

# A COMPARATIVE STUDY OF ANXIETY AND DEPRESSION IN PRIMARY GLAUCOMA SUBJECTS ATTENDING THE OPHTHALMOLOGY DEPARTMENT IN A TERTIARY CARE HOSPITAL

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## ABSTRACT

**Introduction:** Glaucoma is not a single disease process, but a group of disorders characterized by a progressive optic neuropathy resulting in a characteristic appearance of the optic disc and a specific pattern of irreversible visual field defect that are associated frequently with raised intraocular pressure.

**Aims:** a) To study the association of primary glaucoma with anxiety and depression in the age group of 40 to 75, b) To study the anxiety and depression in the control group and c) Finally, comparing the results between the two.

**Materials and Methods:** The present study was Cross-sectional observational study. This study was conducted in Department of Ophthalmology, and the Department of Psychiatry, Pavlov Hospital, Calcutta National Medical College and Hospital from Eighteen months. Total 130 patients were included in this study.

**Result:** In my study, mean PHQ Scale Score is significantly higher in the cases [19.3231±5.3564] compared to controls [7.8769±5.1856] ( $p < 0.0001$ ) and the mean GAD 7 Score is also significantly higher in cases [12.1231±4.1098] compared to controls [7.8769±4.9419] ( $p < 0.0001$ ). Association between PHQ scale score and GAD 7 score with type of glaucoma is not significant ( $p$  value = 0.983).

**Conclusion:** The duration of anxiety and depression with group was statistically significant ( $p$  value 0.004). There are many confounding factors in my study like age, gender, and socio-economic status but multivariate regression analysis proved that glaucoma is significantly associated with anxiety and depression.

**Keywords:** Depressions, glaucoma, PHQ scale score, anxiety and GAD.

## INTRODUCTION

Glaucoma is not a single disease process, but a group of disorders characterized by a progressive optic neuropathy resulting in a characteristic appearance of the optic disc and a specific pattern of irreversible visual field defect that are associated frequently with raised intraocular pressure. Glaucoma is the second most common cause of irreversible blindness worldwide. In India, at least 12 million people are suffering and 1.2 million people having irreversible blindness because of glaucoma. Another recent study estimated that 76 million people worldwide were affected by Glaucoma in 2020, and the number is expected to reach to 111.8 million by 2040.<sup>1</sup>

Clinically, depression is a mental health disorder characterized by persistently low mood, or loss of interest in activities causing significant impairment in daily life. Anxiety is an emotion characterized by feelings of tension, worried thoughts, and physical changes like increased blood pressure. Since glaucoma subjects have to deal with irreversible visual impairment, sometimes vision loss, high economic and long term follow up, there is an increase chance of anxiety and depression among them.<sup>2</sup>

The glaucomas are classified by the appearance of the iridocorneal angle. There are open-angle, closed-angle, and developmental categories, which are further divided into primary and secondary types. Primary open-angle glaucoma can occur with or without elevated intraocular pressure; the latter is sometimes called normal-tension glaucoma. Primary open-angle glaucoma includes both adult-onset disease (occurring after 40 years of age) and juvenile-onset disease (occurring between the ages of 3 and 40 years of age). Examples of secondary open-angle glaucomas include those associated with exfoliation or pigment-dispersion syndrome. Closed-angle glaucoma can be primary (e.g., pupillary block) or secondary (e.g., inflammatory or neovascular causes). Developmental forms of glaucoma include primary congenital glaucoma and glaucoma associated with syndromes (e.g., aniridia or the Axenfeld–Rieger syndrome). Primary open-angle glaucoma, the predominant form of glaucoma in Western countries, probably comprises several clinically indistinguishable diseases.

As the name implies, primary chronic angle-closure glaucoma is a type of chronic angle-closure glaucoma (CACG), a gradual, often clinically silent, closure of the angle resulting in increased intraocular pressure (IOP) and eventual glaucomatous optic nerve damage. CACG is a broader term that includes secondary causes for angle-closure glaucoma, for example anterior traction of the peripheral iris due to neovascular membrane formation, which are not the focus of this review.

**AIMS & OBJECTIVES:** a) To study the association of primary glaucoma with anxiety and depression in the age group of 40 to 75, b) To study the anxiety and depression in the control group and c) Finally, comparing the results between the two.

## **MATERIALS AND METHODS**

**Study design** – Cross-sectional observational study

**Place of study** – Outpatient clinic of the Department of Ophthalmology, and the Department of Psychiatry, Pavlov Hospital, Calcutta National Medical College and Hospital,

**Period of study** – Eighteen months

**Study Population** – All glaucoma patients attending the outpatient department of Calcutta National Medical College

### **Inclusion criteria**

a. Cases: i) Primary open angle glaucoma subjects (40 to 75 years);

ii) Primary angle closure glaucoma subjects (40 to 75 years)

b. Control: Non-glaucoma subjects suffering from mild eye diseases like refractive error, chalazion, styte etc.

**Exclusion criteria**

- a) Anxiety and depression prior to diagnosis of glaucoma;
- b) Cataract;
- c) Macular degeneration;
- d) Diabetic retinopathy;
- e) Psychotic disorders;
- f) Chronic physical illness like cancer, rheumatoid arthritis, Chronic Obstructive Pulmonary disease, cardiovascular diseases

**RESULT AND DISCUSSION**

The current study has been conducted among 130 subjects with 65 cases of primary glaucoma (POAG and PACG) and 65 controls. Among the cases, 58.8% have angle closure glaucoma and 49.2% have primary open angle glaucoma. It has been found that, the mean age is higher in Controls [58.0769±5.9037] compared to Cases [57.4154±6.2347] (p=0.5356) but this is not statistically significant. The study also finds that the glaucoma cases are higher in females compared to that in males (p value 0.0008).

**Rudnicka A.R. et al. (2006)**<sup>3</sup> Carried out a study to quantify the variation in POAG prevalence with age, gender, and race. The study finds that the white population showed the steepest increase in POAG prevalence with age. Men were more likely than women to have POAG.

Another study by **Vajranant. T. et al. (2010)**<sup>4</sup> finds that older women are at risk for glaucoma and glaucoma blindness. Women are at higher risks for Angle Closure Glaucoma but there is no clear gender predilection for Open Angle Glaucoma.

**Dielemans I. et al. (1994)**<sup>5</sup> study conducted the Netherlands showed that men had three times high risk of having POAG than women. In Blue Mountain Eye Study, **Mitchell P et al. (1996)**<sup>6</sup> showed increased risk of POAG in women.

**Yochim BP et al**<sup>7</sup>(2012) showed that two factors which may disrupt the ability to adhere to the treatment for glaucoma are cognitive impairment and mental health complications. They had a mean age of 70.0 years (SD=9.2 y; range: 51 to 86 y) and 70% (n=30) were female.

Association of Occupation with glaucoma cases is not statistically significant (p=0.9897) in my study. It is found that, higher number of patients belong to the middle class in the Case group [37 (56.9%)] compared to Control group [36 (55.4%)] but this is not statistically significant (p=0.9822). It has been found that, higher number of patients are from rural areas in both groups [34(52.3%)] but this is not statistically significant (p=1.0000). In my study, association of education with glaucoma cases is not statistically significant (p=0.9937)

A Korean study by **Shin A.O. et al. (2019)**<sup>8</sup> showed that the prevalence of occupation types were significantly associated with glaucoma and among all the occupations farming, forestry, and fishing showed the highest percentage (4.9%) of glaucoma cases whereas service or retail

showed the lowest (1.3%). Another study by **Kuo Y.S. et al. (2017)**<sup>9</sup> showed that higher level of education significantly affects vision related quality of life in patients with POAG. Glaucoma is

higher in patients with low education level (20.69%) than those with middle class (8.62%) or high (4.04%) education level.

The current study finds that higher number of patients are married in the Case group compared to that in the Control group. However, this is not statistically significant ( $p=0.8482$ ). **Onwubiko SN et al (2020)**<sup>10</sup> conducted a study to explore the factors associated with depression and anxiety among glaucoma patients. The participants were mainly females, among whom 59.3% were married.

In my study, mean PHQ Scale Score is significantly higher in the cases [ $19.3231\pm 5.3564$ ] compared to controls [ $7.8769\pm 5.1856$ ] ( $p<0.0001$ ) and the mean GAD 7 Score is also significantly higher in cases [ $12.1231\pm 4.1098$ ] compared to controls [ $7.8769\pm 4.9419$ ] ( $p<0.0001$ ). Association between PHQ scale score and GAD 7 score with type of glaucoma is not significant ( $p$  value = 0.983). Also I find that the association between gender and the magnitude of depression and anxiety (measured by PHQ – 9 scale and GAD – 7 scale) is not statistically significant. Also the association between gender and glaucoma is not significant ( $p = 0.060$ )

**Kong X et al**<sup>11</sup>(2015) observed that the prevalence of psychological disturbances and personality traits in primary angle closure glaucoma (PACG) were higher than those in primary open-angle glaucoma (POAG) patients. **J. Rezapour et al**<sup>12</sup>(2018) examined that the fear of potential vision loss may result in a higher prevalence of depression and anxiety among glaucoma patients. Another study by **Wu N et al. (2019)**<sup>13</sup> observed that glaucoma cause disturbance in psychological and emotional functioning of patients leading to anxiety and depression. **Ubochi CC et al. (2020)**<sup>14</sup> showed the effect of glaucoma on the mental health of patients using the Hospital Anxiety and Depression Scale. **Dayal A et al. (2022)**<sup>15</sup> showed that glaucoma significantly causes anxiety and depression.

In my study, higher number of patients has Duration of Anxiety and Depression for 3 weeks in Case group [25(38.5%)] compared to 2 weeks in Control group [25(56.8%)], and this is statistically significant ( $p=0.0044$ ).

**Ajith BS et al**<sup>16</sup>(2022) conducted the study to determine the magnitude and direction of association of anxiety and depression and the quality of life (QoL) in persons with glaucoma. Depression and anxiety are common in glaucoma patients, indicating the need for screening protocols using PHQ and GAD scales to identify persons at risk.

## CONCLUSION

- This study has been conducted at the Ophthalmology Department of CNMCH among 130 subjects with 65 cases of primary glaucoma (POAG and PACG) and 65 controls.
- The cases, included 58.8% angle closure glaucoma patients and 49.2% primary open angle glaucoma patients.
- In case group 73.8% were between 40-60 years of age. 23% were between 61-70 years and 3% patients were between 71-75 years. The mean age of cases is higher in Controls

[58.0769±5.9037] compared to Cases [57.4154±6.2347] (p=0.5356) but this is not statistically significant.

- The study also finds that the glaucoma cases are higher in females compared to that in males (p value 0.0008). Among the females 24 (60%) has PACG, and 16 (40%) has POAG. Among the males, 9 (36%) has PACG, and 16 (64%) has POAG. Hence the association between type of glaucoma and gender is not significant (p value 0.060).
- Association of glaucoma with occupation, residence, socio-economic status, and marital status is not statistically significant.
- Both POAG and PACG patients have significant levels of anxiety (mean GAD-7 score 12) and depression (PHQ – 9 score 19) compared to controls (mean PHQ – 9 score 7 and mean GAD – 7 score 7). So, the association of glaucoma with depression and anxiety is statistically significant (p value <0.001). But it has been found that the association between depression and anxiety with the type of glaucoma is not significant. The association between gender and GAD -7 anxiety scale and PHQ – 9 depression scale among cases and controls is not statistically significant.
- The duration of anxiety and depression with group was statistically significant (p value 0.004).
- There are many confounding factors in my study like age, gender, and socio-economic status but multivariate regression analysis proved that glaucoma is significantly associated with anxiety and depression.

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**Table: Demographic Profile of Glaucoma**

		Gender		Total	p Value	Significance
		Female	Male			
TYPE OF GLAUCOMA	Primary Angle Closure Glaucoma	24(60)	9(36)	33(50.77)	0.060	Not Significant
	Primary Open Angle Glaucoma	16(40)	16(64)	32(49.23)		
Total		40(100)	25(100)	65(100)		

**Table: Type of Glaucoma in Cases**

Group			
Type of Glaucoma	Case	Control	Total
Angle Closure Glaucoma	33	0	33
No	0	65	65
Primary Open Angle Glaucoma	32	0	32
Total	65	65	130

**Chi-square value: 130.0000; p-value: <0.0001**

**Table: Type of Glaucoma and PHQ – 9 Grade**

		TYPE OF GLAUCOMA		Total	p Value	Significance
		Primary Angle Closure Glaucoma	Primary Open Angle Glaucoma			
PHQ-9 Grade	Mild	2(6.06)	2(6.25)	4(6.15)	0.983	Not Significant
	Moderate	2(6.06)	2(6.25)	4(6.15)		
	Moderately Severe	15(45.45)	13(40.63)	28(43.08)		
	Severe	14(42.42)	15(46.88)	29(44.62)		
Total		33(100)	32(100)	65(100)		

**Table: Distribution of mean Duration of Anxiety and Depression in Groups**

		<b>Number</b>	<b>Mean</b>	<b>SD</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Median</b>	<b>p-value</b>
<b>Duration of Anxiety and Depression</b>	Case	65	2.9385	.7881	2.0000	4.0000	3.0000	0.0013
	Control	44	2.4773	.5902	2.0000	4.0000	2.0000	