

Study on Clinical Profile, Refractive Status, Optical and Other Low Vision Management Among Age Related Macular Degeneration Patient at a Tertiary Eye Hospital

Ludmila Rudaba Mimfa^{1*} and Dr. Shams Mohammed Noman²

¹Bachelor of science in Optometry (B.Optom), Institute of Community Ophthalmology(ICO), Chittagong Eye Infirmery & Training Complex, Chittagong Medical University (CMU), Chittagong, Bangladesh

²Associate Professor, Department of ophthalmology, Bangabandhu, Sheikh Mujib Medical University (BSMMU), Shahabag, Dhaka, Bangladesh

***Corresponding Author:** Ludmila Rudaba Mimfa, Bachelor of science in Optometry (B.Optom), Institute of Community Ophthalmology(ICO), Chittagong Eye Infirmery & Training Complex, Chittagong Medical University (CMU), Chittagong, Bangladesh, E-mail: rudabamimfa@gmail.com; ORCID: 0009-0003-4332-1410

Received Date: January 14, 2025 **Accepted Date:** February 14, 2025 **Published Date:** February 17, 2025

Citation: Ludmila Rudaba Mimfa, Dr. Shams Mohammed Noman (2025) Study on Clinical Profile, Refractive Status, Optical and Other Low Vision Management Among Age Related Macular Degeneration Patient at a Tertiary Eye Hospital. J Ophthalmol Open Access 9: 1-9

Abstract

Purpose: This study aimed to evaluate the clinical profile, refractive status, and management protocols for Age-Related Macular Degeneration (ARMD) patients at a tertiary eye hospital.

Methods: A prospective, cross-sectional study included 41 ARMD patients aged 50-80 years from the Medical Retina and Low Vision Clinic at CEITC. Demographic and ocular data were documented, and appropriate treatments were provided.

Results: Of the 41 patients, 51.20% were female, with a mean age of 62.21 ± 7.38 years. Dry ARMD was more common (53.70%) than Wet ARMD (46.30%). Wet ARMD was associated with more severe visual impairment. After refractive correction, Dry ARMD patients had better distance visual acuity (6/6-6/18).

Risk factors included age, gender, family history, and systemic diseases like hypertension, diabetes, and cardiac conditions. Simple hyperopia was the most common refractive error in both types of ARMD. Contrast sensitivity difficulties were more significant in Wet ARMD, and color vision defects, particularly Tritan defects, were observed in both types.

Treatment primarily focused on spectacle correction, with 78.04% of patients receiving refractive correction and 21.96% receiving spectacles combined with low-vision aids.

Conclusion: ARMD is most common in individuals aged 60 and above, with Dry ARMD being more prevalent. Wet ARMD, though less common, leads to greater visual disability. Key risk factors include age, gender, family history, smoking, and systemic diseases. Wet ARMD patients face more difficulty with color and contrast vision. Optical management improves visual function, highlighting the importance of comprehensive care to enhance the quality of life for ARMD patients.

Keywords: Risk Factors; Refractive Status; Color Vision; Contrast Sensitivity; Management

Abbreviations: ARMD- Age Related Macular Degeneration ; CEITC -Chittagong Eye Informary & Training Complex ; FFA- Fundus Fluorescein Angiography ; OCT -Optical Coherence Tomography ; DM - Diabetes Mellitus; HTN - Hypertension ; LVDs - Low Vision Devices.

Introduction

Age-related macular degeneration is a progressive degenerative disease of the retina in which the macula is most affected. It is the leading cause of irreversible blindness in elderly population after 5th decade. It is a degenerative disorder affecting macula, characterized by drusens and RPE changes, Choroidal neovascularization (CNV) and Pigment epithelial detachment (PED) [1]. Age-related macular degeneration (AMD) affects millions of people worldwide and is a leading cause of blindness globally. There are 2 main types of AMD, neovascular and nonneovascular AMD, which can be further classified based on specific features of the disease. Nonneovascular AMD (“dry” AMD) accounts for almost 80% to 85% of all cases and generally carries a more favorable visual prognosis. Neovascular AMD (“wet” AMD) affects the remaining 15% to 20% and accounts for approximately 80% of severe vision loss as a result of AMD [2].

The pathogenesis of AMD is complicated with multiple risk factors, including age, ocular dysfunctions, systemic diseases, diet, smoking, genetic, and environmental factors [15]. ARMD causes 54.4%, 4.4%, and 14.3% of legal blindness (acuity,20/200) and 22.9%, 3.2%, and 14.1% of low vision (acuity,6/12) Globally, it is estimated that 32.9 million people suffer from AMD-related visual impairments [14].

Age-related macular degeneration (ARMD) is one

of the leading causes of visual impairment (VI) in elderly population. It is the disease of the central area in the ocular posterior segment, which leads to deterioration of central vision and thereby affecting the performance of daily living activities of aged people [3]. Although medical therapies for ARMD had been improving over past decade, Vision rehabilitation remains a mainstay of treatment for those with vision loss [4].

Specialized rehabilitation programs and external low-vision aids are available to support visual performance for those with advanced ARMD; it’s developing the quality of life tests including activities of daily life and objective assessments [5].

This study aim was to examine the clinical profile & refractive error & management included (optical & other low vision) on Age related macular degeneration among tertiary eye hospital.

Methodology

A hospital based prospective cross sectional study with ARMD, who were referred to Medical Retina and Low vision clinic at CITC encompassed in the study. The reason for referral was assessed from electronic medical records included FFA and OCT images by a Retina specialist. Patients with intellectual disability and any ocular pathology except ARMD also patients with aged below 50 years were excluded. Demographic information was collected by face to face

interview from the patient and attendance. Patients personal history, family history, medical history, Smoking intake or not also collected. Systemic diseases like HTN, Cardiac, DM also noted.

Variable test included Color vision was assessed with Farnsworth D-15 test at a distance 50 cm, Contrast sensitivity done by 10% Bailey Lovie chart at a distance 6m in the well illuminated room condition. It is monocular procedure. Distance visual acuity was measured for each eye at distance 6meter was taken with the help of well illuminated Snellen's Acuity chart in the well illuminated room condition. It was done with Snellen acuity chart from 6meter distance. It is monocular procedure and Near add was performed by N-Notation with patient's refractive correction. Refractive assessment was performed with streak retinoscopy at the working distance at 50cm. According to response of patients to the corrective lenses was assessed.

Management protocol offered with Optical and Low vision management according to patient's condition and need.

Data analysis was performed with Microsoft Excel

version 2020 and SPSS (26.0 for Windows, SPSS Inc, Chicago, IL, USA). All data were entered into a Microsoft Excel database (Microsoft, version 2019) and converted to SPSS for analysis. According to the normality test, all parameters were parametric and frequency data were used to evaluate the demographic, ocular and management characteristics for the study population. The mean and standard deviation were used for the descriptive study. Cross-tabulation was done to segregate the data according to age and gender range. The significant level was determined as P-value <0.05. Graphical structures formed by Microsoft Excel to represent data.

Results

The average age of the patients was 62.21 ± 7.38 years, with ages ranging from 50 to 80 years. Out of 41 patients, 51.20% were female. Among them, the majority (53.70%) were diagnosed with Dry Age-Related Macular Degeneration (ARMD). Table 1 provides the baseline demographic and clinical profiles of the ARMD patients. The prevalence of ARMD was higher among homemakers and urban populations.

Table 1: Demographic and Clinical profile of Study Population (n=41)

Demographic variable	Categories	Frequency(%)
Age	50-60 years	19(46.30%)
	61-80 years	22(53.70%)
Gender	Male	18(48.80%)
	Female	23((51.20%)
Occupation	Employed	10(24.40%)
	Discontinued Job	3(7.30%)
	Housemaker	17(41.50%)
	Retired	11(26.80%)
Geography	Urban	31(75.60%)
	Rural	8(19.51%)
	Hill tract	2(4.87%)
Types of ARMD	Dry	22(53.70%)
	Wet	19(46.30%)
Management	Spectacle	37(78.04%)
	Spectacle with low vision	9(21.96%)

Risk factors were associated found with ARMD in this study. Subjects were divided into two age groups individually. Among the subjects, a subset analysis was performed to identify the risk factors of patients above 60 years. [Table 2].

In addition, individuals with gender, smoking intake and systemic diseases included DM, HTN had higher risk of having ARMD. Table -3 shows profile of ocular status of patients with Dry and Wet ARMD. Visual impairment mostly affected with Wet ARMD patients.

Table 2: Risk Factors of study populations (n=41)

Risk Factors		Group-1 Age (50-60)	Group-2 Age (61-80)
Family history		9(47.36%)	11 (50%)
Gender	Male	8(42.10%)	10(45.45%)
	Female	11 (57.89%)	12(54.54%)
Smoking		7 (36.84%)	10(45.45%)
Diabetes Mellitus		9 (47.36%)	6(27.27%)
Cardiac disease		2 (10.52%)	2 (9.09%)

Table 3: Ocular status of ARMD Patients (n=41)

Variable	Dry ARMD (%) n= 22	Wet ARMD(%) n=19
Visual Acuity (Only after Refractive correction)		
Mild or No Visual Impairment(6/6-6/18)	20 (48.80%)	7 (18.20%)
Moderate Visual Impairment (6/24-6/60)	2 (4.90%)	12 (28.10%)
Refractive error		
Simple Hyperopia	16 (39.00%)	8 (19.50%)
Compound Hyperopic Astigmatism	6 (14.60%)	7 (17.10)
Mixed Astigmatism	-	2 (4.90%)
Emetropia	-	1 (2.40%)
Simple Myopia	-	1 (2.40%)
Contrast Sensitivity Acuity		
(0.00-0.40 LogMAR)	7 (17.10%)	2 (4.90%)
(0.50-0.70 LogMAR)	13 (31.70%)	7 (17.10%)
No Response	2 (4.90%)	10 (24.40%)
Colour Vision		
Normal	10 (24.40%)	2 (4.90%)
Protan	-	-
Deutran	3 (7.30%)	5 (12.20%)
Tritan	9 (22.00%)	12 (29.30%)

Table 4: Baseline characteristics of patients with ARMD attending Low Vision Clinic (n=9)

Range of Near VA (N Notation)	Unaided VA at Near	Near VA After Near Device Trial	P Value
N8	-	3(33.30)	P = 0.000
N10	3(33.30)	1(11.11%)	
N12	1(11.11%)	-	

Table 5: Improvement of near VA after near device trial

Variable	Categories	Frequency(%)
Types of ARMD	Dry ARMD	2(22.22)%
	Wet ARMD	7(77.77%)
Low vision Optical Device (Distance)	Spectacle	9(100%)
Low vision Optical Device (Near)	4x Hand-held magnifier	1(11.11%)
	6 pd BI Prism	3(33.33%)
Low vision Non- Optical Device	Bright indirect illumination	1(11.11%)
	Bright indirect illumination+Torch light + Large print Holy Quran	5(55.55%)
	Torch light + sighted guide+ bright indirect illumination	1(11.11%)
	Large print Holy Quran + Bright indirect illuminaton + Torch light additional Sighted guide for orientation mobility	2(22.22%)

The data were also classified low vision according to subjects visual impairment. The most commonly prescribed near device was Hand - held magnifier (11.11%) and Base In prism (33.33%) also all patients prescribed with both distance and near reading spectacle According to their visual need which is shown in table 4. There was a statistically significant improvement ($P = 0.000 < 0.50$) in near vision with the help of LVDs, which is shown in Table-5.

Discussion

Age-related macular degeneration (ARMD) is a leading cause of visual impairment (VI) among the elderly. This progressive disease affects the central area of the retina, leading to the deterioration of central vision. As a result, individuals with ARMD often struggle with daily living activities. Recognizing its impact, the World Health Organization (WHO) has included ARMD in its Vision 2020 pro-

gram to address avoidable blindness.

Although ARMD has traditionally been more prevalent in developed countries, its incidence is rising in developing nations like Bangladesh. This study aims to investigate the clinical profile, ocular status, and management protocols for ARMD in patients diagnosed at an outpatient department (OPD). A total of 41 patients clinically diagnosed with ARMD were included in the study.

Out of 41 patients, So more preponderance was seen in patients above 60 years and females are more affected than males. It was similar with Rohit Aphale study [1]. Out of 41 patients, so more preponderance was seen in patients above 60 years and females are more affected than males. It was similar with Rohit Aphale study [1]. Wherein few studies showed that according to demographic data people of urban area highly affected in this disease which would

Very depending on the geographical area and food habits [6]. Which is also noticed in the current study.

With increasing age above 60 years risk factors Age, Gender, Family history and systemic disease like hypertension and Diabetes is one of the alarming risk factors associated with ARMD, associated with ARMD, mfound. Though our sample size is small, which reflects the same thoughts like other studies [7-9]?

Dry ARMD was seems more common than Wet ARMD in this study and visual disability was More in Wet ARMD than Dry ARMD. Jayashree MP et al. Stated that visual impairment more in Wet ARMD [11].

In case of refractive error, Simple hyperopia was found higher portion compared to other refractive error group, Tai ES and Kawasaki R also found the similar result [12,13].

The vision loss Associated with ARMD is associated with a substantial decrease in patient's quality of life and reading ability, Management protocol followed were spectacle to all the patients. The loss of contrast sensitivity was most pronounced in the lower spatial frequency range for the patients of Wet ARMD also Pronounced, Tritanopia is present due to colloid bodies present at foveal area. Whereas, a study done by Brinda Haren Shah et al found that Mild to Moderate Tritanopia occurs in Age Related Macular Degeneration [10].

This study also preponderance patient's in low vision with ARMD, among the subdivided group in study population, 2(4.90%) patients had low vision Dry ARMD and 7(17.10%) patients had low vision Wet ARMD. In total 9 low vision patients, all patients were prescribed spectacle to improve in distance visual acuity with optimum refractive correction according to their condition and need, no patients were trailed with distance device considering their age and needs. In case of near vision, the most commonly preferred near optical device were prism 3(33.33%) and hand-held magnifier 1(11.11%).

The following formula was used to calculate the equivalent viewing power (EVP):

$$\text{EVP} = \text{Presenting near visual acuity}/\text{target visual}$$

acuity \times 100/working distance (cm) 3

On the basis of the EVP formula, the required magnification was calculated and appropriate magnifiers were given to the patients for trial and improved their near vision dramatically after device trial ($P = 0.000 < 0.50$), which reflects same thoughts like other study [3].

In case of non-optical device, about 11.11% of patients advised to use Bright indirect illumination for near work, 1 patient advised to use torch light at night for outdoor work also sighted guide and bright indirect illumination for near work, 55.55% of patients advised for along with Bright indirect illumination + Torch light also Large print Holy Quran and 2 patients advised for along with Bright indirect illumination + Torch light additional Sighted guide for orientation mobility training for outdoor activities and also large print Holy Quran.

Age-related macular degeneration (ARMD) is one of the predominant causes of irreversible vision loss in older adults and remains incurable. Despite its prevalence and devastating impact, many patients are left to cope with their disability alone. This study highlights the importance of providing appropriate treatment to prevent severe eye complications and vision impairment. It also emphasizes the need to improve daily living performance, as ARMD can significantly affect a person's quality of life.

The study is aligned with global health initiatives, such as the World Health Organization's Vision 2020 program, and connects local findings to broader international efforts to reduce avoidable blindness. This framework helps emphasize the importance of addressing vision loss on a global scale.

Moreover, the study paves the way for future research. It suggests areas that require further investigation to enhance the understanding and management of ARMD. However, a limitation of the study is that the field of vision was not assessed in all participants, which could affect the overall findings.

Conclusion

Age-related Macular Degeneration (ARMD) in

elderly individuals highlights various aspects of different conditions. Females appear to be more affected than males, and timely management, including refractive error correction, has shown substantial improvement in visual acuity also underscores the prevalence of Dry ARMD over Wet ARMD and emphasizes the importance of identifying risk factors such as age, gender, family history, and systemic diseases. Additionally, observed color vision difficulties, contrast acuity variations further emphasize the diverse challenges faced by ARMD patients. The majority of patients benefit from optical management, particularly near optical and non-optical management. It is important to emphasize the importance of early detection, timely management, and a comprehensive approach to address the multifaceted impact of ARMD on patients' lives.

Ethics Approval and Consent to Participate:

Chittagong Eye Infirmary & Training Complex
(Pahartoli, Chittagong, Bangladesh) No-(880)1774-878991

Consent for Publication

Yes applicable, All the patients of Chittagong Eye Infirmary and Training Complex (CEITC) OPD, who were

willingly participate and cooperative during this research work.

Availability Data and Material

The datasets used and/or analyzed in this study are not publicly available to ensure compliance with ethical standards and protect patient confidentiality. De-identified data may be made available upon reasonable request to the corresponding author, subject to approval by the ethics review board.

Competing Interest

Not applicable.

Funding

Not applicable.

Author Contributions

Ludmila Rudaba Mimfa (first author) she did all correction, data analysis, data collection and whole thesis. Additionally help Dr. Shams Mohammed Noman (second author) under his reference the thesis done.

References

1. Kacha RM, Nigwekar S, Aphale R, Kapase S (2022) Study of clinical profile and management of age-related macular degeneration at rural tertiary care hospital. *Medico Research Chronicles*, 9: 435-41.
2. Thomas CJ, Mirza RG, Gill MK (2021) Age-Related Macular Degeneration. *Med Clin North Am*. 105: 473-91.
3. Gopalakrishnan S, Velu S, Raman R (2020) Low-vision intervention in individuals with age-related macular degeneration. *Indian J Ophthalmol*. 68: 886-9.
4. Borkenstein AF, Borkenstein EM, Augustin AJ (2023) Implantable vision-enhancing devices and postoperative rehabilitation in advanced age-related macular degeneration. *Eye*, 37: 597-606.
5. Decarlo DK, McGwin G Jr, Searcey K, Gao L, Snow M, Stevens L, Owsley C (2012) Use of prescribed optical devices in age-related macular degeneration. *Optom Vis Sci*. 89: 1336-42.
6. Raman R, Pal SS, Ganesan S, Gella L, Vaitheeswaran K, Sharma T (2016) The prevalence and risk factors for age-related macular degeneration in rural-urban India, Sankara Nethralaya Rural-Urban Age-related Macular degeneration study, Report No. 1. *Eye (Lond)*. 30: 688-97.
7. Rim PH, de Vasconcellos JPC, de Melo MB, Medina FM, Sacconi DP, et al. (2022) Correlation between genetic and environmental risk factors for age-related macular degeneration in Brazilian patients. *Plos one*, 17: p.e0268795.
8. Gemmy CM Cheung (2010) "Hyperopic Refractive Error and Shorter Axial Length Are Associated with Age-Related Macular Degeneration: The Singapore Malay Eye study," *Investigative Ophthalmology & Visual Science* December, 51: 6247-52.
9. HL Cook, PJ Patel, A Tufail (2008) Age-related macular degeneration: diagnosis and management, *British Medical Bulletin*, 85: 127-49.
10. Chowdhury PH, Shah BH, *Open Access Journal of Ophthalmology*.
11. Jayashree MP, Harika JVL, Arathi C, Patil BA, Niveditha RK, (2019) Prevalence of age related macular degeneration in a tertiary care centre. *Journal of Clinical Research and Ophthalmology*, 6: pp.007-010.
12. Cheung CMG, Tai ES, Kawasaki R, Tay WT, Lee JL, et al. (2012) Prevalence of and risk factors for age-related macular degeneration in a multiethnic Asian cohort. *Archives of ophthalmology*, 130: 480-6.
13. Yurtseven ÖG, Aksoy S, Arsan AK, Özkurt YB, Kökçen HK (2018) Evaluation of the relationship between age-related macular degeneration and refractive error, socio-demographic features, and biochemical variables in a Turkish population. *Turkish Journal of Ophthalmology*, 48: 238.
14. Liu L, Swanson M (2013) Improving patient outcomes: role of the primary care optometrist in the early diagnosis and management of age-related macular degeneration. *Clinical optometry*, 1-12.
15. Chen X, Rong SS, Xu Q, Tang FY, Liu Y, Gu H, et al. (2014) Diabetes mellitus and risk of age-related macular degeneration: a systematic review and meta-analysis. *PloS one*, 9: p.e108196.

Submit your manuscript to a JScholar journal and benefit from:

- ¶ Convenient online submission
- ¶ Rigorous peer review
- ¶ Immediate publication on acceptance
- ¶ Open access: articles freely available online
- ¶ High visibility within the field
- ¶ Better discount for your subsequent articles

Submit your manuscript at
<http://www.jscholaronline.org/submit-manuscript.php>