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Original Research Article

A Study on Prevalence and Risk Factors for Age Related Macular Degeneration in Tertiary Care Centres by Screening Individuals above 50 Years

Gutti Madhavi Latha[1], Mande Nirmala[2], Poka Avinash[3], Bowvia Rajkumari Balu[4]

[1]Associate Professor, Department of Ophthalmology, Rangaraya Medical College, Kakinada, Andhra Pradesh, India

[2]Associate Professor, Department of Ophthalmology, Siddhartha Medical College, Vijayawada, Andhra Pradesh, India

[3]Assistant Professor, Department of Ophthalmology, Siddhartha Medical College, Vijayawada, Andhra Pradesh, India

[4]Resident, Department of Ophthalmology, Rangaraya Medical College, Kakinada, Andhra Pradesh, India

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Corresponding author: Dr. Poka Avinash

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Abstract

Purpose: To estimate the prevalence of age-related macular degeneration (AMD) and describe associated demographic and systemic characteristics among individuals aged 50 years and above attending a tertiary care ophthalmology centre.

Methods: A hospital-based cross-sectional study was conducted in the Department of Ophthalmology, Government General Hospital, Kakinada, from May 2023 to October 2024. Consecutive patients aged ≥50 years attending the ophthalmology outpatient department and meeting the eligibility criteria were screened for AMD. All participants underwent detailed ocular examination. Demographic information, lifestyle factors, systemic comorbidities, and ocular history were recorded using a structured questionnaire. AMD was classified according to the Age-Related Eye Disease Study (AREDS) classification system. Descriptive statistics were used to summarize patient characteristics and AMD subtypes.

Results: A total of 4,500 individuals aged 50 years and above were screened during the study period. AMD was identified in 100 participants, yielding a prevalence of 2.2%. The mean age of AMD patients was 68.7 years. Among AMD cases, 77% had dry AMD and 23% had wet AMD. Females constituted 66% of AMD cases. Hypertension was present in 75% of AMD patients, diabetes mellitus in 83%, smoking history in 87%, and alcohol consumption in 63%. The prevalence of AMD increased with advancing age. Visual impairment was present in the majority of affected individuals, with 69% having best-corrected visual acuity between 6/18 and 6/60.

Conclusions: AMD was detected in 2.2% of screened individuals aged 50 years and above attending a tertiary care ophthalmology center. Increasing age was associated with a higher occurrence of AMD. Smoking, hypertension, diabetes mellitus, and alcohol consumption were commonly observed among AMD patients. Further population-based studies with multivariable analyses are required to establish independent risk factors and determine the true community burden of AMD.

Keywords: Age-related macular degeneration, AMD, prevalence, risk factors, dry AMD, wet AMD, India.

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Introduction

Age-related macular degeneration (AMD) is a leading cause of blindness. The main risk factor is advancing age, with the severity of vision loss ranging from mild to severe. [1] The rate of disease progression can vary among individuals and has been associated with multiple risk factors [2]. AMD is driven by a combination of genetic predisposition, natural ageing changes and lifestyle factors, such as smoking or nutritional intake. The mechanisms by which these risk factors interact and converge towards AMD are not fully understood and therefore drug discovery is challenging, where no therapeutic attempt has been fully effective thus far [3]. Despite intensive basic

and clinical research, its pathogenesis remains unclear, likely due to the multifactorial character. In addition to strong age-dependence of the disease, a complex interaction of metabolic, functional, genetic and environmental factors seems to create a stage for chronically developing changes in ocular structures of the macular region (choriocapillaris, Bruch's membrane, retinal pigment epithelium-RPE, and photoreceptors) which may contribute to varying degrees to the onset and final picture of AMD4.

This condition can be debilitating and has been associated with decreased mobility and falls, a higher incidence of depression, loss of independence, and lower overall quality of life. AMD is estimated to affect 1.4–3.1% of people living in India, and its prevalence is expected to increase in the next several decades. [4] In order to better understand of aetiology and provide pathways to AMD prevention, it is necessary to analyze the risk factors. Risk factors can be divided into demographic factors, such as age, sex and ethnicity, and lifestyle factors, such as smoking and alcohol consumption. However, numerous risk factors on AMD have been reported but the evidence and strength of association varies [5]. The Age-Related Eye Disease Study (AREDS & AREDS 2) found that daily intake of certain minerals and high-dose vitamins can slow progression of the disease in people who have intermediate AMD, and those who have late AMD in one eye. [6]

The early ARMD which accounts for about 85% of the cases includes the presence of drusen and/or retinal pigment epithelium (RPE) abnormalities for which no definite treatment is available. The late ARMD includes geographic atrophy of RPE or choroidal neovascular complex accounts for the remaining 15% cases. Without treatment, the late ARM will rapidly deteriorate due to retinal destruction and subsequent scarring. Evidences suggests that AMD is a multi-factorial disease but the full aetiopathogenesis of AMD has not yet been unveiled. Studies from western population suggest that lifestyle, nutritional, and genetic factors are involved in the pathogenesis of AMD [7].

The strength of these associations has varied greatly between studies and population. In this study, we analyze risk factors and prevalence in over 100 patients with ARMD above 50 years in a hospital setting.

Aims and Objectives

Aim: A study on the prevalence and risk factors for ARMD in a tertiary care centre by screening individuals above 50 years

Objectives

1. To estimate the prevalence of ARMD among age group more than 50 years
2. To diagnose the types of ARMD by clinical examination and investigations
3. To determine the risk factors associated with different types of ARMD

Materials and Methods

Study Design and Setting: This hospital-based cross-sectional study was conducted in the Department of Ophthalmology, Government General Hospital, Kakinada, Andhra Pradesh, India, over an 18-month period from May 2023 to October 2024.

Study Population: Individuals aged 50 years and above attending the ophthalmology outpatient department during the study period were screened for age-related macular degeneration (AMD). Ethical approval was obtained from the Institutional Ethics Committee of Rangaraya Medical College, Kakinada, before commencement of the study. Written informed consent was obtained from all participants.

Inclusion Criteria

- Individuals aged 50 years or older.
- Patients attending the ophthalmology outpatient department during the study period.
- Participants willing to provide informed consent.

Exclusion Criteria

- Age below 50 years.
- Presence of retinal diseases other than AMD that could interfere with diagnosis.
- Significant ocular comorbidities precluding adequate retinal evaluation.
- Incomplete clinical records or inability to complete ocular examination.

Data Collection: A structured questionnaire was administered to obtain demographic and clinical information, including age, sex, smoking history, alcohol consumption, dietary habits, systemic illnesses, medication use, history of cataract surgery, and exposure to sunlight.

All participants underwent comprehensive ophthalmic examination, including measurement of best-corrected visual acuity, slit-lamp biomicroscopy, intraocular pressure assessment, and dilated fundus examination. The presence and severity of AMD were assessed clinically and classified according to the Age-Related Eye Disease Study (AREDS) classification system.

AMD Classification

AMD was categorized according to the AREDS classification as:

- Category 1: No AMD

- Category 2: Early AMD
- Category 3: Intermediate AMD
- Category 4: Advanced AMD

Advanced AMD included geographic atrophy involving the macular region and neovascular AMD. Continuous variables were summarized as mean ± standard deviation (SD), whereas categorical variables were expressed as frequencies and percentages. The prevalence of AMD was calculated as the proportion of AMD cases among all screened participants aged 50 years and above. Associations between AMD and demographic or clinical variables were evaluated using the Chi-square test or Fisher's exact test for categorical variables and Student's t-test for continuous variables, where appropriate. A p-value <0.05 was considered statistically significant

Results and Discussion: 4500 patients who met the above indicated inclusion criteria and were 50 years of age or older and visited our OPD throughout the study period were screened. After assessment, 100 people had ARMD, meaning the prevalent incidence was 2.2%.

Table 1: Comparison of Prevalence Rate

Studies	Prevalence Rate
Vatsala Vats, Tarannum Shakeel, [8]	1.40%
Jacqueline Hamati, Sai Prashanthi [9]	1.68%
Sucheta R. Kulkarni, Supriya Aghashe [10]	1.38%
Andhra Pradesh eye disease study [11]	1.4%
Our study	2.2%

The patients in this study are 68.67 years old on average. The distribution of patients by age group. Tarannum Shakeel's typical age group in Vatsala Vats, [8] is 66.1. Thirteen (12%) were between 61 and 65, twenty-one (21%) were between 66 and 70, twenty-three (23%) were between 71 and 75, fourteen (14%) were between 76 and 80, ten (10%) were beyond 80, and eight (8%) of the 100 ARMD patients were 50 years of age. A statistically significant relationship between ARMD positive and advancing age was shown by a p- value of less than 0.05.

The percentages of dry, wet, and total ARMD in our study were 1.7%, 0.5%, and 2.2%, respectively, based on the population screened during the study period.

The P.A. Kochami [12] study indicates that 2.0%, 0.5%, and 2.5%, respectively. In our study, there were 77% of dry ARMD-based 100 patients and 23% of wet ARMD-based 100 patients. Of the 100 ARMD patients in this research, 34 (34%) were men and 66 (65%) were women. According to the Beaver Dam Study [13], and the Blue Mountains Eye Study [14], women had a greater incidence of ARMD. However, Vatsala Vats [8] revealed that males were a greater risk factor.

In our study, 10 patients (10%) had vision <3/60, 12 patients (12%) had vision 6/60 to 3/60, 69 patients (69%) had vision 6/18 to 6/60, and 9 patients (9%) had vision >6/18. This suggests that individuals with better eyes had the best corrected visual acuity for distance. According to the study by Sucheta R. Kulkarni and Supriya R. Aghashe10, of the subjects, 26% had moderate visual impairment (6/18 to 6/60), 3% had severe visual impairment (<6/60 to 3/60), and 56% had normal vision (>6/18). Out of the 100 participants in our research, 75 (75%) have hypertension and 25 (25%) do not, based on our analysis of the risk factors. Hypertension was present in 87% of individuals with wet ARMD and 77% of those with dry ARMD. Diastolic blood pressure over 95 mm Hg (odds ratio [OR] = 4.4), self-reported use of strong antihypertensive medication (OR = 2.1), physician-reported history of hypertension (OR = 1.8), and antihypertensive drug usage (OR = 2.5) were all strongly connected with neovascular AMD, according to studies by Hyman L et al [15] and Xu X et al [16], Women who had baseline therapy for hypertension had greater chances of AMD (HR = 1.15, 95% CI: 1.03, 1.30), and the association got stronger the longer they were on antihypertensive medication, according to this study.

Just 17 percent of patients do not have diabetes, compared to 83 percent who do. Diabetes affects 53% of those with wet ARMD and 82% of those with dry ARMD. In Korean individuals aged 50 and above, diabetes mellitus and early AMD are strongly correlated, according to Choi JK et al [17]. However, research by Ming-Shan He et al [18] shown that, in comparison to people without diabetes, there was no significant correlation between the incidence of exudative AMD (HR 1.37; P = 0.023) and nonexudative AMD (HR 1.23; P = 0.108).

Of the 100 people with ARMD, 87 (87%) smoke, compared to 13 (13%) who do not. Smoking is a factor in 74% of dry ARMD patients and 26% of wet ARMD patients. According to several research, there is a high correlation between current smoking and AMD [19, 20, 21].

Of the 100 ARMD patients, sixty-three (63%), routinely consume alcohol, whereas thirty-seven

(37%) do not. Eighty percent of patients with wet ARMD and fifty-nine percent of individuals with dry ARMD routinely use alcohol. According to research by Cho E et al [22], excessive alcohol use—more than three standard drinks per day—is linked to a higher chance of developing AMD early. It is refuted by the Rotterdam Study [23], which indicates that alcohol use in general or in particular is not a risk factor for AMD.

Sixty-six percent of our research participants are not vegetarians, whereas 34 percent are. While 88% of patients with wet ARMD are vegetarians, 77% of those with dry ARMD are not.

There is no significant correlation between CAD and ARMD in this study's 100 individuals. However, research by Cymerman RM et al [24] and Thomas J et al [25] found a precise correlation between CAD and RMD, indicating shared systemic reasons for both that call for more investigation.

Although there is no link between cataract surgery and dry ARMD, it is crucial for 87% of individuals with aging-related wet ARMD.

Out of 100 people with ARMD, about 85% have hard exudates, 33% have soft exudates, 80% have geographic atrophy, and 69% have pigmentary changes.

Conclusion

The current study evaluated the incidence and risk factors for ARMD in a tertiary care hospital by screening individuals over 50. It found that age, sex, smoking, alcohol, diet, cataract surgery, and sun exposure were risk factors for ARMD, which had a 2.2% prevalence.

It is the main reason for blindness and visual impairment. Because AMD has a major negative influence on quality of life and increases the need for help with daily duties, many persons in their retirement years may lose their independence.

Sun exposure, diabetes, high blood pressure, alcohol use, and smoking all seem to have a role in the development of ARMD. Consequently, controlling comorbid conditions and quitting alcohol and tobacco usage can help to slow the progression of the illness.

The development of ARMD is clearly correlated with older age and cataract surgery. Therefore, it is crucial to rule out early ARMD in individuals undergoing cataract surgery.

With the right screening, we can also improve patients' quality of life and maintain functional eyesight. Certain individuals may benefit from lifestyle modifications that delay the progression of their illness, such as giving up alcohol and tobacco and increasing physical exercise to reduce body mass index. By carefully addressing risk factors and performing periodic eye exams, low vision treatment can help decrease vision loss and maintain residual functional vision.

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