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Original Article

Targeted Screening for Awareness Creation and Glaucoma Case Finding in South Indian Community

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Abstract

Purpose: To determine the effectiveness of targeted screening for glaucoma case finding. *Study setting:* Aravind Eye Hospital, Theni. *Materials and Methods:* From hospital database 1493 case sheets of glaucoma patients were retrieved who were informed by postcards (1007), telephone (243) and door to door verbal communication by field workers (253) to come to the base hospital along with their 1st degree relatives for glaucoma evaluation on a particular day. Visual acuity, tension applanation, detailed anterior segment evaluation by slit lamp examination, pachymetry, gonioscopy for relevant patients and optic nerve head evaluation by + 90D slit lamp bio-microscopy were done. New cases of glaucoma were established by IOP, optic nerve head damage and Humphrey visual field (HFA 24-2) analysis. *Results:* 520 patients (New cases / established glaucoma cases – 171 / 349) attended screening in the hospital in a single day. 150 were first degree relatives. 27 (18% of 1st degree relatives) new cases were detected among 1st degree relatives. Overall 48 cases (new / review 27 / 21) were called at later date for HFA 24-2, 45 cases (18 / 27) were advised cataract surgery, 10 cases (0 / 10) were advised combined surgery and 10 patients (6 / 4) were advised 1064 Nd: YAG laser peripheral iridotomy. *Conclusion:* Glaucoma screening and awareness creation program in rural setting is very essential as the major Indian population resides here. This methodology of screening is unique as it provides tertiary care expertise at the doorsteps of rural population and provides awareness of generic nature of disease.

Keywords: Intraocular Pressure; Humphrey's Visual Field Analysis; Field Workers; Vision Centers; Nd: YAG lasers.

Introduction

Glaucoma, the second most common cause of blindness after cataract, causes irreversible loss of vision [1,2,3]. According to World Health Organization, in 2002, 12.3% (4.6 million) of the 37 million blind people worldwide could be attributed to glaucoma. It is predicted that prevalence of glaucoma will exponentially increase to 79.6 million with an estimated 11 million blind in both eyes from glaucoma by 2020 [2]. India has the largest population of persons with blindness and vision impairment with an estimated 18.7 million people blind in India which may increase to 31.6 million by 2020 [4]. Aravind comprehensive eye study done in rural population of southern India reported to have a prevalence of 2.6% for all types of glaucoma with primary open angle glaucoma as the leading cause followed by angle closure glaucoma and pseudo-exfoliation glaucoma [5].

Glaucoma is an eye condition which is treatable and where early interventions can alter or halt the progression of the disease to blindness. However, screening for glaucoma is not as well established as for cataract or refractive errors primarily because of the large differential in prevalence and the relative difficulty to establish a diagnosis (more tests and more equipment in the screening setting) compared with cataracts and refractive errors. This has led to recommendations to use case finding as the first line

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for identification of persons with glaucoma in India [6].

Aravind Eye Hospital, Theni, established in 1985 provides eye care services to a 1.1 million rural population base in Theni, a remote district of Tamil Nadu. We designed a high risk targeted screening approach focused on the first degree relatives of persons with glaucoma (index cases of glaucoma were identified and confirmed at the outpatient department of the hospital) considering that several studies have reported a heritable basis for glaucoma [7, 8, 9, 10]. This manuscript reports on the results of this high risk targeted screening strategy to identify persons with glaucoma. Here we have tried to provide tertiary health care benefits to rural people by utilizing primary health care workers.

Methods

This retrospective analysis had approval of the ethics committee of Aravind eye hospital and post graduate institute and followed all tenets of the Declaration of Helsinki.

With this background a one day glaucoma screening camp was conducted at the base hospital of Aravind Eye Hospital Theni to monitor known glaucoma patients and to screen their 1st degree relatives. 1493 case records of indexed glaucoma patients were retrieved from medical records department using ICD code. Of the indexed cases 1160 (77.7%) case records were from hospital database and 333(22.3%) case records were from vision center database. These vision centers are primary health care centers providing eye care to 50,000 rural populations. There are 9 vision centers situated covering all directions of the district which are well connected with satellite and internet communication with base hospital. A unique methodology of publicity was carried out to inform and educate patients to attend glaucoma screening along with their family members.

Of the 1493 patients, 1007 patients were informed by hand written post cards by our trained paramedics in local language which were sent by post to their respective addresses, 243 patients were informed by phone calls and 254 cases were informed by verbal communication at their doorstep by our field workers. Field workers are ground health staff who are employed in vision centers and take care of outreach activities. Each vision center employs one field worker. Besides mass publicity was done using local cable channels and mike announcements 2 days prior to camp. Glaucoma awareness posters were displayed in various hospitals (Government and Private), vision centers and primary and secondary health care centers.

On the day of camp all patients underwent registration process initially followed by uncorrected visual acuity examination using snellen charts by trained paramedical staff. Intraocular pressures of all the patients were measured by noncontact applanation tonometry followed by preliminary examination of anterior segment by slit lamp. Gonioscopy and pachymetry was done in necessary patients. 3 trained glaucoma experts were invited from our tertiary care center for assessing and diagnosing glaucoma cases. Detailed optic disc evaluation was done with +90D slit lamp bio-microscopy through mydriatic pupils by trained glaucoma experts. Optical coherence tomography 9Stratus OCT, Zeiss meditech) was done in both new and established diagnosed glaucoma cases/ suspects and optic disc evaluation was done using moor-fields regression analysis. Automated perimetry was not part of the protocol. However established glaucoma cases had their Humphreys visual analysis (24-2 and / or 10-2 as indicated) done, field examination for newly diagnosed or glaucoma suspects was performed at a later date. Appropriate management was advised by glaucoma experts followed by counseling by trained counselors. At the end all patients attended a video show depicting and educating the public about glaucoma. Patient flow algorithm is depicted in figure 3.

Results

520 patients attended the glaucoma screening camp. 349 patients or 67.11% of the total registrants were known glaucoma patients and 171 individuals or 32.88% of the registrants were newly screened.150 individuals / 87.7% of new registrants were 1st degree relatives and 21 individuals/ 12.3% of new registrants were 2nd degree relatives. Mean age group of all the registrants was 61.63 years (range 46-92 years). 69.37% were males and 30.63% were females.

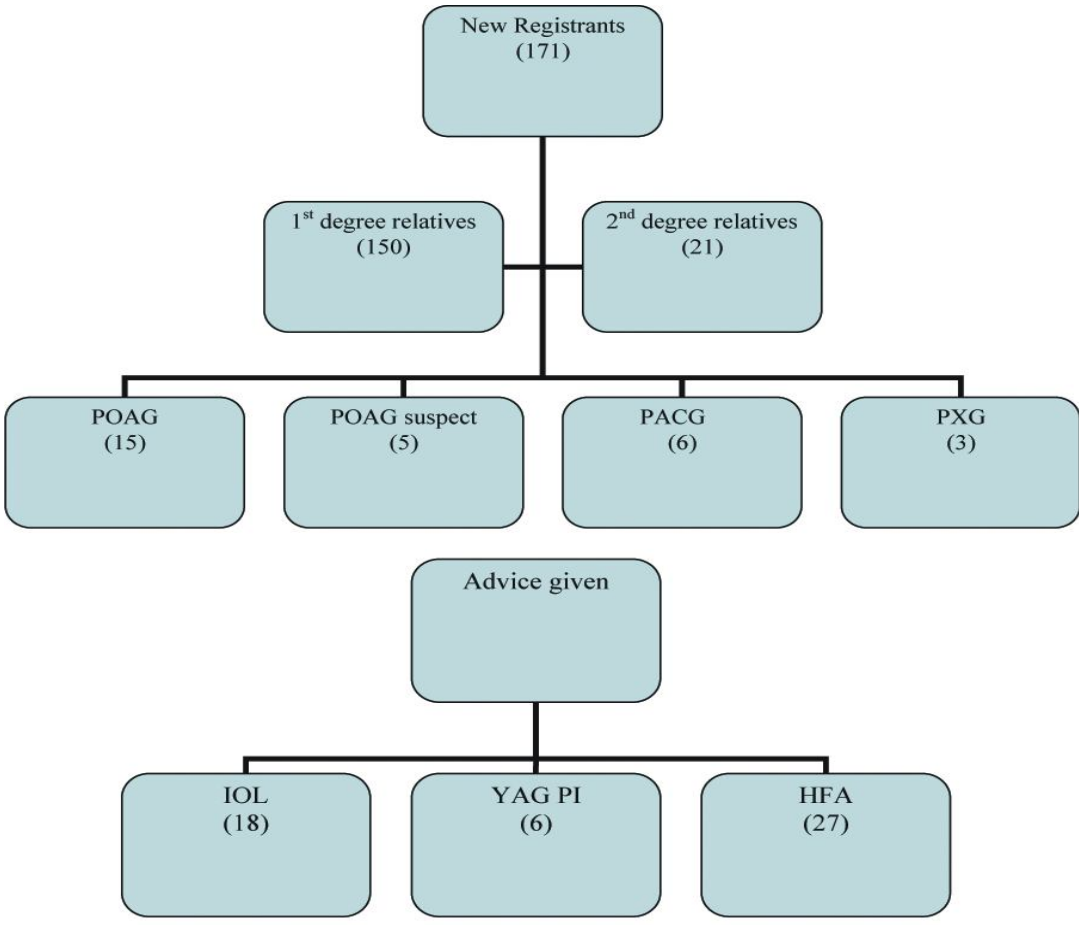
29 cases / 16.9% of new registrants were diagnosed of glaucoma in all forms. 27 cases / 18% of 1st degree relatives were diagnosed of glaucoma. Mean age group of the 1st degree relatives was 51.25 years (range 42-62) Of the 29 cases; 15 cases (51.72%) were primary open angle glaucoma, 5 cases (17.24%) were primary open angle suspects, 6 cases (20.68%) were primary angle closure glaucoma and 3 cases (10.34%) were pseudo-exfoliation glaucoma. 27 newly diagnosed cases were called another day for

full threshold Humphreys visual field analysis 24-2 for confirmation of diagnosis.2 new cases were not advised visual field analysis in view of their advanced cataract. New cases were not advised combined surgery because final intervention is done after analysis of visual field reports at later date.

Overall 10 cases were advised Nd: YAG laser iridotomy of which 6 cases were newly identified cases and the rest 4 were from established glaucoma cases. 10 from the established glaucoma group cases showed remarkable progression in optic nerve head damage (established by OCT) and hence they were advised combined trabeculectomy with cataract surgery and intraocular lens implantation. 18 cases from the new registrants were advised cataract surgery and 27 cases from the established group were advised cataract surgery with intraocular lens implantation through temporal approach as their IOP were well controlled by medical therapy (to salvage superior conjunctiva for trabeculectomy in future). 21 cases from the established group were advised repeat Humphreys visual filed analysis in view of their poor compliance and non-progression of optic nerve head damage in OCT. (Figure 1 shows flow chart of new cases identified and Figure 2 shows flow chart of follow up and management of established glaucoma cases).

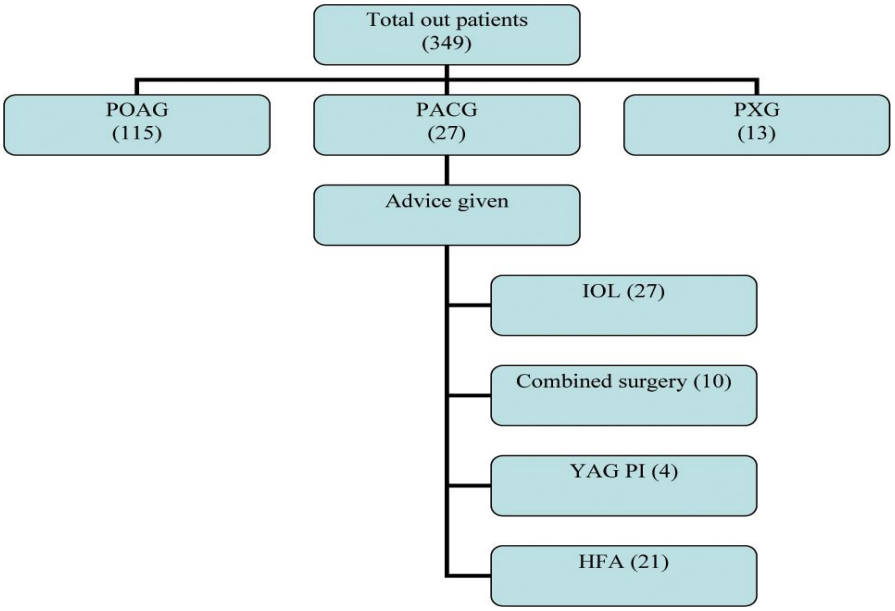
Field workers had a pivotal role in the success of this camp; table 1 shows the performance of each of the field worker in their respective fields.

Fig. 1: Flow chart showing total number of new registrants, newly identified cases and overall management plan.



POAG:- Primary open angle glaucoma
PACG:- Primary angle closure glaucoma
PXG:- pseudoexfoliation glaucoma
POAG suspect:- primary open angle glaucoma suspects
IOL:- cataract surgery with intraocular lens implantation
YAG PI:- Nd:YAG peripheral iridotomy
HFA:- Humphreys visual field analysis

Fig. 2: Flow chart Showing Distribution Of Types Of Glaucoma In Established Glaucoma Patients And Advice Advocated By Trained Glaucoma Experts



POAG:- Primary Open Angle Glaucoma, POAG Suspect:- Primary Open Angle Glaucoma Suspect, PACG:- Primary Angle Closure Glaucoma, PXG:- Pseudoexfoliation Glaucoma, IOL:- Cataract surgery with intraocular lens insertion, Combined surgery:- Combined Trabeculectomy with intraocular lens insertion, YAG PI:- Peripheral iridectomy with Nd:YAG laser, HFA:- Humphreys visual field analysis.

Table 1: Showing the role of individual field workers of each of the vision centers in detecting new glaucoma cases.

Vision Center Name	Door to door visited by field workers	No of New Glaucoma cases identified
Cumbum	60	3
Ambasamudram	20	0
Andipatty	37	1
Bodi	35	1
Chinnamanur	32	2
Periyakulam	25	1
Kadamalaikundu	10	0
Thevaram	15	0
Batlagundu	20	2
Total	254	10

Discussion

Glaucoma as a cause of blindness is of public health significance which needs to be addressed proactively and seriously. In comparison to cataract there is very limited data available for glaucoma. Due to its silent progression most of the people come in late stages where extensive damage to optic nerve head has already been done. Previous studies done in south India estimated 11.2 million people to have glaucoma aged 40 years and above, of which 6.48 million have primary open angle glaucoma and 2.54 million to have primary angle closure glaucoma [5]. Robin et al [10] report from Aravind Comprehensive Eye study that three fourths of rural population aged 40 years and above required eye care services. Lee et al [11] found that knowledge and perceptional barriers were the major obstacles in follow up of the

patients under study amounting to 40% in south India. If this is the pattern of follow ups in known glaucoma patients then situation will be still worse in cases without established diseases [12]. Rural urban disparities in eye care services have further compounded the problem [12, 13, 14]. Only 25% of ophthalmologists practice in rural India. In India ophthalmologist to population ratio is 1:100,000 which is still worse in rural India.

Moreover women have poor access to eye care especially in rural India. Our study also showed poor turnout of females in comparison to males. Thapa et al [15] of Tilganga eye care had conducted similar glaucoma screening camps and awareness creation week for consecutive four years and there was drastic increase in patient attendance but only lacunae was major beneficiaries were from urban region nearly 90% whereas only 10% were from rural region.

Besides glaucoma being a major public health problem it also runs in families. First degree relatives usually have a very high risk of developing glaucoma. Francielli vegini et al [17] of Sao Paolo University did a study among first degree relatives of known glaucoma cases attending glaucoma clinic. They examined 101 first degree relatives and found 10.9% had prior diagnosis of glaucoma and 9.8% were newly diagnosed as glaucoma or glaucoma suspects. In our study we examined 150 first degree relatives, 27 cases /18% were newly diagnosed of glaucoma. The glaucoma inheritance study in Tasmania and other states of Australia examined 442 individuals with strong family history of glaucoma (not only first degree relatives of glaucoma),13% had prior diagnosis of glaucoma or glaucoma suspect status and 16% were newly diagnosed [18]. Even Baltimore eye survey and Barbados eye study showed that people with positive family history of primary open angle glaucoma are more vulnerable to develop glaucoma [19, 20]. Randall et al published a study in which 86 relatives of POAG were examined; showed prevalence of disease in relatives was 30% [21].

Conclusion

The methodology adopted here utilizing paramedics and field workers to detect new cases among first and second degree relatives is very essential and helpful in preventing progression of glaucoma to blindness. As majority of Indian population resides in rural areas with inadequate infrastructure and poor awareness, there is increasing role of local health workers to survey and create awareness of generic nature of the disease.

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