# Comparison of Depression in Low Vision Patients and Normal Vision Patients

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## ABSTRACT

*Objective:* To compare the frequency of depression in low vision and normal vision patients.

*Study Design:* Comparative cross-sectional study.

*Place and Duration of Study:* Eye Department, Combined Military Hospital, Malir Cantt, Karachi Pakistan, from Dec 2017 to May 2019.

*Methodology:* Patients with low vision and normal vision were evaluated for depression. Initially, each patient underwent a complete Outpatient ophthalmological workup. Then, the patients were assigned to the low vision and normal vision groups, and after informed consent, each patient was to complete Patient Health Questionnaire-9 (PHQ-9).

*Result:* Two hundred and sixty-nine patients with low vision and 275 patients with normal vision were included in the study. One hundred and eighty-two (67.66%) patients with low vision and 71(25.82%) patients with normal vision were found to have significant depression (PHQ-9 score≥5). Depression was significantly more prevalent in the Low Vision-Group (*p*=<0.01).

*Conclusion:* Significantly high level of depression in the Low Vision-Group needs to be taken care of in ophthalmology departments. The ophthalmologist should not look into the eyes but treat the patients as human beings.

**Keywords:** Depression, Low vision, Ophthalmology, PHQ-9.

## INTRODUCTION

An estimated 2.9 million Americans suffered from the low vision in 2010, and it is projected to reach 5 million by 2030.[1] Low vision is the best corrected visual acuity (BCVA) of less than 6/12 in the better-seeing eye.[2,3] Various diseases can lead to low vision, such as glaucoma, acquired retinal disease (e.g., age-related macular degeneration (ARMD) diabetic retinopathy (DR), other retinal vascular disorders and retinal detachment), hereditary retinal disorders (e.g. Retinitis pigmentosa, retinal dystrophies), cataract, corneal diseases etc.[4,5]

Disability due to low vision is a major risk factor commonly associated with depression.[6,7] Depression has been found to increase the incidence of disability and is more prevalent in low-vision patients.[8] Higher rates of depression among impaired vision patients have been found in studies in Europe, Asia and North America.[6] Often, depression is not diagnosed or treated in visually impaired patients.[9,10]

Keeping in view the high potential impact of low vision on depression and feeling the lack of focus on depression in low-vision patients in Pakistan, the study under consideration was carried out to evaluate the potential relationship between low vision and depression. In addition, the study aimed to compare the frequency of depression in low-vision and normal-vision patients.

## METHODOLOGY

This comparative cross-sectional study was conducted from December 2017 to May 2019 at the Eye Department, Combined Military Hospital (CMH), Malir Cantt, Karachi Pakistan. After obtaining Hospital Ethical Review Committee approval (Letter No. 10/2020/Trg/Adm), informed written consent was obtained from all participants in the study. Two hundred and sixty-nine patients with low vision (Group-A) and 275 patients with normal vision (Group-B) were included in the study. WHO sample size calculator was used to calculate the sample size, considering the 22% prevalence of depression in Pakistan with a 95% confidence level and margin of error of 0.05.[11] Non-probability consecutive sampling was used for patient selection.

**Inclusion Criteria:** All the adults (age 16 years and older) with low vision (BCVA of < 6/12 in the better eye) 2, visual impairment for at least six months and having sufficient cognition to be able to complete PHQ-9 were included in the study.

**Exclusion Criteria:** Patients with dementia, stroke, drug dependence and extremely poor general health conditions were excluded from the study.

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Complete ophthalmic examination, including dilated slit lamp indirect 90D assisted fundoscopy, applanation tonometry and relevant ophthalmic investigations where indicated, were carried out in all the patients irrespective of the group. Low vision patients were categorized into five groups, including glaucoma, acquired retinal disorders (e.g. ARMD and DR), hereditary retinal disorders (e.g. retinitis pigmentosa), corneal disorders (e.g. keratoconus, various degenerative and dystrophic disorders of the cornea) and others (bilateral cataract etc.).

Age, gender, marital status and rural/urban region were recorded for all the patients. All the patients were assessed using Patient Health Questionnaire-9 (PHQ-9) and its Urdu translation was mostly used. PHQ-9 is the most commonly used item for screening depression.[11,12] It is also used for monitoring the treatment of depression at various stages from start to end.[13] PQH-9 has nine testing question items which specifically directed problems being faced during the last 14 days and score each item from 0-3 depending upon the approximate number of days the problem was present. The score is then added, and the patient has graded accordingly from "No depression score of 1-4" to "Severe depression score of 20-27". A PHQ-9 score of ≥ 5 was considered significant, as a score of less than five usually does not require psychiatric/ psychological intervention. Therefore, patients with a PHQ-9 score of ≥ 5 were referred to the psychiatry clinic for further evaluation. A PHQ-9 score of ≥ 10 has high sensitivity and specificity (88% each) for major depression.[7] A psychologist helped all the participants complete the PHQ-9.

Statistical Package for Social Sciences (SPSS) version 20.0 was used for the data analysis. Mean±SD was used for numerical data, i.e. age. In contrast, frequency and percentages were used for categorical data such as gender, marital status, region, the severity of depression and eye diseases. Significant difference among various variables was found using the Chi-square test. The level of significance was set as $p \leq 0.05$.

## RESULTS

Out of the total 544 participants, 269 were low vision (Group- A) and 275 were normal vision patients (Group-B). The mean age of Group-A was 58.57±15.06 years, and Group-B was 58.72±14.06 years ($p$=0.899).

There was no significant difference in the two groups based on gender ($p$=0.875), marital status ($p$=0.731) and region ($p$=0.947) (Table-I). One hundred and eighty-two (67.66%) patients with low vision and 71(25.82%) patients with normal vision were found to have significant depression (PHQ-9 score ≥5) ($p$=0.01) (Table-II). Relationship between various eye diseases and the severity of depression WAS shown in Table-III, which is statistically significant ($p$<0.01). There appeared to be no significant association between age ($p$=0.773), gender ($p$=0.225), urban/rural status ($p$= 0.962) and marital status ($p$=0.523) with depression in low vision patients.

**Table-I: Demographic Factors of Study Population (n=544)**

| Demographic Factors | Low Vision (Group-A) (n=269) | Normal Vision (Group-B) (n=275) | p-value |
|---|---|---|---|
| **Gender** | | | |
| Male | 141(52.41 %) | 146 (53.09 %) | 0.875 |
| Female | 128 (47.58 %) | 129 (46.90 %) | |
| **Marital Status** | | | |
| Married | 257 (95.53 %) | 261(94.90 %) | 0.731 |
| Unmarried | 12 (4.46 %) | 14 (5.09 %) | |
| **Region** | | | |
| Rural | 144 (53.53 %) | 148 (53.81 %) | 0.947 |
| Urban | 125 (46.46 %) | 127 (46.18 %) | |

**Table-II: Frequency of Depression in Low Vision and Normal Vision Patients (n=544)**

| Depression Severity (PHQ-9 Score) | Low Vision-Group (n=269) | Normal Vision-Group (n=275) | p-value |
|---|---|---|---|
| Minimal or No (0-4) | 87(32.34 %) | 204(74.18 %) | |
| Mild (5-9) | 88(32.71 %) | 47(17.09 %) | |
| Moderate (10-14) | 61(22.67 %) | 22(8.00 %) | <0.01 |
| Moderately Severe (15-19) | 21(7.80 %) | 2(0.07 %) | |
| Severe (20-27) | 12(4.46 %) | 0(0.00 %) | |

**Table-III: Relationship between Various Eye Diseases and Grades of Depression (n = 269)**

| Eye Diseases | Depression | | | | | p-value |
|---|---|---|---|---|---|---|
| | Minimal or No | Mild | Moderate | Moderately Severe | Severe | |
| Glaucoma | 10 (3.71%) | 31 (11.52%) | 33 (12.26%) | 2 (0.74 %) | 5 (1.85%) | |
| Acquired Retinal Disorder | 31 (11.52%) | 27 (10.03%) | 10 (3.71 %) | 7 (2.60 %) | 2 (0.74%) | |
| Hereditary Retinal Disorder | 6 (2.23%) | 8 (2.97%) | 4 (1.48 %) | 5 (1.85 %) | 2 (0.74%) | <0.01 |
| Corneal Disease | 25 (9.29%) | 21 (7.80%) | 11 (4.08 %) | 5 (1.85 %) | 2 (0.74%) | |
| Others | 15 (5.57%) | 1 (0.37%) | 3 (1.11%) | 2 (0.74%) | 1 (0.37%) | |

## DISCUSSION

Vision loss is an important public health problem even in developed countries as low vision affects

mental and physical well-being with its resulting economic implications.[13,14] Our study showed a statistically significant association of depression with low vision (*p*<0.01) compared to the normal vision population.

A Study published in 2017, conducted by Saeed *et al.* in Lahore, Pakistan, showed only one patient showing no depression out of 13 right eyes and 11 left eyes with low vision using Beck Depression Inventory (BDI) scale (*p*=0.006) in the right eye and (*p*=0.001) in left eye).[12] An Iranian study by Dibajnia *et al.* published in 2013, showed mean depressive score in low vision patients and the Normal Group was 8.45±5.4 and 4.38±3.34, respectively (*p*=0.001).[3] In a study published in 2019, Sewuese *et al.* in Ibadan, Nigeria, found that those having impaired vision for ≥1 year had 18 times more likelihood of being screened depression positive than those who had <1 year of visual impairment while severe visual impairment patients had 235 times more chances of being depressed as compared to those with mild visual impairment.[5] In a visually impaired older population-based study in Britain, published in 2007, Evans *et al.* reported depression in 13.5% compared to 4.6% in people with good vision.[6]

Depression has been found in 27.1% of the adults with visual impairment in another study.[15] One study found a score of 8.45±5.40 in low vision patients as compared to 4.38±3.39 in Normal Group patients using depression scale of DASS-21. Concurrent vision loss and depression patients have fewer chances to avail vision rehabilitation services and if they seek the care they receive less service than patients without depression.[16]

One randomized control trial showed 43% of patients reporting significant depressive symptoms, of which 75% were not using any treatment.[17] This necessitates the need to have more attention towards these patients. An increase in depressive symptoms in line with decreasing visual acuity has been reported.[18] Severity of depression has also been associated with poorer self-reported visual function. It has been mentioned that worse visual function leads to low mood and depressed mood impairs the self-perception of visual function.[19]

This association was linked with its effect on central vision. The effect of severe ARMD, an acquired retinal disease, on quality of life is comparable to uncontrolled pain due to advanced stages of cancer of the prostate or persistent paralysis and incontinence due to stroke.[19] Our study revealed 46(59.74%) patients with acquired retinal disorders while 19(76%) of the patients with hereditary retinal disorders had significant depression. We found that 71(87.65%) of glaucoma patients had significant depression (PHQ-9 score of ≥5), of which 5(6.17%) had severe depression. A glaucoma-specific study by Wang *et al.* in the United States of America published in 2012 revealed that the prevalence of depression among participants with and without glaucoma was 10.9% and 6.9%, respectively (*p*=0.02).[20] The difference from our study might be due to the cut-off point of the PHQ-9 score which was ≥10 for the quoted study as against our study, where the cut-off point was ≥5.

A study of the incidence of depression in glaucoma by Chen *et al.* in Taiwan published in 2018 showed 5.9%, a significantly greater risk of incidence of depression (*p*-value <0.0001).[21] This study was focused on incidence as against prevalence in our study. The high prevalence of significant depression in glaucoma patients may be due to the perception of poor prognosis for glaucoma in the general population. The variables included in the study showed that 39(60.5%) of the corneal disorders group had significant depression while 7(31.8%) of the "other" group had significant depression. One possible reason for different levels of prevalence of depression in low vision patients might be the use of different types of scoring systems and the variation of questions used in various questionnaires.

## CONCLUSION

Low-vision patients have a higher rate of depression than the normal population. A holistic overview of the study suggests that depression is very common in low-vision patients irrespective of the demographic variables or the causative disease. The ophthalmologist is the first to be visited by people with low vision.

**Conflict of Interest:** None.

**Author's Contribution**

Following authors have made substantial contributions to the manuscript as under:
IH: Study design, drafting the manuscript, data interpretation, critical review, approval of the final version to be published.
MWA & FAK: Concept, data acquisition, data analysis, drafting the manuscript, critical review, approval of the final version to be published.
QA & SS: Critical review, approval of the final version to be published.
Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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