

Population based screening programme for glaucoma

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Review of literature: Since glaucoma is a blinding disease, early diagnosis might prove essential to prevent further damage. The natural history of POAG is not well understood. Patients do not complain much about the visual difficulties until serious damage is done. The routine screening techniques in the population are so time consuming and no standardised test results are available that could be generalised. Few permutations and combinations are satisfactory.

- i) **Visual field:** Screening of the visual field of each eye is the ideal method to identify the glaucomatous members of a population¹. A suprathreshold testing of visual field is a better method of screening². The automated techniques are becoming popular without loss of sensitivity and specificity. The most promising concept is to combine automated perimetry with threshold related testing of selected points in the field of vision that are more likely to contain early glaucomatous damage^{3,4}
- ii) **Optic nerve head:** Evaluation of the anatomical changes of the optic nerve head by ophthalmoscopic examination with a +90 D lens, stereo fundus photography are all tried. But they need a prolonged timing.
- iii) **Intraocular pressure:** Generally speaking, It is an unreliable method for early diagnosis. Perkins applanation tonometer is an appropriate instrument for mass screening. If a "cut-off" point between 21 mm and 24 mm Hg. is taken, at least half of all glaucoma patients will be missed as they do not have a raised IOP at the time of examination³. In the

Baltimore eye survey 215 out of 1770 subjects (12.1%) were referred because they had intraocular pressure more than 21 mm Hg. Only 4 of them i.e, 1.86% of the referred people, and 0.2% of the total people who were initially screened by measuring intraocular pressure satisfied the definition of glaucoma⁵. Till to-day reduction of intraocular pressure is the only way to stop or check the progress of glaucomatous damage. But studies have revealed that the association between intraocular pressure and progress of glaucomatous damage was not as strong as was believed earlier⁶.

- iv) **Combination of tests:** Tielsch and co-workers(1991)⁵ in the Baltimore eye survey, reported 196 cases out of 1435 persons screened to have a definite or probable glaucoma. Their observation was:

Test	Sensitivity	Specificity
Tonometry(>21 mm Hg)	47.1%	92.4%
Tonometry(>18 mm Hg.)	65%	65%
Cup-disc ratio	48%	89%
Narrow neuroretinal rim	adequate	adequate

They were of the opinion that there was no test or tests of reasonable sensitivity and specificity to conduct a population based screening programme for glaucoma⁵. Measurement of intraocular pressure alone may miss 50% of the glaucoma cases and examination of optic nerve head alone may miss 33% of cases³.

Armaly(1969)⁷ suggested to perform testing of visual field on all subjects having IOP over 15 mm Hg. to identify those cases of definite glaucoma with loss of visual field. Leske et al (1979)⁸ reported that only a few of those people who are found to have IOP more than 21 mm Hg. have field defects as well.

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The issue is very complicated while conducting any study in the population and more so in the developing world. Glaucoma screening amongst population at risk has to be done in a community setting. This will help in detecting early cases and improving development of community awareness⁵. In a review of 24 community based studies, it was shown that further referral was needed in an average of 5.41% of those screened for the first time⁹. In a health care setting again, the referral rate was still higher. There were reasons for that the people who are at higher risk of developing glaucoma – come to the health care setting. But there are still reasons for doing screening in a community setting particularly in higher risk group of

people. Sommer(1996)¹⁰ suggested frequent visual field examination of subjects because patients remain symptom less until 80% to 90% of the optic nerve is destroyed. Considering the difficulty of the task he also suggested that a visual field examination may be done only on people having IOP over 23 or 25 mm Hg. but in all probability it will reduce overall sensitivity by another 50%. Quigley (1996)¹¹suggested that the detection of the earliest cases of glaucoma was not necessary. He emphasised that due to a low disability /case ratio, it would be realistic to identify those glaucoma patients who are at high risk of blindness.

Situational analysis in a community

	In 2010	In 2020
<i>The prediction on glaucoma:</i>	60.5 million OAG & ACG.	79.6 million – 74% OAG
<i>Blindness due to glaucoma:</i>	4.5 m with OAG & 3.9m with ACG	5.9 m with OAG and 5.3 m with ACG

Asians – 47% of Total glaucoma patients and 87% ACG¹²

Referral criteria from block to district level hospitals

A rough calculation may be done assuming a block having 100,000 populations and a district with 20 such blocks with a glaucoma prevalence rate around 4% in 50+ years age group. If referral criterion is on IOP >21 mm Hg alone then approximately 500 individuals per block i.e; around 10000 people from the whole district will be referred to the district level hospitals each year. If referral criterion at block level is on VCDR >0.6 alone, then approximately 300-400 individuals per block and a total around 6000 people would through the district hospitals every year. If referral criteria is a combination of IOP >21 mm Hg and VCDR >0.6, or, *VCDR 0.9 alone*, then around 100 individuals per block and around 2000 people will be referred each year to a district level hospital. From the above calculation it may be said that the third option is rather feasible, taking into consideration that around 5 ophthalmologists at district and sub-division level screen 400 persons each to detect glaucoma. Definitely a load of the patients will

be tackled by the other private practitioners in the district. But at the grass root level, the Paramedical Ophthalmic Assistant(PMOA) should examine all people of all villages aged 50 years and above. The PMOAs in the BPHCs should be retrained in performing tonometry (Schiotz) and optic disc examination with direct ophthalmoscope with standard charts for comparison. Special training in the glaucoma procedures (Automated Perimetry, stereoscopic disc examination with +60 D / +78 D / +90 D lenses, applanation tonometry and Gonioscopy) for all ophthalmologists (Govt. and non-govt. institutions) may be necessary.

Experience from West Bengal Glaucoma Study

This study was undertaken in a rural population in West Bengal, India to determine the prevalence of glaucoma in people aged 50 years and above in 9 villages of 3 blocks of South 24 Paraganas district. A cluster random sampling was done. Out of a total population of 13,215 enumerated in the 9 villages, 1594 people aged 50 years or more were identified and were eligible to undergo clinical examination

for glaucoma. Of these, 1324 persons (83.1%) responded to the invitation to attend for examination at clinics established in the villages. Besides a detailed history, Best corrected visual acuity (BCVA), a detailed examination under slit lamp, Visual field examination, Intraocular pressure measurement with applanation tonometry, Centre Corneal Thickness measurement (CCT), by optical pachymetry, gonioscopy and a dilated disc examination (+90 D) including fundus photography (Topcon) were done.

The details of the methodology were described elsewhere¹³. The age-standardised estimate for the prevalence of all glaucoma in people aged 50 years or more was 3.4%¹³. "The authors conclude that ophthalmic services in West Bengal should focus on detecting POAG. Since there is still no satisfactory method of screening for POAG, there is no alternative to case detection (opportunistic screening) in eye clinics"¹³.

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