

## Glaucoma Distribution in major Religious Communities of Rural Gangetic Delta

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**Abstract:** - **Aim:** To study the pattern of glaucoma distribution among the patients in rural Gangetic Delta  
**Materials and Methods:** A retrospective analysis of 1800 glaucoma patients was done, who were recruited by a door to door field survey and brought to a rural Base Eye Hospital in the Hooghly district of West Bengal, India between January 2010 and December 2012 . The subtypes of glaucoma in different religious groups( mainly among Hindus and Muslims) along with the age and gender distribution were studied.  
**Results:** The mean age of the glaucoma patients was 54.6 years. Glaucoma was diagnosed in 972(54%) Muslim and in 632(35.1%) Hindu patients. The prevalence of POAG (35.0%) was close to that of PACG (33.1%). POAG was the most common type of glaucoma in males (15.2%), while PACG was very common among females (16.4%). In Hindu patients, POAG (42.4%) was the commonest form of glaucoma, while in Muslims, PACG (41.8%) was the highest form of glaucoma.

**Conclusion:** Glaucoma distribution in the Muslim population is the highest among all religious groups of the rural Gangetic Delta .

### I. INTRODUCTION

The blindness caused by glaucoma is expected to reach alarming proportions. [1] It is the second most common cause of world's blindness and majority of them reside in Asia [2, 3]. India accounts for 12.9% of the Primary Open Angle Glaucoma (POAG) cases and 12.7% of the Primary Angle Closure Glaucoma (PACG) cases in the world [4].

There were studies which account for the different subtypes of glaucoma and showed the varying predominance of glaucoma types in different regions of India in urban [5] and rural populations [6–8]. There is only little data on the distribution of these glaucoma subtypes according to the religion of the patients, as India has complex patterns of migration and this contributes to the marked ethnic diversity between the different regions and religions.

As the data on the distribution of these glaucoma subtypes according to the religion of the patients, is small and India has complex patterns of migration and this contributes to the marked ethnic diversity between the different regions and religions, we conducted this study, to further contribute in this regard, West Bengal, India.

According to the Census of India 2001, Hugly (12), West Bengal (19)C District Hugli (12), 1.Hindus 4,216,701  
2.Muslims 763,471  
3.Others 49,075

The Hindu population accounts for 35.1% of the glaucoma cases in rural Gangetic Delta, which is much lower than that in the state of Uttar Pradesh (80.62%)

### II. MATERIALS AND METHODS

The rural study area consists of 28 contiguous villages from the district of Hugli in West Bengal which are about 20kms surrounding the Rural base hospital located at Dhobapara, in Village Bakulia of this District.

A three year retrospective analysis (January 2010-December 2012) of the records of 12000 patients was done. 1800 patients, aged >30 years, who were diagnosed as having glaucoma in one or both the eyes were included.

Exclusion criteria :

Incomplete data

Congenital and Developmental glaucoma

Patients lost to follow up

A previous glaucoma surgery

The work up of the history and the ophthalmic examination included:

The Best Corrected Visual Acuity (BCVA)

The IOP which was obtained by using a Goldman applanation tonometer. Slit lamp examination, gonioscopy, with the use of a Goldman four-mirror lens, was done in all the patients. The occludability was assessed by using a dim ambient and a slit lamp illumination, with the patient looking straight ahead. The anterior chamber angle was classified by using Shaffer's grading [9]. Grade 2 or less was considered as occludable, and grade 3 or more was considered as open. The eyes with occludable angles and no glaucoma were labelled as latent ACG.

Optic disc examination was done with a +90 dioptres (D) lens at 16 × magnification without a pupillary dilatation. The Vertical Cup-to-Disc Ratio (VCDR) was used as the index for the structural glaucomatous change. If the stereo view was not satisfactory due to the opacity of the lens or due to the restrictions of the pupil size, the pupil was dilated by using 0.5% tropicamide and 0.5% phenylephrine hydrochloride. The fundus changes which were suggestive of glaucoma included focal notching of the disc, deepening of the cup, thinning of the neuroretinal rim, a lamellar dot sign, overpass cupping, saucerization of the cup, asymmetrical cupping in the two eyes and Retinal Nerve Fibre Layer (RNFL) defects.

A field examination was done by using automated perimetry (the Humphrey Field Analyzer 24-2 Sita Standard) if the fundus findings were suggestive of glaucoma. The unreliable fields [10] with the typical glaucomatous visual field damage (i.e. nasal step, or paracentral, Seidel's or arcuate scotoma, or deep diffuse depression) were repeated twice [11].

A glaucomatous visual field defect was considered to be present if the following were found:

A Glaucoma Hemifield Test (GHT) result which was outside the normal limits, and

A cluster of three or more nonedge, contiguous points, which were not crossing the horizontal meridian, with a probability of 5% of the age-matched normals on the pattern deviation plot, on two separate occasions.

Some components of the examination could not be carried out on the patients who refused such an examination, those with cataracts, or those with corneal opacities.

PAOG was defined as a condition in a subset of patients with open angles, a raised IOP which was associated with either a glaucomatous cupping of the optic nerve head or visual field changes which were suggestive of glaucoma [12]. The patients who were less than 35 years of age, with a clinical picture which was similar to that of POAG, were labelled as having Juvenile Open Angle Glaucoma (JOAG) [12].

PACG was said to exist when a person had, in the same eye or in both eyes (a) a pressure of >21 mm Hg and (b) an anterior chamber angle which was two-thirds obstructed. The angle closure was considered to be either appositional or synechial. The chronic appositional angle closure was diagnosed in the presence of a raised intraocular pressure and with closed angles on gonioscopy, in the absence of peripheral anterior synechiae (PAS). The presence of glaucomatous field defects or optic disc changes was not considered as mandatory for the diagnosis of angle closure glaucoma [12], [13]. The latent ACG comprised of asymptomatic patients with occludable angles [12].

The normal tension glaucoma patients were classified as having open angles, and progressive optic nerve head changes or a visual 500 field loss which was suggestive of glaucoma in the absence of an elevated IOP [12]. The glaucoma suspects included (a) a subset of patients with open angles, an IOP of less than 22 mmHg and absence of field changes but with optic nerve head changes; and (b) patients with a strong family history of glaucoma in the absence of optic nerve head changes or a high IOP [12].

### III. RESULTS

A door to door survey was conducted in the 28 villages of the Hugli district in West Bengal. Of the 4,216,701 Hindus and 763,471 Muslims, there were 1800 diagnosed glaucoma patients.

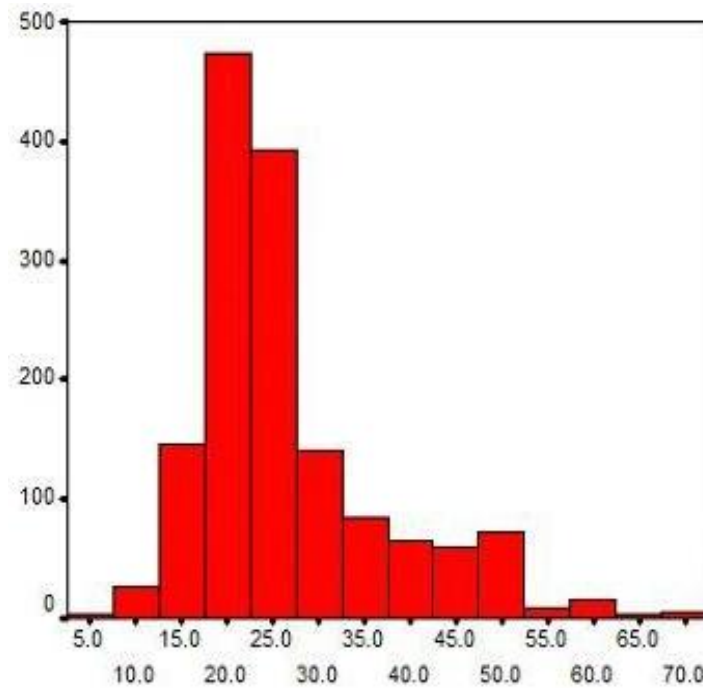
Glaucoma was diagnosed in 972 (54%) Muslim and in 632 (35.1%) Hindu patients. The prevalence of POAG (35.0%) was close to that of PACG (33.1%). POAG was the most common type of glaucoma in males (15.2%), while PACG was very common among females (16.4%). In Hindu patients, POAG (42.4%) was the commonest

form of glaucoma, while in Muslims, PACG (41.8%) was the highest form of glaucoma. 1800 (2.03%) glaucoma patients were identified. The mean age was 54.6 years with an S.D. of 11.3.

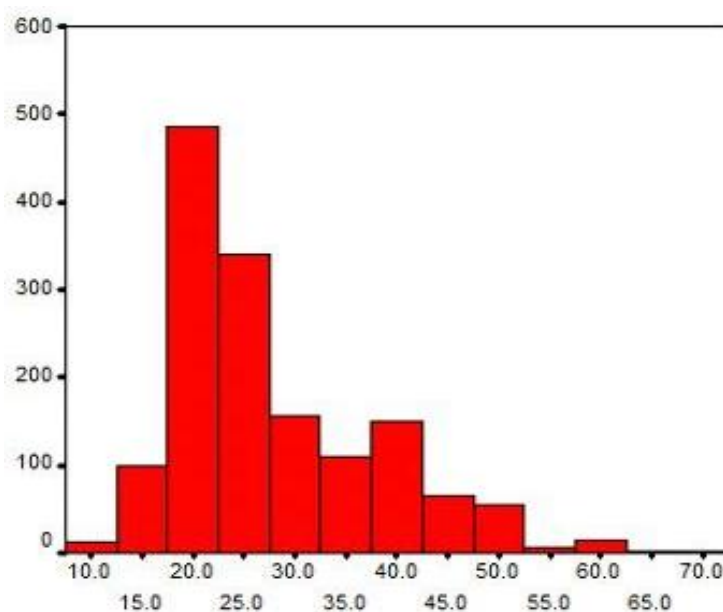
The mean IOP recorded in RE was 25.8 mm Hg with S.D of 11.14 [Table/Fig-1] and in LE it was 26.4 mm Hg with S.D. of 11.36 [Table/Fig-2]. By matching the IOP with the slit lamp examination findings and the field defects, the patients were categorized into various glaucoma subtypes.

Primary Open angle glaucoma was diagnosed in the maximum number of patients (35%), followed by Primary angle closure glaucoma (33.1%)

Further analysis was done to find out the pattern of glaucoma which was present in the two major religious population.. They included Hindus (GroupA) and Muslims (Group B). POAG (42.4%) was found to be leading form of glaucoma among the Hindu patients [Table/Fig-3] while PACG was the most common type of glaucoma (41.8%) among the Muslim patients [Table/Fig-3]



Table/Fig 1 : Right Eye IOP(Intra Ocular Pressure) N= 1800; Mean IOP 25.8 ; SD 11.14



Table/Fig 2 : Left Eye IOP(Intra Ocular Pressure) N= 1800; Mean IOP 24.6 ; SD 11.36

Subtype	Group A	Group B
Juvenile open angle glaucoma	15 (2.5%)	26 (2.7%)
Primary open angle glaucoma	267 (42.4%)	447 (46.2%)
Primary angle closure glaucoma	205 (32.6%)	406 (41.8%)
Normal tension glaucoma	24 (3.8%)	40 (4.2%)
Secondary glaucoma	13 (2.2%)	27 (2.8%)
Ocular hypertension	64 (10.2%)	31 (3.2%)
POAG suspect	55 (8.8%)	17 (1.8%)

Table/Fig 3: Showing distribution of various glaucoma subtypes

#### IV. DISCUSSION

We studied the data of 1800 glaucoma patients following a door to door survey of rural patients in the hugli district of West Bengal, India. The mean age of presentation was 54.6 years. The mean age of presentation of glaucoma varies from 30 to 60 years, as was seen in various studies [13], [14].

In our study, we tried to find the pattern of the prevalence of glaucoma in a Population based data. The prevalence of glaucoma was found to be higher among Muslim patients, 972 (54%) as compared to 632 (35.1%) Hindu patients. This was despite the fact that overall Hindu patients were 4,216,701 of the population, more as compared to Muslims 763,471. POAG was found to be most common type of glaucoma (40.8%) among the Hindu patients, followed by PACG(20.7%). Whereas PACG was reportedly highly prevalent among the Muslim patients (42.4%) as compared to PAOG (32.6%). The difference which we found, might be due to some cultural practices which are more common in the Muslim population, like consanguineous marriages [15]. An important aspect of our study is that, this is the first study in Eastern India, which has highlighted the prevalence of glaucoma and its subtypes, based on religious factors in a population database.

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