Review Article

Psychiatric aspects of ophthalmic disorders: A narrative review

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Ophthalmic disorders have psychiatric aspects associated with them at various levels. Psychological factors have a well-documented role in the causation, aggravation, and maintenance of various ophthalmic conditions, including glaucoma, central serous retinopathy, dry eye disease, and retinitis pigmentosa. Many ophthalmic conditions, including blindness, have psychological manifestations as well, which need to be addressed, in addition to the ophthalmic pathology. There is also significant overlap in the treatment of the two disciplines in many ways. For instance, many ophthalmic drugs have psychiatric side effects. Even ophthalmological surgeries have psychiatric aspects associated with them, which primarily include black patch psychosis and anxiety in the operation theater. This review will be useful for psychiatrists and ophthalmologists, for their clinical practice and research. Future research should focus on this interface to give it its well-deserved attention.

Key words: Black patch psychosis, blindness, dry eye disease, glaucoma, psychiatric manifestations

Access this article online

Website: https://journals.lww.com/ijo

DOI: 10.4103/ijo.IJO_2101_22

Quick Response Code:

Liaison is the heart of clinical practice; however, the contact between the disciplines of ophthalmology and psychiatry is one of the least discussed ones in literature. One of the earliest recorded liaisons of this nature probably dates back to the 1950s, when the patient described had a psychosis-like picture following cataract surgery.[1] The psychiatrists proposed that it could be caused due to sensory deprivation, which led to the revision of postoperative management techniques to prevent disturbances of mental state following surgery.[2] These practices are followed even six decades later, and it goes to show that such liaisons benefit not just in the short term, but are fruitful in the long run as well.

Numerous studies have underlined the importance of the association between the disciplines of psychiatry and ophthalmology. For example, the authors of a recent Taiwanese study opined that awareness needs to be raised for psychiatric disorders during ophthalmology follow-up and vice versa.[3]

This review aimed to collate literature focusing on the bidirectional relationship between the two branches of medicine – ophthalmology and psychiatry – with the hope that this information will aid the practitioners from both these disciplines to apply the same in both research and clinical practice.

Psychological Causation of Ophthalmic Diseases

Psychological factors play a key role in the causation, aggravation, and maintenance of many ophthalmological conditions,[4] a few of which have been discussed here.

Glaucoma

Psychological stress has been shown to have a minor but statistically significant effect on intraocular pressure (IOP).[5] Stress can alter the IOP in people with closed-angle glaucoma, which is also affected by their emotional state. Because IOP is a key indicator of closed-angle glaucoma, it is possible that lowering stress can help patients manage their symptoms. Stress may also have an impact on IOP.[6] According to the results of a recent systematic review of 12 studies, glaucoma patients were more likely to have a "negative" personality, which the authors defined as having nervousness, poor health, hysteria, and depression.[7] It has also been shown that anxiety causes a faster decline in the retinal nerve fiber layer thickness.[8] A decline in the quality of life and mental health status of glaucoma patients is linked to the progression of visual impairment in them.[9]

However, raised intraocular tension is not the sole psychological mechanism for causing glaucoma, as stress is known to be one of the major causes of normal tension glaucoma as well.[4]

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Received: 27-Aug-2022 Revision: 29-Dec-2022
Accepted: 23-Jan-2023 Published: 17-May-2023

Cite this article as: Mamtani NH, Mamtani HG, Chaturvedi SK. Psychiatric aspects of ophthalmic disorders: A narrative review. Indian J Ophthalmol 2023;71:1810-5.

Central serous chorioretinopathy

Stress, sleep difficulties, and the use of psychopharmacological substances are all well-known risk factors for central serous chorioretinopathy (CSCR).[10,11] Catecholamines and glucocorticoids, which are known to be mediators of psychological stress, are responsible for changes in choroidal blood flow autoregulation and the development of CSCR.[12,13]

Interestingly, certain characteristics of temperament and personality have been shown to be associated with CSCR. These include emotional dissociation, low cooperativeness, decreased frustration tolerance, emotional instability, insecurity, along with traits of type A personality (competitiveness, sense of urgency, aggressive nature, and hostility).[14,15]

A greater number of significant life events, negative coping mechanisms, and psychosomatic difficulties in individuals with CSCR further point toward the role of psychological factors in their pathology.[16]

Dry eye disease

Dry eye disease (DED) has been found to be associated with sleep disorders, anxiety, depression, schizophrenia, posttraumatic stress disorder (PTSD), and mood swings.[17,18] It has also been shown that drugs used for mental illnesses may themselves contribute to DED.[18,19]

Depression has been consistently described to be linked with DED in literature. Several factors may underpin this link. While the exact pathways are unknown, the pathophysiology of the two disorders may be similar. Both diseases share common risk factors such as female sex and menopause.[20] Inflammation also plays an important role in the development of DED,[21] and the anti-inflammatory properties of omega-3 polyunsaturated fatty acids (PUFAs) have been demonstrated to aid in the relief of dry eye symptoms and signs.[22] Studies have also shown that chronic or long-term depression can increase both acute and chronic proinflammatory cytokine production,[23] which can thereby worsen the symptoms of DED.

Interestingly, it has been noted that the degree of subjective ocular symptoms does not match with the severity of the signs in DED, which could be attributed in part to decreased corneal sensibility caused by prolonged activation of the neural reflex arc.[24] However, individual pain perception, as well as depression and anxiety, can also contribute to this discrepancy.[25]

Retinitis pigmentosa

Psychological stress has been recognized as one of the triggers for the promotion of photopsia,[26] commonly found in retinitis pigmentosa (RP).

Psychological Manifestations of Ophthalmological Diseases

Ophthalmological conditions can also manifest with psychological symptoms, most of which can be explained as being secondary to the underlying disorder. It is important to address these as well, as we saw how these manifestations can result in maintenance and, in some cases, even further worsening of the underlying ophthalmological condition.

Blindness and visual impairment

Ophthalmologists typically encounter many cases of visual impairment and blindness. Even though the underlying pathology might not be related to the mind directly, it can certainly have a secondary impact on one's psyche. Losing one's vision can be a devastating experience. It can also have significant psychosocial ramifications that impair daily life. Visual impairment is likely to impede mobility and access to social contacts, as well as render people unable to work or engage in previously pleasurable activities. This can lead to social isolation, disengagement, loneliness, and a loss of social support. Hence, confronting the disability alone is a big factor in making people with blindness feel dejected and desolated.[27] Because of their incompetence in comparison to healthy people, people with blindness may experience inferiority complex, anxiety, melancholy, and other psychological issues.[28] In an attempt to deal with the daily obstacles of life, visually impaired people experience a wide range of emotions such as fear, rage, frustration, and denial.[29] They were also discovered to be more worried, depressed, and addicted to substances.[30] Understandably, they are more likely to have sleep–wake pattern disorders.[31]

The psychological reaction to blindness has been described in stages of disbelief, protest, depression, and resolution, also called the "blindness reaction."[32] It is similar to the stages of grief, implying that loss of vision can be conceptualized as mourning in many ways.

In the pediatric population, this problem becomes even more complex. Visual impairment causes additional repercussions in them, such as developmental delays and learning difficulties. Children with blindness have been reported to have autistic-like developmental symptoms, such as difficulties with social interaction and communication, emotional expression and recognition, symbolic and functional play, along with stereotypies.[33] It has been shown that the facial expressions of individuals with visual impairment are less compared to their sighted counterparts.[34]

In rare cases, progressive diminution of vision can be linked to a hallucination syndrome, which can be distressing to patients. Complex visual hallucinations with insight commonly occur in visually impaired, cognitively intact individuals due to acquired visual impairment and are unrelated to their chronological age.[35] These perceptual experiences have been described as Charles Bonnet syndrome, named after the person who first described the phenomenon in his grandfather who was suffering from cataract.[36]

In people who recently turned blind, phenomena of visual hallucinations, repeated subjective reactions to dreaming, and waking experiences have been observed, which, put together, has been conceptualized as an equivalent of "phantom limb phenomenon."[37]

Some cataract patients have been found to have spatial recall difficulties, with the patient distorting his or her surroundings to resemble the patient's own house.[38] In addition, there have also been reports of paranoid and hypochondriac reactions, which have been interpreted as attempts to hide blindness and helplessness.[38]

Visual distortions

Photopsia and dysmegalopsia are among the common visual phenomena that have been described in association with various conditions. These are nonspecific symptoms that can accompany a wide range of illnesses with a variety of etiologies.

Here, we shall look at a few of the ophthalmological conditions associated with these phenomena.

Photopsias (also referred to as phosphenes) are simple visual pseudohallucinations that consist of unformed geometric shapes or light phenomena. These have been described as a swarm of flickering, pulsating, or shimmering lights in photoreceptor illness, like RP. RP patients with more severe visual impairment have greater photopsias, as these are more common in the absence of light and visual cues. Photopsias are considered to be a result of spontaneous activity in the degenerating retinal cells, which occur due to remodeling of the inner retina in RP. When the typical interaction between the formation of an action potential, discharge, and inhibition is disrupted, undamaged neurons are more likely to discharge spontaneously due to a lack of afferent signals.[39]

Dysmegalopsia is a term used to describe objects that are perceived to be larger (or smaller) on one side than the other, or simply any change in perceived size.[40] It can be seen in retinal pathologies, disorders of accommodation, and convergence.[40]

Visual deceptions

Illusions and hallucinations are the two classical types of deceptions described in psychopathology literature.[40]

Illusions most commonly occur in the visual modality.[40] These can occur in healthy people; however, they are more common in those with neurological conditions. Although precise localization and determination of an etiology are impossible in most situations, lesions in the occipital and occipitotemporal regions near the visual pathway are usually involved.[39]

Hallucinations are either unformed or formed. An occipitotemporal location is suggested by complex hallucinations.[39] Whether they appear throughout the visual field or only in the hemifield could be crucial in determining etiology.[39]

Visual hallucinations have also been described in the context of sensory deprivation. There have been reports on the impact of social isolation and a lack of variety in information output on people such as truck drivers who spend long hours traveling alone, explorers at sea, prisoners, patients on respirators, and experimental subjects. The manifestations comprise sleepiness, irritability, fantasizing, and intense visual and auditory hallucinations.[38]

Age-related macular degeneration

A prevalent cause of vision impairment and blindness in the elderly, age-related macular degeneration (AMD) has a significant impact on their quality of life. Increased functional disability is the most typical negative effect of AMD-related vision impairment.[41] As a result of this, the sufferers are more likely to experience mental health issues such as depression and anxiety.[42]

Dry eye disease

DED can cause chronic irritation and vision impairment, which can be bothersome and even aggravate depression.[43] In DED, sleep disturbances are widespread, affecting almost half of the patients. These can be devastating, affecting sleep in a variety of ways, including extended sleep latency, short duration, and poor subjective quality.[44] Disrupted sleep could be caused by a variety of factors. Sleep disturbances are linked to primary Sjögren's syndrome. The discomfort caused by nocturnal eye exposure could be a factor. Depression is a substantial contributing factor, and the poor sleep that is commonly associated with depression may be aggravated by the other causes in DED, resulting in reciprocal effects that worsen both DED and the depression symptoms. Because DED and depression frequently coexist, treatment for one has an impact on the management of the other. Dry eyes can be caused by and exacerbated by antidepressants. This was more noticeable with tricyclic antidepressants' anticholinergic effects, but it also happens with Serotonin and Norepinephrine Reuptake Inhibitors (SNRIs) and Selective Serotonin Reuptake Inhibitors (SSRIs) without recognized anticholinergic effects.[45]

Glaucoma

Glaucoma has been associated with a greater risk of developing major depressive disorder, bipolar disorder, and schizophrenia in the future.[3] A neurodegenerative pathway was postulated to be a common link between glaucoma and psychiatric illnesses.[3]

Retinitis pigmentosa

A Korean study established that individuals with RP had poorer mental health compared to healthy controls.[46] People with RP were four times more likely to have a diagnosis of depression and anxiety disorders compared to the general population.[47] An Iranian study of over 400 RP patients found a high prevalence of the obsessive compulsive disorder, schizophrenia, antisocial personality, paranoia, hypochondriasis, depression, hysteria, and hypomania.[48]

Ophthalmic Drugs Causing Psychiatric Side Effects

It is noteworthy that medications used for ophthalmologic conditions can also have psychiatric adverse effects, and the important ones among these are described here.

Beta-blockers

The link of central nervous system adverse effects with oral beta-blockers was first published about a decade before the topical antiglaucoma drug timolol was introduced. Depression and psychosis were among the side effects. Such occurrences were also documented in human volunteers who were otherwise healthy.[49] Depression, psychosis, confusion, and hallucinations have all been documented as side effects of topical ophthalmic timolol treatment. It is worthwhile to note that topical ocular timolol may cause rapid changes in mental status or the emergence of common psychiatric illnesses like depression. Once the use of the medicine is stopped, these side effects normally subside within a week's time.[50]

Anticholinergics

Anticholinergics are commonly used as cycloplegics in ophthalmologic practice. Even though psychiatric side effects are rare with topical forms, still psychosis and delirium have been reported with them.[51,52] Central anticholinergic syndrome has also been described,[53] the manifestations of which include psychotic symptoms.

Corticosteroids

Corticosteroids have been linked to a wide array of psychological side effects. Symptoms such as euphoria, sleeplessness,

mood swings, personality changes, severe depression, and psychosis (also known as corticosteroid-induced psychosis) have been reported in 5%–18% of individuals who have been given corticosteroids.[54] Among these, manic (35%), depressive (28%), and psychotic (24%) symptoms are the most commonly reported ones.[55]

While symptoms usually appear 11 days after starting corticosteroid therapy, they can appear at any time, including after the treatment has been completed or discontinued.[56] A high dose of corticosteroids is the primary risk factor for developing corticosteroid-induced psychosis, with the risk increasing among patients taking 40 mg or more of prednisone or its equivalent daily; psychiatric adverse effects occur in 1.3% of cases when the dose is less than 40 mg daily and 18.4% of cases when the dose is 80 mg daily.[57]

The majority of case reports cite atypical antipsychotics and lithium as effective treatments for corticosteroid-induced psychosis.[56]

Conversely, discontinuing long-term glucocorticoid medication is linked to an increased risk of depression as well as delirium or confusion, with older persons having a larger risk of delirium or confusion.[58]

Alpha-agonists

By virtue of their lipophilic nature and their ability to cross the blood–brain barrier, alpha-agonists may lead to central nervous system symptoms such as lethargy and drowsiness.[59]

Carbonic anhydrase inhibitors

Carbonic anhydrase inhibitors are used for the management of glaucoma. They are implicated in the causation of depression, delirium, and anorexia.[60]

Psychological Aspects Associated with Ophthalmological Surgical Procedures

Black patch psychosis

Black patch psychosis, also called black patch delirium, is a postoperative condition, commonly characterized by restlessness, hyperactivity, anxiety, anger, and confusion. Mania, delusions, and auditory and visual hallucinations are less-common manifestations of this entity.[1] In most cases, the psychotic symptoms resolve once the ocular bandage is removed.[38]

It has been conceptualized as a faulty adaptation to the psychological stress of visual deprivation and loss of perceptual and conceptual cues.[1] Interestingly, it has been noted that multiple sensory interferences like associated impaired hearing can make a person more susceptible to postoperative psychosis.[61] Routine use of sedative medicines before and after surgery has been known to contribute to increased chances of development of postoperative delirium in general.[62]

Postoperative visual contact with the surroundings, early ambulation, an appropriate meal, and early discharge from the hospital can be useful in preventing such complications. Sedation, reassurance, and, if required, physical restraint can be used to manage postoperative psychosis and prevent harm to the operated eye.[38]

Anxiety in the operation theater

Surgery can prove to be a stressful event, which can lead to psychological reaction of anxiety. However, in addition, it might also cause physiological changes related to sympathetic arousal, like tachycardia, hypertension, hyperventilation, tensed muscles, tremulousness, and sweating.[63] There are reports that preoperative anxiety and cardiovascular medical history in combination with prolonged ultrasound during cataract phacoemulsification are significantly more often associated with intraoperative complications.[64]

Although the treating ophthalmic surgeon may not realize it, passing through various stages of eye surgery can create significant distress and anxiety in the patient. This fear and anxiety can have a multitude of causes. The main ones include the fear of surgery, such as the fear that the procedure will be painful, fear of failure, and fear of possible deterioration or loss of vision. Patients also have the fear of moving their head or eye during surgery, coughing, or not being able to cooperate with the surgeon.[65] It is also believed that in ophthalmic surgery, the fear of being blind is analogous to the fear of death associated with major surgery.[65]

The thought of the needle prick with the local anesthetic around one's eyes can itself be anxiety provoking for a person, whereas the commonest worry about a general anesthetic is that of not waking up. Fear of needle pain at the puncture site, being awake during surgery, paralysis, and backache are some of the most common fears observed.[66]

Tomophobia, also known as "blood–injection–injury" type phobia, is characterized by fear of witnessing blood, becoming injured, receiving an injection, or any other invasive procedure.[67] This phobia is characterized by a combination of fear and disgust.[68] Syncope is a common symptom of blood–injection–injury fear, which distinguishes it from other phobia subtypes.[67]

When the second eye is operated upon, patients who had an uncomplicated and easy surgery in one eye are often calm and well. In a study by Heard *et al*.,[69] over 60% of individuals who were extremely or very anxious during their first cataract surgery were not anxious during their second one.

Spending time with the patient to discover the causes and circumstances that influence preoperative worries and anxiety can be quite beneficial. In addition to the ophthalmologists, other health-care providers, such as nurses, social workers, psychologists, health-care educators, and occupational therapists, can improve communication with patients in the leadup to surgery.[70]

Conclusion

As seen in this review, many aspects connect the branches of ophthalmology and psychiatry. Ophthalmologists need to be aware of the psychiatric aspects of ophthalmic disorders to facilitate early detection and liaison with psychiatrists.

Even though there have been numerous developments concerning the interface between psychiatry and ophthalmology, there is ample scope for further research in this emerging area. It would be interesting to have studies determining the extent of liaison that is happening between psychiatrists and ophthalmologists at various types of institutes, with insights

into the kind of referrals that are being made. This data can be used in the formulation of appropriate management guidelines for both specialties. Research elucidating the exact pathogenesis of psychiatric manifestations of ophthalmic disorders can also provide targets of intervention for the management of these manifestations.

The aforementioned associations between various aspects of psychiatry and ophthalmology call for a recognition of this convergence. Similar reviews have been published in the past;[38,71] however, we are still far from giving this interface the attention that it deserves. The recognition of the branch of "psycho-ophthalmology" will not only add to the research in this ever-evolving branch, but also encourage more professional communications between the two specialties, which will ultimately benefit the patients.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Weisman AD, Hackett TP. Psychosis after eye surgery; establishment of a specific doctor-patient relation in the prevention and treatment of black-patch delirium. N Engl J Med 1958;258:1284-9.
2. Kornfeld DS. Consultation-liaison psychiatry: Contributions to medical practice. Am J Psychiatry 2002;159:1964-72.
3. Liu CH, Kang EYC, Lin YH, Wu WC, Liu ZH, Kuo CF, *et al*. Association of ocular diseases with schizophrenia, bipolar disorder, and major depressive disorder: A retrospective case-control, population-based study. BMC Psychiatry 2020;20:486.
4. Grieshaber MC, Mozaffarieh M, Flammer J. What is the link between vascular dysregulation and glaucoma? Surv Ophthalmol 2007;52(Suppl 2):S144-54.
5. Jiménez R, Vera J. Effect of examination stress on intraocular pressure in university students. Appl Ergon 2018;67:252-8.
6. Shily BG. Psychophysiological stress, elevated intraocular pressure, and acute closed-angle glaucoma. Am J Optom Physiol Opt 1987;64:866-70.
7. Tan Z, Tung TH, Xu SQ, Chen PE, Chien CW, Jiang B. Personality types of patients with glaucoma. Medicine (Baltimore) 2021;100:e25914.
8. Shin DY, Jung KI, Park HYL, Park CK. The effect of anxiety and depression on progression of glaucoma. Sci Rep 2021;11:1-10.
9. Kumar S, Ichhpujani P, Singh R, Thakur S, Sharma M, Nagpal N. The impact of primary open-angle glaucoma: Quality of life in Indian patients. Indian J Ophthalmol 2018;66:416-9.
10. Gelber GS, Schatz H. Loss of vision due to central serous chorioretinopathy following psychological stress. Am J Psychiatry 1987;144:46-50.
11. Yannuzzi LA. Type-A behavior and central serous chorioretinopathy. Retina 1987;7:111-31.
12. Lucassen PJ, Pruessner J, Sousa N, Almeida OFX, Van Dam AM, Rajkowska G, *et al*. Neuropathology of stress. Acta Neuropathol 2014;127:109-35.
13. Kim HM, Ahn J, Kim TW. Psychological factors associated with central serous chorioretinopathy. J Psychol Psychother 2016;6:250. doi: 10.4172/2161-0487.1000250.
14. Conrad R, Geiser F, Kleiman A, Zur B, Karpawitz-Godt A. Temperament and character personality profile and illness-related stress in central serous chorioretinopathy. ScientificWorldJournal 2014;2014:631687.
15. Spahn C, Wiek J, Burger T, Hansen L. Psychosomatic aspects in patients with central serous chorioretinopathy. Br J Ophthalmol 2003;87:704-8.
16. Lahousen T, Painold A, Luxenberger W, Schienle A, Kapfhammer HP, Ille R. Psychological factors associated with acute and chronic central serous chorioretinopathy. Nord J Psychiatry 2016;70:24-30.
17. Yu J, Asche CV, Fairchild CJ. The economic burden of dry eye disease in the United States: A decision tree analysis. Cornea 2011;30:379-87.
18. Kaštelan S, Bakija I, Bogadi M, Orešković I, Kasun B, Gotovac M, *et al*. Psychiatric disorders and dry eye disease-A transdisciplinary approach. Psychiatr Danub 2021;33(Suppl 4):580-7.
19. Singh L, Singh V, Yadav S, Garg P. Mental health status in dry eye disease – A case control study. Eur Ophthalmic Rev 2018;12:56.
20. Freeman EW. Associations of depression with the transition to menopause. Menopause 2010;17:823-7.
21. Research in dry eye: Report of the Research Subcommittee of the International Dry Eye WorkShop (2007). Ocul Surf 2007;5:179-93.
22. Rashid S, Jin Y, Ecoiffier T, Barabino S, Schaumberg DA, Dana MR. Topical omega-3 and omega-6 fatty acids for treatment of dry eye. Arch Ophthalmol 2008;126:219-25.
23. Lutgendorf SK, Garand L, Buckwalter KC, Reimer TT, Hong SY, Lubaroff DM. Life stress, mood disturbance, and elevated interleukin-6 in healthy older women. J Gerontol A Biol Sci Med Sci 1999;54:M434-9.
24. Bourcier T, Acosta MC, Borderie V, Borrás F, Gallar J, Bury T, *et al*. Decreased corneal sensitivity in patients with dry eye. Invest Ophthalmol Vis Sci 2005;46:2341-5.
25. Vriezekolk JE, Geenen R, Hartkamp A, Godaert GLR, Bootsma H, Kruize AA, *et al*. Psychological and somatic predictors of perceived and measured ocular dryness of patients with primary Sjögren's syndrome. J Rheumatol 2005;32:2351-5.
26. Bittner AK, Diener-West M, Dagnelie G. A survey of photopsias in self-reported retinitis pigmentosa: Location of photopsias is related to disease severity. Retina 2009;29:1513-21.
27. Bhagotra S, Sharma AK, Raina B. Psycho-social adjustments and rehabilitation of the blind. Soc Med 2008;10:48-52.
28. Lindo G, Nordholm L. Adaptation strategies, well-being, and activities of daily living among people with low vision. J Vis Impair Blind 1999;93:434-46.
29. Hodge S, Barr W, Bowen L, Leeven M, Knox P. Exploring the role of an emotional support and counselling service for people with visual impairments. Br J Vis Impair 2013;31:5-19.
30. Singh N. Psychological impact of visual impairment and the miracle of the bionic eye. MOJ Appl Bionics Biomech 2019;3:98-100.
31. Arendt J, Aldhous M, Wright J. Synchronisation of a disturbed sleep-wake cycle in a blind man by melatonin treatment. Lancet 1988;1:772-3.
32. O'Malley TP, Newmark TS, Rothman MI, Strassman HD. Emotional aspects of cataract surgery. Int J Psychiatry Med 1989;19:85-9.
33. Cass HD, Sonksen PM, McConachie HR. Developmental setback in severe visual impairment. Arch Dis Child 1994;70:192-6.
34. Galati D, Miceli R, Sini B. Judging and coding facial expression of emotions in congenitally blind children. Int J Behav Dev 2001;25:268-78.
35. Menon GJ. Complex visual hallucinations in the visually impaired: A structured history-taking approach. Arch Ophthalmol 2005;123:349-55.
36. Schadlu AP, Schadlu R, Shepherd JB. Charles Bonnet syndrome: A review. Curr Opin Ophthalmol 2009;20:219-22.

37. Fitzgerald RG. Reactions to blindness. An exploratory study of adults with recent loss of sight. Arch Gen Psychiatry 1970;22:370-9.
38. Rajsekar K, Rajsekar YL, Chaturvedi SK. Psycho ophthalmology: The interface between psychiatry and ophthalmology. Indian J Psychiatry 1999;41:186-96.
39. Kölmel HW. Visual illusions and hallucinations. Baillieres Clin Neurol 1993;2:243-64.
40. Casey P, Kelly B. Fish's Clinical Psychopathology: Signs and Symptoms in Psychiatry. Cambridge, United Kingdom: Cambridge University Press; 2019.
41. Casten RJ, Rovner BW. Update on depression and age-related macular degeneration. Curr Opin Ophthalmol 2013;24:239-43.
42. Hayman KJ, Kerse NM, La Grow SJ, Wouldes T, Robertson MC, Campbell AJ. Depression in older people: Visual impairment and subjective ratings of health. Optom Vis Sci 2007;84:1024-30.
43. Miljanović B, Trivedi KA, Dana MR, Gilbard JP, Buring JE, Schaumberg DA. Relation between dietary n-3 and n-6 fatty acids and clinically diagnosed dry eye syndrome in women. Am J Clin Nutr 2005;82:887-93.
44. Ayaki M, Tsubota K, Kawashima M, Kishimoto T, Mimura M, Negishi K. Sleep disorders are a prevalent and serious comorbidity in dry eye. Invest Ophthalmol Vis Sci 2018;59:DES143-50.
45. Koçer E, Koçer A, Özsütçü M, Dursun AE, Krpnar İ. Dry eye related to commonly used new antidepressants. J Clin Psychopharmacol 2015;35:411-3.
46. Kim S, Shin DW, An AR, Lee CH, Park JH, Park JH, *et al*. Mental health of people with retinitis pigmentosa. Optom Vis Sci 2013;90:488-93.
47. Le P, Nguyen M, Vu T, Dao DP, Olson D, Zhang AY. Anxiety and depression in patients with retinitis pigmentosa. J Vitreoretin Dis 2021;5:114-20.
48. Adhami-Moghadam F, Iran-Pour E. Psychological disorders in patients with retinitis pigmentosa in Iran. Iran J Public Health 2014;43:523-8.
49. Bourgeois JA. Depression and topical ophthalmic beta adrenergic blockade. J Am Optom Assoc 1991;62:403-6.
50. Shore JH, Fraunfelder FT, Meyer SM. Psychiatric side effects from topical ocular timolol, a beta-adrenergic blocker. J Clin Psychopharmacol 1987;7:264-7.
51. Ferris A, Mohamed B, Thomas C. Eye drop psychosis in Parkinson's disease: A cautionary tale. Prog Neurol Psychiatry 2018;22:11-4.
52. Mirshahi A, Kohnen T. Acute psychotic reaction caused by topical cyclopentolate use for cycloplegic refraction before refractive surgery: Case report and review of the literature. J Cataract Refract Surg 2003;29:1026-30.
53. Panchasara A, Mandavia D, Anovadiya AP, Tripathi CB. Central anti-cholinergic syndrome induced by single therapeutic dose of atropine. Curr Drug Saf 2012;7:35-6.
54. Cerullo MA. Corticosteroid-induced mania: Prepare for the unpredictable. Curr Psychiatry 2006;5:43-50.
55. Sirois F. Steroid psychosis: A review. Gen Hosp Psychiatry 2003;25:27-33.
56. Gagliardi JP, Muzyk AJ, Holt S. When steroids cause psychosis. Rheumatologist 2010;4:40.
57. The Boston Collaborative Drug Surveillance Program. Acute adverse reactions to prednisone in relation to dosage. Clin Pharmacol Ther 1972;13:694-8.
58. Fardet L, Nazareth I, Whitaker HJ, Petersen I. Severe neuropsychiatric outcomes following discontinuation of long-term glucocorticoid therapy: A cohort study. J Clin Psychiatry 2013;74:e281-6.
59. Bowman RJC, Cope J, Nischal KK. Ocular and systemic side effects of brimonidine 0.2% eye drops (Alphagan) in children. Eye (Lond) 2004;18:24-6.
60. Stoudemire A, Houpt JL. Carbonic anhydrase inhibitors: An underrecognized cause of psychiatric symptoms. Psychiatr Med 1983;1:353-5.
61. Ziskind E, Jones H, Filante W, Goldberg J. Observations on mental symptoms in eye patched patients: Hypnagogic symptoms in sensory deprivation. Am J Psychiatry 1960;116:893-900.
62. Wilson JE, Mart MF, Cunningham C, Shehabi Y, Girard TD, MacLullich AMJ, *et al*. Delirium. Nat Rev Dis Primers 2020;6:1-26.
63. Obuchowska I, Konopinska J. Fear and anxiety associated with cataract surgery under local anesthesia in adults: A systematic review. Psychol Res Behav Manag 2021;14:781-93.
64. Pérez-Campagne E, Basdekidou C, Petropoulos IK, Noachovitch B, Moubri M. Impact of preoperative and intraoperative factors in cataract surgery. Klin Monbl Augenheilkd 2013;230:326-9.
65. Obuchowska I, Ługowska D, Mariak Z, Konopińska J. Subjective opinions of patients about step-by-step cataract surgery preparation. Clin Ophthalmol 2021;15:713-21.
66. Wu CL, Naqibuddin M, Fleisher LA. Measurement of patient satisfaction as an outcome of regional anesthesia and analgesia: A systematic review. Reg Anesth Pain Med 2001;26:196-208.
67. Gerlach AL, Spellmeyer G, Vögele C, Huster R, Stevens S, Hetzel G, *et al*. Blood-injury phobia with and without a history of fainting: Disgust sensitivity does not explain the fainting response. Psychosom Med 2006;68:331-9.
68. Koch MD, O'Neill HK, Sawchuk CN, Connolly K. Domain-specific and generalized disgust sensitivity in blood-injection-injury phobia: The application of behavioral approach/avoidance tasks. J Anxiety Disord 2002;16:511-27.
69. Heard JA, Zacarias AAG, Lawrence AT, Stoicea N, Palettas M, Fiorda-Diaz J, *et al*. A prospective observational cohort study to evaluate patients' experience during sequential cataract surgery under monitored anesthesia care and topical anesthesia. Medicine (Baltimore) 2020;99:e21834.
70. Marback R, Temporini E, Kara Júnior N. Emotional factors prior to cataract surgery. Clinics (Sao Paulo) 2007;62:433-8.
71. Sadykov E, Studnička J, Hosák L, Siligardou MR, Elfurjani H, Hoikam JL, *et al*. The interface between psychiatry and ophthalmology. Acta Medica (Hradec Kralove) 2019;62:45-51.