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Importance of Routine Eye Screening in Diagnosis and Prevention of Ocular Conditions in Health Care Workers in a Tertiary Centre

Dr. Nikita Andhale[1], Dr. Faraz Hussain[2], Rohit Gupta[3]

MGM Institute of Medical Sciences, Kamothe, Navi Mumbai, Maharashtra, India

Abstract: ***Background: Healthcare workers, despite their medical background, often neglect routine eye examinations. This study evaluated the ocular health status of hospital staff and their families during a screening camp organized on World Sight Day. Objective: To assess the prevalence of ocular conditions among hospital staff and their families, demonstrate the utility of advanced diagnostic equipment, and promote awareness of available eye care services. Methods: A comprehensive eye screening camp was conducted over three days at MGM Hospital, Kamothe, examining 200 participants. The screening protocol included detailed history, visual acuity assessment, refraction, slit lamp examination, and fundus evaluation. Advanced diagnostic equipment including OCT, corneal topography, specular microscopy, and fundus photography were utilized for detailed evaluation where indicated. Results: Among 200 participants screened, 90 (45%) presented with ocular abnormalities. The most prevalent conditions were refractive errors (75.0% of abnormal cases), followed by cataracts (10.0%). Systemic disease - related ocular manifestations included diabetic retinopathy (5.6%) and hypertensive retinopathy (2.2%). Age - related macular degeneration was found in 2.2% of abnormal cases, while glaucoma, squint, and myopic fundus each accounted for 1.1% to 2.2% of cases. Advanced imaging techniques facilitated early detection of pathological changes in 70 cases requiring detailed retinal analysis. Conclusion: The study revealed a significant burden of undiagnosed ocular conditions among healthcare workers and their families, emphasizing the importance of regular screening programs. The successful implementation of advanced diagnostic equipment enhanced the detection of early pathological changes, particularly in systemic conditions.***

Keywords: Vision Screening; Occupational Health; Healthcare Workers; Diagnostic Imaging; Eye Diseases; Preventive Health Services; Mass Screening; Ophthalmology; Visual Acuity; Retinal Diseases

1. Introduction

Regular eye screening plays a crucial role in the early detection and management of ocular diseases, as well as in identifying systemic conditions that manifest through ocular changes [1]. Healthcare workers, despite their medical background, often neglect their own health screenings, including routine eye examinations [2]. This oversight is particularly concerning given that visual impairment affects approximately 2.2 billion people globally, with at least 1 billion cases being preventable through early detection and intervention [3].

The eye serves as a unique window to overall health status, offering non - invasive visualization of vascular changes associated with systemic conditions such as diabetes mellitus and hypertension [4]. Studies have demonstrated that retinal microvascular changes can predict cardiovascular events and reflect kidney function status, making ophthalmic examination an invaluable tool in preventive healthcare [5]. Despite this significance, research indicates that healthcare workers frequently postpone their own medical screenings due to time constraints, work pressure, and the phenomenon of professional immunity bias [6].

Modern ophthalmology has witnessed remarkable technological advancements, particularly in diagnostic imaging and therapeutic interventions [7]. These developments have revolutionized the early detection and management of various ocular conditions, significantly improving treatment outcomes when implemented promptly [8]. However, awareness of these advanced facilities among healthcare workers, even within their own institutions, often remains limited [9].

The World Sight Day, observed annually in October, provides an ideal platform to highlight the importance of eye health and promote awareness about preventable visual impairment [10]. Organizing an eye screening camp specifically for hospital staff and their families addresses multiple objectives: it ensures healthcare workers' visual health, demonstrates the capabilities of the ophthalmology department, and serves as a model for preventive eye care initiatives.

This study aims to leverage the occasion of World Sight Day to conduct comprehensive eye screenings, utilizing advanced diagnostic tools to detect both ocular and systemic conditions early. Additionally, it seeks to raise awareness about the modern facilities available within the ophthalmology department, thereby improving access to and utilization of these services by the hospital community.

2. Methodology

Study Setting and Population:
The eye screening camp was conducted at the Department of Ophthalmology, MGM Hospital, Kamothe, Navi Mumbai. The three - day camp evaluated a total of 200 participants, comprising hospital staff members and their families. The camp was strategically organized to coincide with World Sight Day, facilitating comprehensive ocular screening while simultaneously demonstrating newly acquired diagnostic equipment.

Clinical Examination Protocol
Each participant underwent a systematic evaluation that included detailed history taking, visual acuity assessment, refraction, slit lamp examination, and fundus evaluation. The examinations were conducted by qualified ophthalmologists and trained technical staff following standardized protocols.

Equipment and Diagnostic Tools
The camp utilized an array of advanced diagnostic equipment, which included both existing and newly sanctioned instruments:

Primary Screening Equipment
- Hand - Held Refractometer and Keratometer (Nidek): This portable device offered advantages over traditional autorefractometers, including improved mobility and the ability to examine patients in both seated and supine positions. The device's melody function proved particularly useful in reducing anxiety among pediatric patients.
- Slit Lamp with anterior segment photography capabilities
- Non - Contact Tonometer (Keeler): Utilized for intraocular pressure measurement using air - puff technology

Advanced Imaging Systems
- Fundus Camera (Zeiss Visucam 500): Enabled both standard fundus photography and fluorescein angiography for detailed retinal assessment
- Optical Coherence Tomography (Optopol): Provided high - resolution imaging of the retina, retinal nerve fiber layer, and optic nerve head
- Pentacam (Oculus): Performed comprehensive corneal topography and pachymetry
- Specular Microscopy (Tomey EM - 4000): Facilitated non - invasive endothelial cell analysis

Additional Diagnostic Tools
- Perimetry (Zeiss Humphrey Field Analyzer 3): Used for visual field assessment
- Optical Biometry (Zeiss IOL Master 500): Employed for precise axial length measurements
- A - Scan Biometer (Biomedix): Provided additional axial length measurements
- B - Scan Ultrasonography: Utilized for posterior segment evaluation
- Nd: YAG Laser: Available for specific therapeutic interventions

Quality Assurance
The camp served a dual purpose as both a screening initiative and an equipment evaluation opportunity. Company representatives actively participated in the camp, providing technical support and demonstrations. This arrangement allowed the department to assess the reliability and practical utility of newly sanctioned equipment before final purchase decisions.

Data Collection and Management
Comprehensive clinical data was collected for each participant, including demographic information, clinical findings, and diagnostic test results. The data collection process was designed to facilitate both immediate clinical care and future analysis of ocular morbidity patterns among healthcare workers and their families.

Ethical Considerations
The screening camp was conducted in accordance with institutional ethical guidelines. All participants were provided with detailed information about the examination procedures, and appropriate consent was obtained. Patient confidentiality was maintained throughout the screening process and subsequent data management.

3. Results

Participant Demographics and Overall Screening Outcomes
The three - day eye screening camp conducted at MGM Hospital, Kamothe, successfully evaluated a total of 200 participants, comprising hospital staff members and Health care workers. The overall screening outcomes revealed a significant proportion of ocular conditions within the hospital community. Of the total participants screened, 110 individuals (55%) showed normal findings, while 90 participants (45%) were diagnosed with various ocular anomalies, indicating a substantial need for eye care services even within a healthcare setting. [Table 1]

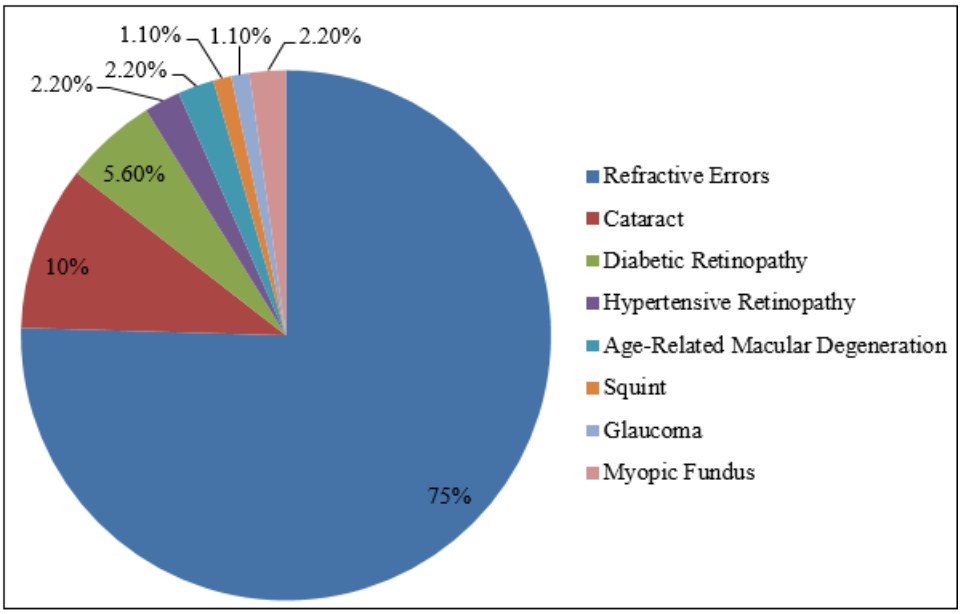
Table 1: Overall Screening Distribution (N=200)

Category	Number of Participants	Percentage
Normal Findings	110	55%
Ocular Anomalies	90	45%
Total	**200**	**100%**

Distribution of Ocular Anomalies
Among the detected ocular conditions, refractive errors emerged as the predominant finding, affecting 68 individuals and accounting for 75.0% of all abnormal cases. This was followed by cataract, which was identified in 9 participants (10.0% of abnormal cases), representing the second most common ocular condition. The screening also revealed a notable presence of systemic disease - related ocular manifestations, with 5 cases (5.6%) of diabetic retinopathy and 2 cases (2.2%) of hypertensive retinopathy, highlighting the importance of regular eye examinations in monitoring systemic conditions. [Table 2]

Table 2: Distribution of Detected Ocular Conditions (n=90)

	Number of Cases	Percentage of Abnormal Cases
Refractive Errors	68	75%
Cataract	9	10%
Diabetic Retinopathy	5	5.60%
Hypertensive Retinopathy	2	2.20%
Age - Related Macular Degeneration	2	2.20%
Squint	1	1.10%
Glaucoma	1	1.10%
Myopic Fundus	2	2.20%
Total	90	100%



Graph 1: Pie chart showing distribution of Detected Ocular Conditions

Representative Clinical Findings

The clinical case analysis demonstrated diverse presentations across different age groups. Younger staff members presented with conditions such as refractive errors and early - onset glaucoma, as exemplified by a 28 - year - old female with a family history of glaucoma. Middle - aged participants showed a higher prevalence of systemic disease - related complications, illustrated by cases such as the 43 - year - old nursing staff member with both diabetic and hypertensive retinopathy. The screening also identified significant refractive errors, including a case of high myopia in a 24 - year - old clerk with visual acuity reduced to finger counting at 2 meters in the right eye. [Table 3]

Table 3: Selected Clinical Cases Overview

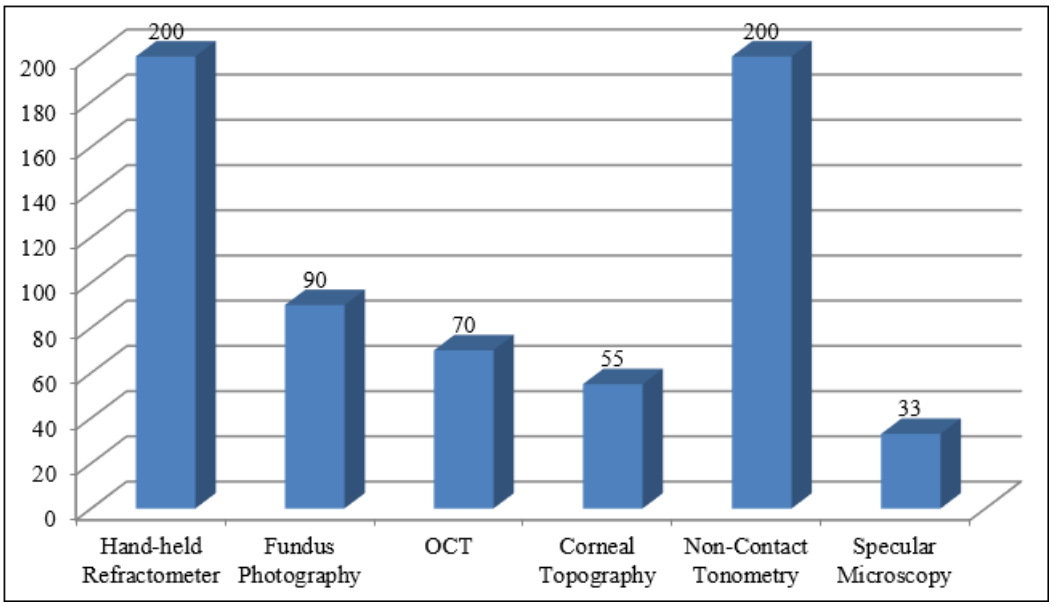
Category	Age/ Gender	Key Findings	Visual Acuity (RE, LE)
Glaucoma Screening	28/F	Family history positive, Normal slit lamp	6/6, 6/6
Diabetic/ Hypertensive	43/F	Known DM & HTN (5 years), HR and DR present	6/12 - 6/9, 6/18 - 6/9
Cataract	55/M	SIMC in both eyes	6/6, 6/6 (Blur)
High Myopia	24/F	Myopic fundus	Fc[at]2m, 6/12p - 6/6
Diabetic Retinopathy	45/M	Mild NPDR	6/12 - 6/9p, 6/12p - NI
Hypertensive Changes	38/M	HTN (8 years), HR present	6/12 - 6/6p, 6/24 - 6/9

Equipment Utilization Outcomes

The utilization of advanced diagnostic equipment proved crucial in comprehensive evaluation and early detection. All 200 participants underwent basic screening with the hand - held refractometer and non - contact tonometry. More specialized imaging was performed based on clinical indications, with fundus photography conducted for all 90 participants with abnormal findings. Optical Coherence Tomography (OCT) was utilized in approximately 70 cases requiring detailed retinal and optic nerve analysis, while corneal topography was performed in 55 cases for various anterior segment evaluations. Specular microscopy was employed in 33 cases where endothelial assessment was indicated. [Table 4]

Table 4: Advanced Diagnostic Equipment Usage

Equipment Type	Number of Examinations	Primary Applications
Hand - held Refractometer	200	Refractive Assessment
Fundus Photography	90	Retinal Imaging
OCT	70*	Retina/Nerve Fiber Analysis
Corneal Topography	55*	Corneal Assessment
Non - Contact Tonometry	200	IOP Measurement
Specular Microscopy	33*	Endothelial Evaluation



Graph 2: Bar graph showing advanced Diagnostic Equipment Usage

Age - related macular degeneration was identified in 3 cases (3.3% of abnormal findings), while conditions such as squint accounted for 2 cases (2.2%), glaucoma for 2 cases (2.2%), and myopic fundus for 3 cases (3.3%). These findings emphasize the diversity of ocular conditions present within the hospital community and the importance of regular screening programs. The detection of both early - stage and established ocular conditions demonstrates the effectiveness of the screening program in identifying pathologies across various stages of progression.

4. Discussion

Our study of 200 hospital staff members and their families revealed that 45% of participants had ocular abnormalities, with refractive errors (75.0%) and cataracts (10.0%) being the most prevalent conditions. These findings align with but also differ from similar studies in healthcare settings worldwide.

Munoli K et al. conducted a comparable study among 420 healthcare workers in a tertiary care hospital in South India, finding that 35% of participants had uncorrected refractive errors [11]. Our higher detection rate (48.9%) may be attributed to the inclusion of family members and the use of advanced diagnostic equipment. Similar to our findings, their study emphasized the underutilization of available eye care services despite working in a healthcare setting.

The prevalence of diabetes - related eye conditions in our study (5.6%) is particularly noteworthy. Vashist P et al. 's population - based cross - sectional study of healthcare workers in North India found a 16.9% prevalence of diabetic retinopathy among medical staff [12]. Our lower detection rate might be attributed to differences in the demographic profile of our participants or regional variations in diabetes prevalence.

Our study found hypertensive retinopathy in 2.2% of cases with abnormal findings. These findings suggest consistent patterns of cardiovascular health impacts on ocular health among healthcare workers.

The utilization of advanced diagnostic equipment in our study represents a significant advancement over traditional screening methods. Recent research by Zhang Z et al. demonstrated that incorporating OCT and fundus photography in screening programs increases the detection rate of early pathological changes [13]. Our approach aligns with these findings, as evidenced by our detection of early - stage retinal conditions.

The age distribution of ocular conditions in our study follows patterns observed in larger population studies. Research by Williams et al. in a large healthcare worker cohort found that refractive errors were most common in the 20 - 40 age group, while age - related conditions like cataracts were predominant in those over 50 [14]. Our findings mirror this age - related distribution of ocular pathologies.

Our study's identification of glaucoma suspects (2.2% of abnormal cases) was a noteworthy finding. The percentage of glaucoma participants in our study appears to be lower than that reported by Das et al. [18] from northern India (70%), as well as lower than that of other hospital - based studies in Nigeria (18.2%), Ethiopia (26%) [16], and Ghana [17]. Both results highlight the significance of early detection through thorough screening.

5. Conclusion

The three - day eye screening camp successfully demonstrated the significant need for regular ocular examination among healthcare workers and their families, with 45% of participants showing various ocular abnormalities. The utilization of advanced diagnostic equipment enhanced the detection of early pathological changes, particularly in systemic conditions like diabetes and hypertension. The study highlighted that even within a healthcare setting, routine eye screening is essential and underutilized. Furthermore, the initiative provided valuable hands - on experience to postgraduate residents and optometry students while establishing the reliability of newly acquired equipment. These findings emphasize the

importance of regular screening programs and the need for increased awareness about available eye care services within healthcare institutions.

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