



Original Research Article

Observational study for assessing the relation of visual impairment with symptoms of depression

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ARTICLE INFO

Article history:

Received 04-01-2022

Accepted 20-03-2022

Available online 29-06-2022

Keywords:

Visual impairment

Refractive error

Depressive symptoms

Patient health questionnaire9

ABSTRACT

Aims: To assess the relation of visual impairment related to the refractive error with symptoms of depression in relation to age, gender, educational qualification, level of visual impairment, type of refractive error, and use of corrective measures taken by the patient.

Study and Design: Observational cross-sectional study.

Materials and Methods: A total of 260 participants above the age of 12 years with unaided visual acuity below 6/18 were examined for their refractive error using objective and subjective tests of refraction. Depressive symptoms were assessed using patient health questionnaire – 9 (PHQ-9).

Statistical Analysis used: Chi-square and Fisher's exact test to find an association between qualitative variables.

Results: Overall 70.77% of participants had depressive symptoms of varying degree. On assessing its severity 8.46% had moderate, 23.68% had mild, 38.46% had minimal depressive symptoms. Depressive symptoms were more prevalent in the younger age group, educated patients, and similar in both genders, but none were statistically significant. A statistically significant association was found between the level of visual impairment with depressive symptoms ($p=0.01$) and its severity ($p=0.03$). Relation of depressive symptoms with various types of refractive error were significant ($p=0.01$). The prevalence of depressive symptoms increased with an increasing degree of myopia ($p=0.015$) and hypermetropia ($p=0.68$). Participants who were not using corrective measures had more depressive symptoms in comparison to those using it. ($p=0.19$)

Conclusions: Statistically significant association was found between depressive symptoms and its severity with the level of visual impairment, types, and degree of refractive error, especially myopia. There was no statistically significant association of refractive error with depressive symptoms and its severity in relation to age, gender, education.

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1. Introduction

The leading causes of visual impairment includes cataract (39%), uncorrected refractive error (18%), glaucoma (10%) age-related macular degeneration (7%), corneal opacities (4%), diabetic retinopathy (4%), trachoma (3%), childhood eye diseases (3%) and onchocerciasis (0.7%).¹ Uncorrected

refractive errors are the leading cause of moderate to severe visual impairment worldwide and the second most common cause of blindness.^{2,3} According to NPCB data, refractive error accounts for 29.6% of cases of visual impairment in the population aged 0-49 years and 13.4% cases in the population aged >50 years. Vision is an important contributor to living a pleasurable life and conducting activities effectively. Refractive errors affect the educational outcome, quality of life, personal and

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psychological well-being.⁴ Studies have shown that people with refractive errors in their childhood had lower self-esteem, were lonelier, experienced more criticism about physical aspects of themselves and may have experienced more fear and more stressful life events.⁵ Visual impairment impacts all aspects of life, be it reduced functional ability, social isolation, reduced quality of life or negative impact on mental health status.^{6–8} WHO estimates that people with visual impairment are three times more likely to suffer from depression and anxiety disorders. According to a meta-analysis visual impairment is one of the most common chronic conditions associated with depression in old age.^{9,10} In young adults, the relationship between visual impairment and depression is not well-established.^{9,11} There is a dearth of literature on mental health issues among the visually impaired in India.⁹ Present study attempts to assess the relation of visual impairment related to the refractive error with symptoms of depression using the 9-item Patient Health Questionnaire (PHQ-9)¹² in relation to age, gender, education level, level of visual impairment, type and severity of the refractive error and based on the use of corrective measures.

2. Materials and Methods

This observational study was approved by the institutional human research and ethics committee. Total of 260 participants above the age of 12 years with unaided visual acuity less than 6/18 were included in the study. Participants with ocular morbidities other than refractive error were excluded from the study. Informed consent was taken from all participants or their guardians (younger than 18 years). Demographic details of participants including age, gender, and educational qualification were obtained.

Visual acuity testing was done using Snellen's chart and a thorough ophthalmic examination was done to rule out other ocular morbidities. Their objective refraction testing was done with a wet streak retinoscopy. Post mydriatic testing was done after 2 days of retinoscopy to decide the final refractive correction of the participant. Based on the level of presenting unaided visual acuity, participants were divided into mild (visual acuity worse than 6/12 to 6/18), moderate (visual acuity worse than 6/18 to 6/60), severe (visual acuity worse than 6/60 to 3/60), and blindness (visual acuity worse than 3/60) group. Refractive errors were classified as a basic myopic refractive error (which includes myopia and compound myopic astigmatism based on spherical equivalent), basic hypermetropic refractive error (which includes hypermetropia and compound hypermetropic astigmatism based on spherical equivalent), Astigmatism (includes simple myopic, simple hypermetropic and mixed astigmatism). The basic myopic refractive error further was divided into low (<3 D), moderate (3-6 D), high (>6 D) myopia. Basic hypermetropic refractive error was divided into low (<2 D), moderate (2-5 D), high (>5 D)

hypermetropia. The spherical equivalent is defined as a sphere plus half of the cylinder. Participants were asked whether they were already using refractive correction or not at the time of examination.

The patient health questionnaire-9 (PHQ-9) was used to assess depressive symptoms. PHQ-9 is a self-administered multipurpose questionnaire used for screening, diagnosis, monitoring and measuring the severity of depression, which incorporates DSM-IV depression diagnostic criteria.¹⁰ The validity and reliability of the PHQ-9 depression module to establish the depressive diagnosis and grade its severity have been widely documented.¹⁰ The PHQ-9 is recommended as the depression screening tool of choice in primary care and general medical settings.^{13,14} The PHQ-9 is completed by the patient in minutes and is rapidly scored by the clinician. The PHQ-9 has also been used to assess depression among those with visual impairment in other studies.^{15,16} It asks participants to report whether they have been bothered with any of the nine symptoms in the past 2 weeks. Responses are rated with a four-category response, starting from not at all to nearly every day. The PHQ-9 can be used as a screening tool, with summed scores ranging from 0 (no depressive symptoms) to 27 (all symptoms occurring daily). Based on the total score, depressive symptoms are classified as minimal (PHQ-9 score 1-4), mild (PHQ-9 score 5-9), moderate (PHQ-9 score 10-14), moderately severe (PHQ-9 Score 15-19), and severe (PHQ-9 score 20-27). A PHQ-9 score of 10 or more has been found to have 88% sensitivity and 88% specificity for a diagnosis of major depression.¹⁰ The conventional cut-off point for the PHQ-9 ≥ 10 used to define levels of depressive symptoms warranting further assessment by a psychiatrist.¹⁰

Data entry has been done in Microsoft Excel and data analysis was done by using SPSS version 23. Association between qualitative variables like age, gender, education, level of visual impairment, type of refractive error, use of corrective measures with depressive symptoms was done with the help of chi-square test. Fisher's exact test is used when more than 20% of cells have an expected frequency of less than five. Mean and standard deviation were used for quantitative variables.

3. Results

A total of 260 participants were included in the study. Distribution of participants as per variables including age, gender, education level, level of visual impairment, types and degree of refractive error and based on the use of corrective measures shown in Table 1. The mean age of participants in the study was 34.35 years with a standard deviation of ± 14.71 . A maximum number of participants was in the young age group. The ratio of males: females was about 1.25: 1. About 60% of participants were graduates. Maximum participants were in moderate visual impairment which was followed by severe and blindness

Table 1: Distribution of participants and prevalence of depressive symptoms with different variables

	Distribution of participants	Depressive symptoms N(%)		P-value
	N(%)	Absent	Present	
Total Participants	260(100)	76(29.23)	184(70.77)	
Age				0.115
Young (12-29 years)	131(50.38)	33(25.19)	98(74.81)	
Middle-aged (30-59 years)	105(40.38)	32(24.43)	73(55.73)	
Elderly(>60 years)	24(9.23)	11(45.83)	13(54.16)	
Gender				0.776
Male	147(56.54)	44(29.93)	103(70.07)	
Female	113(43.46)	32(28.31)	81(71.68)	
Education level				0.06
Illiterate	18(6.92)	9(50.00)	9(50.00)	
Primary Education	26(10.00)	8(30.77)	18(69.23)	
Secondary & Higher Secondary Education	64(24.62)	12(18.75)	52(81.25)	
Graduate	152(58.46)	47(30.92)	105(69.08)	
Level of visual impairment				0.01
Mild	-	-	-	
Moderate	125(48.08%)	45(36.0)	80(64.0)	
Severe	102(39.23%)	30(29.41)	72(70.59)	
Blindness	33(12.69%)	1(3.03)	32(96.97)	
Type of refractive error				0.03
Basic myopic refractive error	161(61.92)	41(25.46)	120(74.54)	
Basic hypermetropic refractive error	44(16.92)	11(45.00)	33(75.00)	
Astigmatism	55(21.15)	24(43.63)	31(56.36)	
Degree of Myopia				0.015
Low	51(31.68)	21(41.18)	30(58.82)	
Moderate	49(30.43)	14(28.57)	35(71.43)	
High	61(37.90)	6(9.84)	55(90.16)	
Corrective measures				0.19
With use of corrective measures	84(32.31%)	29(34.52)	55(65.48)	
Without the use of corrective measure	176(67.69%)	47(26.70)	129(73.30)	

* p-value obtained using chi-square test. Fisher's exact test is used when more than 20% of cells have an expected frequency of less than five.

group. 161 participants had a basic myopic refractive error, 44 had a basic hypermetropic refractive error and 55 had astigmatism. Among myopic participants, 51, 49, and 61 had low, moderate, and high myopia respectively and among hypermetropic 18, 15, and 11 had low, moderate, and high hypermetropia respectively. Only 84 participants were using corrective measures at the time of examination.

Overall, 70.77% of participants had depressive symptoms of varying degrees. On assessing the severity of depressive symptoms 8.46% had moderate (Mean PHQ-9 score 10.91 ± 0.85), 23.68% had mild (Mean PHQ-9 score 6.05 ± 1.10), 38.46% had minimal (Mean PHQ-9 score 2.68 ± 1.08) depressive symptoms. Maximum depressive symptoms were found in the young age group. The prevalence of depressive symptoms decreases with increasing age but was not statistically significant. The prevalence of depressive symptoms was similar in both genders which were around 70%, though not significant. Comparing literacy levels, educated participants had more depressive symptoms ($p=0.06$). The increasing prevalence of depressive symptoms was found with an increasing level of visual impairment. Statistically significant association was found between the level of visual impairment and depressive symptoms ($p=0.01$). Among myopic 74.54%, among hypermetropic 75%, and astigmatic 56.36% participants had depressive symptoms, which was found statistically significant ($p=0.03$). Depressive symptoms were found more in a higher degree of myopia ($p=0.015$) and hypermetropia ($p=0.15$). The prevalence of depressive symptoms was more in those not using corrective measures in comparison to those using it, though statistically not significant.

On assessing the severity of depressive symptoms with different variables maximum number of participants had minimal depressive symptoms followed by mild and moderate as shown in Figure 1. None of the participants had moderately severe or severe depressive symptoms. Statistically, a significant association was found between the level of visual impairment and the severity of depressive symptoms ($p=0.01$).

4. Discussion

In this observational study depressive symptoms were absent in 29% of participants. 38.46% had minimal, 23.68% had mild and 8.46% had moderate depressive symptoms. In a study done in Australia, 27.3% of participants had mild and 14.75% had moderate depressive symptoms.¹⁷ In a population-based study done in the United States, 20.10% had mild and 11.3% had moderate depressive symptoms.⁹ These results are comparable with the present study.

The prevalence of depressive symptoms decreases with increasing age in this study. Similar results were found in studies done in England¹⁸ and Korea.¹⁹ Similar to the present study there was no statistically significant

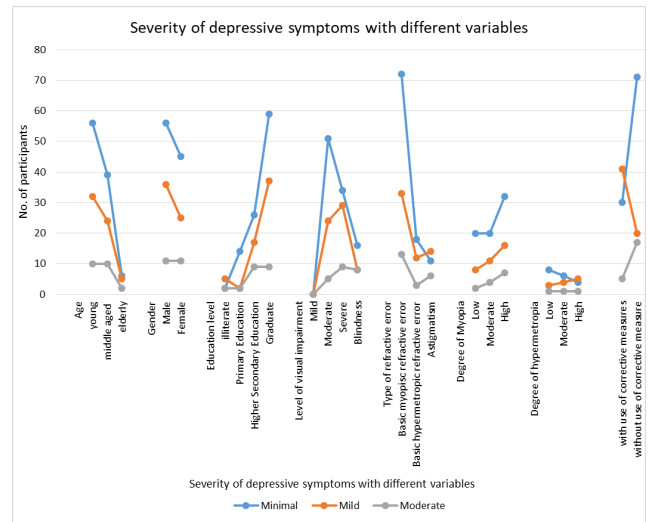


Fig. 1: Distribution of severity of depressive symptoms with different variables

association between gender and depressive symptoms in the studies done in England¹⁸ and New Zealand.²⁰ No evidence of an association between educational qualification and depressive symptoms was found in an Australian population-based study.¹⁷ In this study, it was found that the prevalence of depressive symptoms increases with an increasing level of visual impairment, which was statistically significant. Karen. J. Hayman et al. did a study in Austria that found similar results.²⁰ Similar to our study, in a population-based Chinese study, it was found that the prevalence of depressive symptoms was more in myopic adults than in non-myopic ones.²¹ They did not include other refractive errors. In the same Chinese study, they found that there was no significant difference in the risk of having depressive symptoms between those with low and high myopia.²¹ Cynthia Owsley et al. found that those using refractive error correction had less depressive symptoms compared to those not using it.²²

This is the first-ever study in government hospitals of Gujarat for assessing the relation of visual impairment related to the refractive error with depressive symptoms.

In conclusion, this study observed that visual impairment due to refractive error can give rise to minimal to moderate depressive symptoms. Statistically significant association was found between depressive symptoms and its severity with level of visual impairment, types and degree of refractive error specially myopia. Dissemination of results of this study will help ophthalmologists and psychiatrists to correlate the types and degree of refractive error that may cause symptoms of depression. If known, corrective measures can make a difference. Improved access to screening, appropriate referral, and treatment may help to reduce the burden of depression and improve the quality of life of people with visual impairment.

5. Source or Funding

None.

6. Conflict of Interest

None.


Acknowledgment

I am thankful to Dr. Sanjibani Panigrahi, (MD Psychiatry) for selecting the valid depression screening questionnaire for the study, for the help in its execution and interpretation.

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Cite this article: Satani C, Gupta PK. Observational study for assessing the relation of visual impairment with symptoms of depression. *Indian J Clin Exp Ophthalmol* 2022;8(2):271–275.