

Blindness And Visual Impairment In India Due To Glaucoma Can Be Prevented

¹Kishor P. Govekar, ²Mukesh K. Sharma, ³Deepa Sharma, ⁴Anshu Anind, ⁵Pratima Mishra

¹Assistant Professor & Eye Consultant, ²Eye Consultant, ³Senior Medical Officer, ⁴Senior Resident Doctor, ⁵Postgraduate Student Eye Department, Dr. R.M.L. Hospital & PGIMER, New Delhi, India.

ABSTRACT:

Background & Objectives: A lot has been done to decrease prevalence of blindness in India since the National Programme for Control of Blindness (NPCB) was established in 1976.¹⁻³ However, the focus has been on curable causes of blindness and less attention has been given to preventable causes like glaucoma.⁴ In this context, Rapid Assessment Methods for Blindness (RAAB) are elucidated for evaluation, epidemiological and statistical analysis of blindness due to glaucoma in India.^{5,6} **Method:** We use a strategic plan starting from PHC with participation of community to screen glaucoma cases under the NPCB. The available manpower at the PHC is utilized with their training & supply of logistics. **Result:** The aim is to screen for glaucoma at the earliest in the community to prevent blindness and then either to treat, refer or rehabilitate them to reduce morbidity or blindness due to glaucoma. **Conclusion:** Many causes of blindness are preventable including glaucoma, if we create proper awareness by health education and by giving proper training to the PHC staff, for regular eye checkup and how to diagnose glaucoma. This strategic plan lowers the prevalence & the morbidity of glaucoma.

Key-words: Blindness, Glaucoma, NPCB, RAAB.

Corresponding Author: Dr. Kishor P. Govekar, A-32, Pocket D, SFS Flats, Mayur Vihar Phase 3, New Delhi-110096 India. kishorgovekar@yahoo.com

INTRODUCTION:

The prevalence of glaucoma in India varies from 1% to approximately 6%. (NPCB -1%, 2006-2007; DGHS-6%, 1999-2001). There are approximately 6.48 million cases in India.^{4,8-12} Glaucoma is designated as the third most common cause of blindness in India. However, the number is supposedly much more, as much as 12 million. The problem is analogous to the tip of the iceberg like any other disease. To find this unidentified population, more efforts will be required for detecting glaucoma starting from the grass-root level.^{7,13} Primary open angle glaucoma (POAG) can be called as the “thief of sight” as there is a gradual painless loss of vision which patients fail to realize. However, once vision is lost, it can't be

recovered. Moreover, it is a bilateral disease of old age, but if we diagnose early, then the medical or surgical treatment can be started to halt further progression.

Although symptoms of this disease are vague, e.g., excessive tearing, photophobia and squeezing of lids (blepharospasm), many high risk factors, symptoms and signs can be identified by preliminary ocular examination by medical or paramedical workers at PHC level.⁷ This can be linked to the existing National Programme in India like NPCB and strategic plan like the Motiabinu Mukti Abhiyan (MMA). MMA is a novel community initiative to cure cataract by screening in the community and offering surgical and rehabilitative facilities. Community level

screening obviates the need to treat an affected patient who may not be able to do so because of lack of resources, cost of medicines, unaffordable cost of surgery, etc. Addition of glaucoma screening, training along with cataract screening training initiatives to PHC workers, which would aid monitoring and implementation of glaucoma control programme. Moreover, public awareness and participation, delivering of eye health education for removal of taboos by changing knowledge, attitude, practices and optimum utilization of human resources to prevent blindness due to glaucoma and subsequent national economic loss.

METHODS:

Diagnosis of glaucoma requires a comprehensive ophthalmic examination by tonometry, ophthalmoscopy, visual field testing and optic nerve head imaging. The medical officers and paramedical ophthalmic assistant at the PHC should be trained enough to identify high risk patients for glaucoma (glaucoma suspects) by taking a detailed history and performing an appropriate examination.^{7,13}

Screening of Glaucoma-The only effective way is through comprehensive eye examination as there is no single test for detecting glaucoma. It is also called in community as RAAB i.e. rapid assessment method of blindness study at the grass root level and at most primary health centers where limited equipments are available.^{5,9} It is vital to have a good screening protocol at peripheral level. POAG diagnosis is based on measurement of certain parameters. Although POAG treatment is responsibility of secondary or tertiary level, but at PHC level health worker or assistant also have a role to play in the preventive aspect of glaucoma control programme. RP Center of AIIMS has a fixed criteria for diagnosis of glaucoma by taking an IOP more than twenty one, Diurnal phasing, Perimetry, Imaging of optic nerve head (ONH) by HRT, Non mydriatic fundus camera, Anterior Segment OCT and requires a

sophisticated machine. However, high risk factors at PHC for glaucoma are identified and should be looked for, as mentioned below in a questionnaire format.^{5,7}

Age more than 40 years of age, ethnicity, positive family history of glaucoma blindness, refractive status-high myopia, previous ocular trauma or inflammation or previous history of surgery, history of headache, use of steroid in allergy, decreased vision in one eye, frequent changes of near glasses, the increased minimum light requirement for reading and difficulty in a working environment. Observe patient and talk to relatives regarding difficulty in moving around and, taking a long time to search things. In brief occupational history, it will be possible to pick up some clues which suggest a high risk of glaucoma. Eye examination at PHC is done to find glaucoma suspect and those with positive findings are registered under Glaucoma.^{13,14}

ADCPRO testing: Acuity, Digital Tension, Pupillary Examination, Confrontation Field Method, R.A.P.D., Ophthalmoscopy

1. Visual acuity counting fingers at different distances.
2. Assess digital intraocular tension (DTN) with eyes closed and each eye is assessed separately.
3. Confrontational visual field testing is done for each eye separately.
4. Use of torch to see white or black pupil and clinical examination of pupillary reactions.
5. Pupillary light reflex and look for RAPD.
6. Use of direct ophthalmoscope to see the optic nerve head after dilatation of the pupil.

- (a) Visual Acuity-Snellen's Charts: Near and distance visual acuity is recorded using Snellen's charts, and if a patient's vision is poor counting finger visual acuity is taken.
- (b) Digital Tension of the eye: During the screening of glaucoma a simple palpation of one eye at a time using the

index finger of both hands for fluctuation is done. A normal eye feels like a tomato that is just ripe neither solid nor soft. The pressure of both eyes should be compared with each other. However, this method is very crude and needs to be done only by persons who are experienced. To have an objective and calculated intraocular tension, Schiotz tonometer should be used. It is very simple to use and the procedure can be learned easily. It is a compact, portable, easy to sterilize and has low maintenance cost.

- (c) Torch light examination: When there is a diminution of vision, pupil is examined, if we find a white pupil cataract is suspected, and if we find black pupil glaucoma is suspected. Anterior chamber depth – is assessed by eclipse test. RAPD (Relative afferent papillary defect) should also be looked for in a suspect of glaucoma, retinal or optic nerve disease. This is clinically tested on swinging flashlight test and may be graded like trace/subtle: 1-2+:3-4+: or amaurotic accordingly.
- (d) Confrontation method: It is one of the basic methods to assess the patient's visual field. In glaucoma the visual field starts constricting but the patient is not aware of this until tunnel vision is left. The confrontation method requires a doctor's skill at the PHCs.
- (e) Direct Ophthalmoscopy: Look for cup changes which include a large cup of 0.5 mm or more in both eyes compared to disk size and an asymmetry of cup of 0.2mm or more. Dilated pupil makes ocular examination easier. Some characteristic findings suggestive of glaucoma are large cup size, asymmetry of cups, lost Neuro-retinal rim (ISNT rule). According to ISNT rule, visual field loss occurs first inferiorly followed by superior, nasal and temporally at last.

- (f) Glaucoma registration, awareness, referral, education, and rehabilitation (RARER).¹³ Patients with glaucoma suspect are registered so that they can be easily followed up or established cases diagnosed elsewhere or those requiring further investigations referred to higher centers, medical colleges, RIO, DBCS or AIIMS like institute having advance facilities. Finally, registration is useful for patient record maintenance and medicine distribution. Those who require low vision aids (LVA) are referred to LVA clinics or motivated for community based rehabilitation.
- (g) Public eye health education & counselling: Creating community awareness programme through Eye camp approach with involvement of NGOs, Lions club, General practitioners and PPP support group. It is also important to talk to the patient regarding risks and benefits as well as side effects of medical treatment. Noncompliance group of patients and reluctance for surgery for glaucoma is a major issue and should be resolved by motivated them. There are various myths about this disease which should be removed. Simple eye health education like when and how to apply eye drops regularly on their own e.g. by pulling lower lid.^{5,7} Eye health education is an integrated approach at personnel, social, primary, secondary and tertiary level and linked with other national programme like Vision 2020.^{15,16}

At Secondary or Tertiary level:

Measurement of intraocular pressure is done by applanation tonometry which is the gold standard method of IOP measurement, gonioscopy must be done to rule out other causes of glaucoma apart from POAG,^{11,14,17} visual field testing by SAP (Standard Automated Perimeter) helps in analyzing the visual field to diagnose glaucoma. It is easy, reliable, and affordable

to detect specific field changes, e.g., generalized constriction of The field, tunnel vision or total loss.

	Current status	Need	Need of the instrument	Challenges
Primary level	ASHA (Awareness) HW Male Female MO,GPs, PMOAs Guidelines: 1. Format for high risk cases and history of glaucoma(registration for glaucoma).	ASHA per 1000, ANM per 5000 Health Worker and Health Assistant	1.DARK ROOM(10sqm) 2.Visual acuity chart 3. Pupil black/white pupil RAPD 4.DTN/Schiotz 5.Confrontation method of field. 6.Ophthalmoscopy	Overburdened, Lack and untrained PMOA, non involvement of private practitioners. Increase IEC activity Follow up & issuing of Glaucoma medicine to the Glaucoma patients. Counseling for surgery.
	Awareness compliance and follow up of glaucoma and identifying people with risk and screening for Glaucoma in glaucoma suspects	More training in PEC (Glaucoma is a part) Screening by Schiotz tonometry 40+ people.	1.Torch 2.opthalmoscope 3.IEC chart for Glaucoma 4.Schiotz tonometry 5 Referral chart	Proper referral of difficult cases. Eye Health education. Aware of the quakers from Home made drugs. Training for PHC staff is very difficult as it is a specialized field. 10 days training.
Secondary level	Ophthalmologists (1-3) PMOA, One nurse (MICROSCOPE-OT)	2 Months training. Refreshers training Short training course on Glaucoma	Applanation tonometer/ Gonioscope/ YAG laser, Slit lamp with applanation 78D,SAP, 90Dpachymeter, NCT, Automated perimeter, ophthalmoscopy, Fundus camera	Cost maintenance (AMC) Online access to GSI website EMR SOPs and flow chart for diagnosis and management Telemedicine facility Drug bank Reimbursement of costly drugs in setup
Tertiary level	Medical colleges do not have glaucoma specialist and clinics	Glaucoma with expert consultant Support of Counselers/ PMOA's Strict guidelines enforced bare minimum	Dedicated OT AS MENTIONED IN SECONDARY LEVEL + Imaging devices Low vision devices Diode laser	Fellowship in glaucoma Awareness A prominent personality addressing meetings. SOP's Attitude toward glaucoma Cost and maintenance and utilization LVA training, issuing of disability certificates and rehabilitation Government back up funds Resources not available Road transport facilities poverty

Recommendations:

The following guidelines are to be followed:

1. Creating awareness of glaucoma among people (after community it is named as Kala Pani, or Kala Motia), glaucoma support groups, increase awareness by Community involvement, eye health education, using attractive educational material. Involvement of mass media to propagate messages, shows, Posters, glaucoma walk, counselling, displaying the slogan through internet, patient education booklet, talk by a leader on glaucoma prevention on various aspects of the disease and its care.^{7,13}
2. Giving due importance in undergraduate and postgraduate training in medical colleges, encouragement for health providers of PHC to attend CMEs so that they can acquire knowledge, or training manual for PHC and paramedical health workers and making of logistics available to PHC including torch, Schiotz tonometer, ophthalmoscope. In future non-mydiatric fundus should be provided for taking photographs of disk sent by a smart phone for diagnosis as in teleophthalmology. Introduce teleophthalmology to reduce cost of treatment for each patient.^{7,13}
3. Use of the GSI website for glaucoma registration and for follow-up cases.^{6,13}
4. Encourage health promoting standard operating procedure (SOPs).
5. Glaucoma screening should be done during an eye examination in the eye camps or mobile unit.
6. For production of glaucoma indigenous drugs for the poor, there should be a drug bank contributed by the Government and Drug Company.
7. Subsidize the travel cost of poor to reach to PHC.
8. Qualitative research.
9. Financial support, from Government of India.
10. NICE-National institute for health and clinical Excellence, UK (2009) has published guidelines on diagnosis and management of glaucoma, which are evidence based. Such guidelines are not only for ophthalmologists but also useful for the information, referral, communication, and staff management.^{7,17}
11. In strategic planning goals are set to be achieved, target population is identified, areas of priority are decided, time limits for the programme are set, and guidelines are framed.
12. Various indicators as a part of MIS for the implementation and evaluation of programme and staff management.

Control of blindness is one of the important health care programme in India (GOI-National health policy document 1983^{5,12}). One of the human basic rights is the right to see. We have to ensure that no citizen goes blind needlessly, or being blind, does not remain so, if by reasonable deployment of skill and resource, his eye sight can be prevented from deterioration or already lost, can be restored. Presently the goal set to be achieved under NPCB is to reduce the prevalence of glaucoma or blindness due to glaucoma from 5.7% to targets that are set.

CONCLUSION:

Many causes of blindness seen are preventable, including glaucoma. If we create awareness of health education and use medical facilities for a regular eye checkup and treatment, we can achieve the target or can reduce the prevalence and morbidity or disability due to glaucoma or glaucoma related blindness. Glaucoma is a disease of old age and has bilateral involvement. There is a need for services to diagnose and treat early. The programme for prevention of glaucoma has to be integrated into the existing National Programme in Rural and Urban setting, i.e. PHC and effective use of Human resources as well as financial assistance from Government of India has to

be provided.^{8,15}

Conflict of Interest: None Declared.

Source of Funding: Nil

References:

1. Thulsiraj RD, Nirmalan PK, Ramkrishnan R et al. Blindness and vision impairment in rural South Indian population, Aravind comprehensive eye survey. *Ophthalmology* 2003;110:1491-98.
2. Murthy GV, Gupta S, Ellwein LB et al. A Population-based Eye Survey of Older Adults in a Rural District of Rajasthan: I & II, Central Vision Impairment, Blindness and Cataract Surgery. *Ophthalmology* 2001;108:679-92.
3. Mohan M. National Survey of Blindness-India. NPCB-WHO Report. New Delhi: Ministry of Health and Family Welfare, Government of India: 1989.
4. Sinha R, Sharma N. Corneal blindness-present status, Cataract and Refractive surgery Today October 2005; 59-61.
5. Govekar K, Sharma MK. Blindness & Visual impairment in Delhi region National J. of Community Med 2014;5(2):370-72.
6. John N, Jose R. Rapid Assessment of Avoidable Blindness in India. <http://www.plosone.org/article/info:doi/10.1371/journal.pone.0002867>.
7. Mannah F, Susan L, Heiko P, et al. Community eye survey, community eye healthy general International centre for eye health Vision 2020, 2014;3(5).
8. Jose R, Bachani D. World bank assisted cataract blindness control project. *Ind J of Ophthalmology* 1995;43:35-43.
9. Mohan M. Collaborative Study on Blindness (1971-1974): A Report New Delhi, Indian Council of Medical Research: 1987: 1-65.
10. Murthy GS, Gupta SK, Bachani D. et al. Current estimates of blindness in India, *Br J of Ophthalmology* 2005; 89: 257-60.
11. NPCB in India. Achievements. Ophthalmology section. DGHS, MOI & FW, GOI, New Delhi: Nirman Bhavan: 2004:23.
12. Sarin IB. Health and Population, Perspectives National Programme for Control of Blindness NPCB by 2001;24(2):99-108.
13. Workshop on strategic planning for glaucoma management, workshop held on 23rd to 24th November at Advanced eye centre, PGIMER, Chandigarh.
14. WHO global initiative for elimination of avoidable blindness: An informal consultation. WHO/PBL/97.61 Geneva: WHO: 1997.
15. Foster A. Cataract And "Vision 2020-the right to sight" initiative. *British Journal Ophthalmology*, 2001;85:635-639.
16. Murthy GV, Gupta SK, John N, et al. Current status of cataract surgery. Cataract blindness and Vision 2020: The right to sight initiative in India, *Ind J of Ophthalmol* 2015; 56(6): 489-495.
17. Shrivastava RK, Jose R, Rammamoorthy K, et al. NPCB. Achievements and targets. NPCB India, 2006;1:5-6.

Cite this Article as: Govekar KP, Sharma MK, Sharma D, Anind A, Mishra P. Blindness And Visual Impairment In India Due To Glaucoma Can Be Prevented, *Int Res Pub Med Sci* 2015; 1(3): 22-27.