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A Comprehensive Approach to Managing Degenerative Myopia: Optical and Non-Optical Interventions in Tertiary Eye Care Hospital

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ABSTRACT

Purpose: To demonstrate the integration of optical and non-optical approaches for the management of degenerative myopia in a tertiary eye care hospital.

Methods & Materials: A total of 60 patients were included in this study who were diagnosed with degenerative myopia in the medical retina & referred to the low-vision & contact lens Department for optical needs and also for non-optical devices for better enhancement of their daily lives. Procedures like History of the individuals, visual acuity, Refraction, Contrast sensitivity, Spectacle/ contact lens dispense, distance device trial, near device trial, and non-optical measurements were done.

Results: The mean age was 27.01±9.22 among 60 patients. Age onset of developing degenerative myopia was found common in less than 10 years old and between 10 and 20 years old that was 37% and 21% respectively. Most of the patients were managed with the spectacle that was 68%, 10% by the contact lens, 10% by both spectacle and contact lens, 9% by spectacle & distance device, and 3% by spectacle & near device. Bright light during near work is common among non-optical devices were 38.3% of total respondents & most common fundus features were found tigroid fundus (40.20), temporal crescent (18.70), tilted disc & peripapillary atrophy (8.30%) each, lattice degeneration 7.50%, lacquer cracks (5.50%). 50% of the total patients were found low-vison due to degenerative myopia.

Conclusion: Pathological myopic patient suffers both clinically & socially. So, proper management could improve functional vision & rehabilitate the patient for better life.

Keywords: Myopia, Myopic Macular Degeneration, Contact lens, Low-Vision, Optical & Non-Optical Devices.

INTRODUCTION

A decrease in visual acuity (VA) may result from degenerative myopia, sometimes referred to as "myopic macular degeneration," "myopic maculopathy," or "pathological myopia." One to three percent of the general population suffers from pathologic myopia [1, 2]. Degenerative myopia, which affects roughly 2% of Americans, is the seventh most common cause of legal blindness. People of Chinese, Japanese, Middle Eastern, and Jewish ancestry are most likely to have it [3]. Although this illness can begin at birth, it usually first manifests in the preteen years. It is thought to run in families. Compared to other types of myopia, degenerative myopia

is more severe and is linked to retinal abnormalities that may result in significant vision loss [3]. It is currently a serious and expanding global health issue that is especially common in Asian and Middle Eastern nations. [4]

Pathological myopia is a genetic condition that is passed down as an autosomal recessive characteristic. It may be linked to further systemic and ocular conditions. Pathologic myopia is linked to environmental variables, alcoholism, rubella, and prenatal and neonatal illnesses (prematurity, syphilis, newborn toxoplasmosis, and maternal toxemia) [5]. High myopia increases the risk of blinding consequences, including retinal detachment, posterior staphyloma, and myopic macular degeneration (MMD), which can all result in irreversible vision loss [6].

Myopic macular degeneration causes vision impairment and blindness early in life, which raises the lifetime economic burden on people, families, and society because of the associated functional limitations and loss of freedom. The functional impairments brought on by MMD may be lessened by the availability of visual rehabilitation treatments [7]. The primary causes of the large number of people with low vision who are very myopic include the high incidence of retinal diseases or problems linked to pathological myopia, such as complete or partial vision loss [8].

One of the major reasons of low vision is degenerative myopia. Low vision in severely myopic eyes can be caused by a combination of conditions, including glaucoma, cataract, macular retinoschisis, lacquer cracks, retinal detachment, choroidal neovascularization, and macular atrophy. [9,10,11,12,13,14]. Both clinically and socially, pathologic myopia is problematic [15]. Clinically and socially, people may feel better if their illness is well managed.

This study aims to find both optical & non-optical management of pathological myopia. No study discussed the low vision management of pathological myopia in Bangladesh. Some studies were done in other countries. The number of cases of degenerative myopia is increasing day by day in Bangladesh. So, enhancing the vision & rehabilitating the patients is now essential for getting a better quality of life in their lives. This study will also discuss the patterns of non-optical devices that are needed in the management of pathological myopia.

METHODOLOGY

This was a hospital-based prospective study that was conducted at the Low Vision Clinic department in CEITC. Patients of all ages were assessed within a period of September 2022 to October 2023. The individuals in our sample were diagnosed in a medical retina and referred to a low-vision clinic for low-vision management and aids. Patients between the ages of 18 and 50 years who were diagnosed with degenerative myopia even with systemic and retinal diseases are both included in this study. Still, those with additional any other ocular abnormalities such as cataract or media opacity and intraocular surgery were excluded. Before eye examinations, the patient was interviewed in person and given a standardized questionnaire that included their demographic information and other pertinent ocular history. A Snellen acuity chart was used to evaluate each eye's distant visual acuity at a distance of six meters. An "N" notation was used to indicate near visual acuity, which was evaluated using a near vision chart. Objective refraction was performed with the help of static retinoscopy to find out the refractive status. For those subjects whose refractive status couldn't be performed by retinoscopy, auto-refraction was performed. Subjective refraction was done with the help of a trial set. Moreover, the Color vision was done by the Farnsworth D-15 test and the visual field was analyzed grossly by the confrontation method. To improve eyesight Contact lens trials, counselling, and management were conducted in the pathological myopic patient. In order to improve their functionality, patients were finally given both optical and non-optical visual

assistance. Following this, they received rehabilitative counselling. All data were entered into a Microsoft Excel database and converted to SPSS (version 22.0 or Windows, SPSS One. Chicago, IL, USA) for analysis. Descriptive statistical measures such as mean ±, standard deviation (±SD) for continuous variables and percentages were computed for categorical variables. Examination data were presented both in tables and graphs.

RESULTS

The mean, median and mode of ages of the patients with pathologic myopia range from 18 to 50 years, where mean, median & mode were 27.01 years, 24 years and 18 years respectively. The standard deviation being 9.22 means the patient ages varied significantly. (Table no-1)

Table no 01: Central Tendency of the age of patients with degenerative myopia

Age range	No.	Mean	Median	Mode	Standard Deviation
18-50 years	60	27.01	24	18	9.22

Table 02: percentage distribution of age onset of study population.

Age Onset	Frequency(n)	Percentage (%)
≤10	37	62
11-20	21	35
>20	2	3

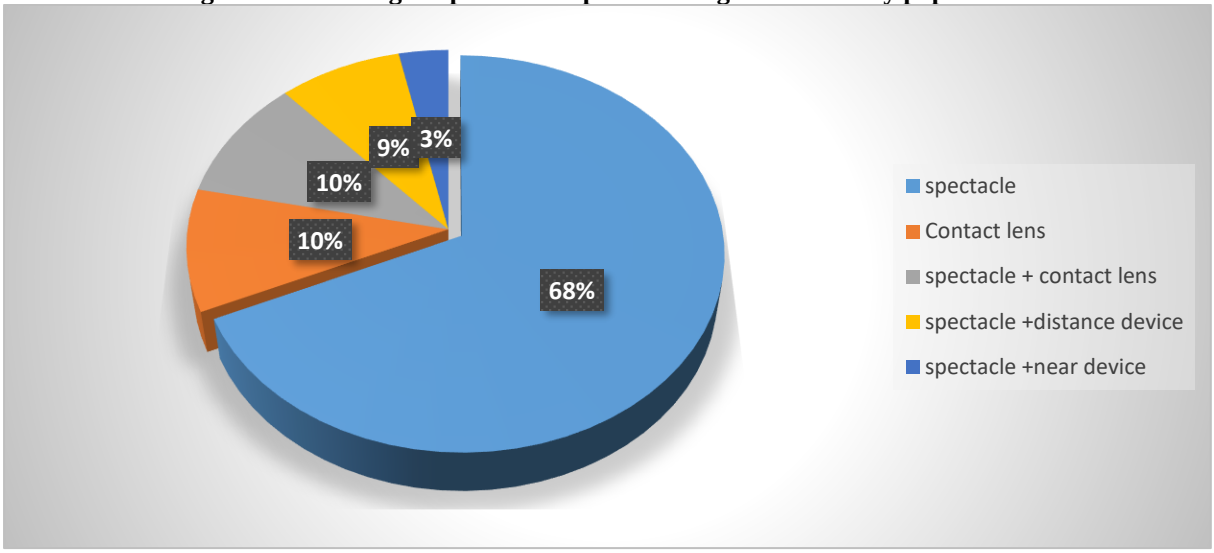
In study population(n=60), 62% had started degenerative myopia below 10 years age,35% had between 11 to 20 years & least amount of 3%, age more than 20 years of old.

Figure 03: Percentage distribution of dioptric value.

Dioptric Value	Frequency(n)	Percentage (%)
<6.00	6	5
6.00-9.00	24	20
>9.00-12.00	26	22
>12.00-15.00	23	19.2
>15.00-18.00	18	15
>18.00	23	19.2

Among 120 eyes of 60 respondents, below 6D had 5%, 6-9D had 20%, >9-12D had 22 %, > 12-15D had 19.2%, >15-18D had 15%, >18D had 19.2%.

Figure 1: Percentage of pattern of optical management in study population.



Among 68% patient were managed with spectacle of the total respondents.

Figure 04: Percentage of non-optical device preference among study respondents.

Non-Optical device Preference	Frequency (n)	Percentage (%)
Bright Light during near work	23	38.3
Contrast Enhancing Support	9	15
Comfort Maintenance	8	13.3
Torch Light at night	7	11.7
Glare Control Device	2	3.3
Orientation & Mobility Support	3	5.0
None of the Above	8	13.3

Among 60 patients, bright light illumination during near activities was the commonest need for daily activities that was almost 38.3%.

Table 05: Percentage distribution features of Fundus of degenerative myopia

Fundus features	No of eyes (n)	Percentage (%)
Tigroid fundus	101	40.20
Temporal crescent	47	18.70
Tilted disc & pale disc	21	8.30
Peripapillary atrophy	21	8.30
Lattice degeneration	19	7.50
Lacquer cracks	15	5.90
Peripheral retinal degeneration	07	2.70
Chorioretinal scar	05	1.90
Macular scar	05	1.90
Posterior vitreous detachment	2	0.70
Peripheral retinal hole	2	0.70
Retinal coloboma	2	0.70
Posterior staphyloma	2	0.70
White with pressure	2	0.70
Total	120	100

Each eye has counted individually where total eyes were 120.

Figure 06: Percentage distribution of low vision & normal vision among study population

Category according to vision	Frequency (n)	Percentage (%)
<6/18	30	50
>6/18	30	50

Among, 60 patients, 30 respondents (50%) were found low vision among degenerative myopic patients.

DISCUSSION

In this study,60 people was diagnosed degenerative myopia where mean age was 27.01±9.22 years & male 25(41.50%), female 35(58.50%). Age onset was found mostly in less than 10 years old & 10-20 years old patient, that was 61% & 35% of the total respondents.

Similar study done by Dr M. Satyanarayana Reddy et al 'A Clinical Study of High and Pathological Myopia' showed age between 10-20 years has the highest percentage of age onset & that was 33% of the total patient.

Moreover, in this study, among 68% patient were managed with spectacle.10% had managed by contact lens. Both spectacle and contact lens were given 10% to the respondents. Spectacle combined with distance low-vision device and near low-vison device were managed by 9% and 3% respectively.

In the review literature of 'Myopic Degeneration and it's Low Vision Management'- by Raju Kati et al discussed that Spectacle, Contact lens, Spotting and scanning distance objects like telescope are low vision management for pathological myopic patient & different non optical device such as direct illumination, eccentric viewing technique, relative larger size devices, bold line paper etc. are also common management of pathological myopia.

Furthermore, among 60 patients, bright light illumination during near activities was the commonest need for daily activities that was almost 38.3%, contrast enhancing 15% and comfort maintenance 13.30% also popular among degenerative myopic patients. 11.70% patient need torch light at night due to reduced vision. Some of the respondents needed orientation and mobility counselling 5%., 13.30% patient did not need any non-optical devices.

Another study –'Management of Low Vision in people with Myopic Macular Degeneration'- by Mufaarriq Shah discussed that, findings from their study demonstrate that adequate optical correction and provision of glasses/contact lens could improve functional vision pf people with Myopic Macular Degeneration.

Again, most common fundus features were tigroid fundus (40.20%), temporal crescent (18.70%), tilted disc & pale disc (8.30%), parapapillary atrophy (8.30%), lattice degeneration (7.50%) & lacquer cracks (5.90%). Other features were Peripheral retinal degeneration (2.70%), Chorioretinal scar (1.90%), macular scar (1.90%), Posterior vitreous detachment (0.70%), Peripheral retinal hole (0.70%), Retinal coloboma (0.70%), posterior staphyloma (0,70%), White with pressure (0.70%).

In the study of 'Pathological myopia: an overview of the current understanding and interventions'- by Takashi Ueta showed different patterns and degrees of chorioretinal atrophy and specific findings including lacquer cracks, Fuchs's spot and myopic CNV.1 Again, 'Degenerative myopia by Dan Roberts' also discussed about typical features such as temporal crescent, lattice degeneration, tilting optic disc, tinning of retinal pigment epithelium in degenerative myopia.

In this study, 50% was found low-vision due to degenerative myopia among all the respondents.

CONCLUSION

Degenerative myopia is a serious condition that requires early detection and long-term management to prevent vision loss. Regular vision check-up is important for monitoring vision impairment related problems. Optical corrections specially contact lens can maintain crucial rule in the management of this condition. Besides, low-vision devices both for distance and near can rehabilitate the patient socially.

Declaration by Authors

Ethical Approval: Approved

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Conflict of Interest: The authors declare no conflict of interest

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