, it can be considered important to identify patients with a high level of anxiety before cataract surgery and to provide the necessary support. Preoperative monitoring of the mental status of cataract patients and psychiatric follow-up if necessary would be useful.

The education level of patients can affect preoperative anxiety [32]. A low level of education increases anxiety about cataract surgery. In the current study findings, it was seen that the visual acuity values (logMAR) were significantly lower in patients receiving psychiatric treatment compared to those who were not. It should be kept in mind that the probability of reduced visual acuity because of cataract could be a reason directing anxious individuals to have earlier cataract surgery. It is known that mental status affects patients presenting for cataract surgery [16].

Limitations of this study were primarily the cross-sectional design and that it was conducted in a single center. Larger-scale studies will be able to clarify the results reached in this study. In addition, inclusion of patients who had previous cataract surgery in the other eye may affect the anxiety level of the patient [25], so inclusion of these patients in the study is one of our limitations. There is a need for further more extensive studies to be able to obtain more information about the relationship between preoperative and postoperative trait anxiety and visual acuity.

Conclusion

In conclusion, the sociodemographic data and visual acuity of patients undergoing cataract surgery can affect the preoperative and postoperative mental status of these patients. Identification of anxiety and the reasons for it in patients who are to undergo cataract surgery and interventions to the psychology of these patients will have a positive effect on the process of cataract surgery.

Ethical approval

Approval for this study was granted by the Non-Interventional Clinical Research Ethics Committee of Fırat University (decision no: 02-34, dated: 01.02.2024).

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