

# Anxiety and mood in patients receiving intravitreal injection

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**Abstract. – OBJECTIVE:** The goal of this study was to examine how anxious patients were before and after receiving intravitreal injections, which are commonly used in the treatment of ophthalmologic illnesses.

**SUBJECTS AND METHODS:** The study was performed by administering a questionnaire containing sociodemographic information as well as two scales (Beck Anxiety and State-Trait Anxiety Inventory) to patients undergoing intravitreal injection in the ophthalmology department. The two scales were given to patients before and after the intravitreal injection.

**RESULTS:** The patients who completed part of the study were 45% male and 55% female. There was a significant difference ( $p<0.001$ ) between the median values of STAI Trait anxiety inventory scores prior to intravitreal injection and STAI Trait anxiety inventory scores after intravitreal injection. The median values of STAI State anxiety inventory scores before intravitreal injection and after intravitreal injection differed ( $p<0.001$ ). There was a difference ( $p<0.001$ ) between the median values of Beck anxiety inventory scores before intravitreal injection and after intravitreal injection.

**CONCLUSIONS:** Patients who will have intravitreal injections may experience a high rate of anxiety before the treatment due to the invasive nature of the technique. As a result, intravitreal injection patients will benefit from psychological assistance and anxiety-reduction approaches.

*Key Words:*

Intravitreal injections, Anxiety, Mood.

## Introduction

Intravitreal injections (IVI) are now one of the most often utilized treatments for ophthalmologic disorders. The drugs are injected directly into the eye's internal structures, such as the retina and choroid, during this treatment. Intravitreal injections, which are routinely used to treat conditions

such as a wet form of age-related macular degeneration, diabetic retinopathy, and cystoid macular edema, aim to protect patients' vision but may have psychological consequences<sup>1-3</sup>.

Anxiety and mood are important factors in determining how medical treatments impact people. Intravitreal injections, in particular, which can be invasive and target the delicate anatomy of the eye, might cause patients to have elevated anxiety and emotional responses. The potential impact of these parameters on medication efficacy and patient compliance should be investigated. Few studies<sup>2-5</sup> have been conducted on the effect of intravitreal injections on anxiety and mood. The goal of this study is to examine how patients' anxiety and mood states change after getting intravitreal injections. Furthermore, we plan to study the potential effects of these changes on treatment outcomes and provide clinical practice and patient care recommendations.

The goal of this study is to learn more about how intravitreal injections affect patients' anxiety and mood. The findings may help us understand the influence of intravitreal injections on psychological health and promote patient adherence to this treatment method.

## Subjects and Methods

The study was performed by administering a questionnaire containing sociodemographic information as well as two scales (Beck Anxiety Inventory and State-Trait Anxiety Inventory) to patients undergoing intravitreal injection in the ophthalmology department. The two scales were given to patients before and after the intravitreal injection (for a minimum of one week and a maximum period of three months). Before beginning the project, the Adana City Training and Research Hospital Clinical Research Ethics Committee granted ethical permission on May

11, 2023, meeting No.: 126, decision No.: 2557. Before administering the questionnaire, all participants provided written informed consent.

Although invasive procedures may make patients anxious, the study was planned with the possibility that anxiety could have multiple causes. A follow-up on anxiety and mood has been scheduled after three months at the latest; two scales (Beck Anxiety Inventory and State-Trait Anxiety Inventory) were given to patients both before and after intravitreal injection in order to track changes in these variables. The consistency and reliability of anxiety and mood levels were also improved by employing two distinct scales. The objective was to ascertain, through the level difference between the scale results, the more significant and reliable impact of intravitreal injection intervention. Patients 18 years of age and younger were excluded from the study due to the possibility of abrupt, unclear, or meaningless changes in anxiety and mood levels in minors, which could result in inconsistent outcomes. People having a diagnosis of psychological diseases and those using psychiatric drugs were excluded from the study since anxiety and changes in mood cannot provide us precise and comprehensible results. Furthermore, the study excluded patients exhibiting incomplete data and inconsistent scales between the pre- and post-intravitreal injection periods. The research did not include patients who refused to participate in the study or who did not fill in completed informed consent forms.

Beck Anxiety Inventory (BAI) is a self-assessment scale established by Beck et al<sup>6</sup> that is used to determine the frequency with which individuals experience anxiety symptoms. It is a Likert-type scale with 21 items with a score range of 0-3. It is classified based on the score (0-63 points) (21>: mild, 22-35: moderate, >36: severe), and anxiety is assumed to increase as the score increases. Ulusoy et al<sup>7</sup> tested its validity and reliability in Turkey, and the internal consistency coefficient was found to be 0.93.

The State-Trait Anxiety Inventory (STAI) was invented by Spielberger et al<sup>8</sup> in 1970 and consists of two subscales, each containing 20 statements evaluating state and trait anxiety. The State Anxiety Inventory defines how an individual feels at a specific time and under specific conditions, whereas the Trait Anxiety Inventory represents how the individual feels on a regular basis. The scale's score ranges from 20 to 80 points, with high scores on each subscale indicating a high

rate of anxiety. The scale's Cronbach alpha value was between 0.83 and 0.92 for the State Anxiety Inventory and 0.86 and 0.92 for the Trait Anxiety Inventory. In 1983, Öner and Le Compte<sup>9</sup> conducted research on the scale's validity and reliability. The inventory reliability coefficient ranged from 0.83 to 0.87, test-retest reliability from 0.71 to 0.86, and item reliability from 0.34 to 0.72.

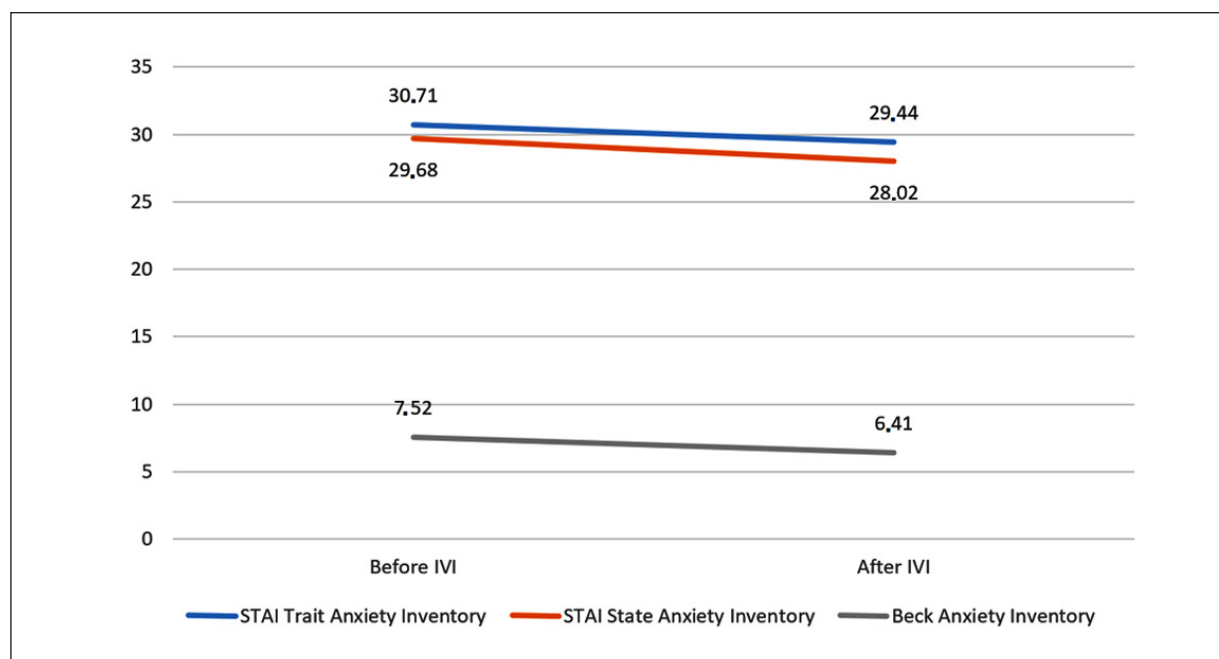
### **Statistical Analysis**

IBM SPSS v. 23 (IBM Corp., Armonk, NY) was used to collect data. The Kolmogorov-Smirnov test was used to determine if the data conformed to a normal distribution. The Wilcoxon test was employed to compare before and after data in paired groups that did not have a normal distribution. For categorical variables, the analysis findings were provided as frequency (%), mean standard deviation, and median (minimum-maximum). The significance level was set at  $p < 0.05$ .

## **Results**

Regarding gender, 45% were male and 55% were female. The study found that the average age was  $66.15 \pm 9.93$  years. Before intravitreal injection, the mean Beck anxiety inventory score was 7.52, and after intravitreal injection, the mean Beck anxiety inventory score was 6.41. In both periods, the maximum Beck anxiety inventory score was 21, and all patients were classed as mildly anxious. STAI Trait anxiety inventory intravitreal injection temperature scores averaged 30.71, while STAI Trait anxiety inventory post-intravitreal injection temperature scores averaged 29.44. The mean STAI State anxiety inventory scores before intravitreal injection were 29.68, while the mean STAI State anxiety inventory scores after intravitreal injection were 28.02 (Figure 1). Table I displays all sociodemographic data.

There was a significant difference ( $p < 0.001$ ) between the median values of STAI Trait anxiety inventory scores prior to intravitreal injection and after intravitreal injection. Before intravitreal injection, the median value was 29.5; after intravitreal injection, the median value was 29. There was a significant difference in the median values of STAI State anxiety inventory scores before and after intravitreal injection ( $p < 0.001$ ). Before intravitreal injection, the median was 29,



**Figure 1.** Median values of the scales. IVI: Intravitreal injection.

while after intravitreal injection, it was 27. There was a difference ( $p < 0.001$ ) between the median values of Beck anxiety inventory scores before and after intravitreal injection. The median was 7 before intravitreal injection and 6 after intravitreal injection (Table II). According to the STAI State-Trait anxiety inventory and Beck anxiety inventory scores, there was a significant and statistically significant decrease in anxiety levels after intravitreal injection. Gender, marital

status, educational position, and occupation had no effect on anxiety and mood when receiving intravitreal injection in the study.

## Discussion

Anxiety disorders and declining mood can be caused by several conditions. Individuals may differ from one another in certain situations,

**Table I.** Descriptive sociodemographic statistics.

		Frequency (n)	Percentage (%)
Gender	Male	45	45
	Female	55	55
Marital Status	Married	82	82
	Single	4	4
	Wife passed away	14	14
Health Assurance	Yes	95	95
	No	5	5
Education Status	Illiterate	21	21
	Primary education	36	36
	Secondary education	14	14
	High School	19	19
	University and above	10	10
Profession	Nurse/Midwife	1	1
	Teacher	3	3
	Officer	4	4
	Housewife	41	41
	Other	11	11
	Retired	40	40

**Table II.** Scale-based comparison of values before and after intravitreal injection.

Scale Score	Mean $\pm$ S.D.	Median (min-max)	Test statistic	<i>p</i> *
STAI Trait Anxiety Before IVI	30.71 $\pm$ 6.2	29.5 (20-46)	-4.408	< 0.001
STAI Trait Anxiety After IVI	29.44 $\pm$ 6.06	29 (20-46)		
STAI State Anxiety Before IVI	29.68 $\pm$ 6.09	29 (20-46)	-6.609	< 0.001
STAI State Anxiety After IVI	28.02 $\pm$ 6.08	27 (20-47)		
Beck Anxiety Before IVI	7.52 $\pm$ 5.75	7 (0-19)	-4.894	< 0.001
Beck Anxiety After IVI	6.41 $\pm$ 5.77	6 (0-21)		

\*The Wilcoxon signed-rank test. S.D.: Standard Deviation, Min: Minimum, Max: Maximum, IVI: Intravitreal injection.

and each person may react differently. A number of common circumstances can lead to anxiety and a worsening of mood, including stressful life events (such as losses like death, separation, divorce, career-related challenges like job loss or job change, financial issues, and economic instability)<sup>10</sup>. Genetic and biological factors may also contribute to anxiety disorders and worsening of mood, in addition to experiencing traumatic events such as major accidents, natural disasters, assaults, and sexual, physical, or emotional abuse during childhood<sup>11,12</sup>. Anxiety and mood can also be impacted by pain, suffering, and chronic diseases. The impact of health conditions on human psychology is also readily apparent. We compared the anxiety and mood levels before and after the intravitreal injection treatment to obtain more accurate results. This made it possible for us to take into consideration any scenario that could affect a person's mental health<sup>13</sup>.

Although intravitreal injections are an effective treatment for eye illnesses, they might have an impact on patients' anxiety and mood. Hereafter, we analyze the impact of intravitreal injections on patients' psychological well-being and examine the topic in a broader context by analyzing research findings. Several studies<sup>14-17</sup> have found that intravitreal injections can produce more anxiety in patients who have been notified that they will be receiving intravitreal injections. Associating injections, an invasive operation, with physical discomfort and concerns about the delicate structure of the eye may lead to a high rate of anxiety in patients. This can have a detrimental impact on medication adherence and raise patients' stress levels. Furthermore, the requirement to repeat injections on a frequent basis may lead to patients viewing intravenous injections as a persistent source of stress throughout the treatment process<sup>14,15</sup>. In our investigation, we discovered that patients' anxiety levels fell dramatically and statistically significantly after receiving intravitreal injections.

However, the effects of intravitreal injections on mood remain debatable. While some studies<sup>16,17</sup> indicate that injections have no effect on patients' psychological well-being, others<sup>18</sup> imply that mood changes may occur depending on the medication. These discrepancies are thought to vary depending on factors such as patients' personal features, reactions to treatment, and psychosocial support. Changes in anxiety levels were examined in addition to trait and state anxiety levels in our study, allowing us to reach a more explanatory conclusion.

Berger et al<sup>19</sup> found that the intravitreal injection process was related to a temporary increase in systolic and diastolic blood pressure, pulse rate, and oxygen saturation before and after intravitreal injection. The primary reason for the increase was anxiety linked to receiving an injection, which can be a risk factor for cardiovascular or cerebrovascular complications. This can be particularly concerning for patients who are at greater risk for such events and receive multiple injections. Similarly, anxiety levels in patients decreased after intravitreal injection in our study. This shows that psychological support, precise information, and an appropriate physical setting prior to intravitreal injection may be strategies that can make the patient feel more at ease.

Kayıkcioglu et al<sup>20</sup> examined intravitreal injection patients using the STAI State-Trait anxiety inventory measure, which is the same measure we utilized. In contrast to our findings, state-trait anxiety levels were higher in experienced patients than in individuals receiving intravitreal injection for the first time, although this difference was not statistically significant. Moreover, similar to earlier studies<sup>15,16,20</sup> that identified no statistically significant distinction in state and trait anxiety scores among male and female participants, as well as between working and retired patients, our study revealed no impact of gender,

marital status, educational background, or occupation on anxiety and mood following intravitreal injection.

Segal et al<sup>21</sup> employed the visual analog scale for anxiety (VASA) to demonstrate that intravitreal injection enhanced pre-procedural anxiety and subjective discomfort. Studying ways to reduce anxiety during outpatient intravitreal injections may be interesting because it can lower discomfort. A study<sup>21</sup> that offered multiple recommendations on this subject produced similar results to ours.

## Conclusions

The effects of intravitreal injections on anxiety and mood states in patients are complex and multidimensional. Although the consistency of the findings in the research is insufficient, it is reasonable to state that injections may have an impact on the psychological health of patients. As a result, when developing treatment regimens, ophthalmologists must consider their patients' psychological needs. Understanding how the treatment procedure impacts the anxiety levels of patients may be a crucial step toward establishing better patient management strategies.

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### Conflict of Interest

The Authors declare that they have no conflict of interests.

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### Acknowledgements

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### Ethics Approval

Before beginning the project, the Adana City Training and Research Hospital Clinical Research Ethics Committee granted ethical permission on May 11, 2023, meeting No.: 126, decision No.: 2557.

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### Informed Consent

Before administering the questionnaire, all participants provided written informed consent.

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### Availability of Data and Materials

All data necessary to support the protocol are available upon reasonable request.

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### Authors' Contribution

IF and BK wrote the main manuscript text, tables, and figures. BK provided the resources. BK conducted the investigation. IF worked on data curation. BK and IF worked on the conceptualization of the study. All authors approved the publication.

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