



PREVALENCE AND RISK FACTORS OF AGE-RELATED MACULAR DEGENERATION AMONG PATIENTS OVER 50 YEARS OF AGE IN DELHI NCR: A CROSS-SECTIONAL STUDY

Ophthalmology

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ABSTRACT

Background: Age-related macular degeneration (ARMD) is a chronic degenerative retinal disease that significantly impairs central vision and is a leading cause of blindness among the elderly population globally. With India's rapidly aging population, understanding the regional prevalence and risk factors of ARMD is vital for public health planning. **Objectives:** This study aimed to estimate the prevalence of ARMD among patients aged 50 years and above in Delhi NCR, visiting the outpatient department of Santosh Medical College, and to identify associated risk factors. **Methods:** A cross-sectional study was conducted from December 2017 to October 2019 at Santosh Medical College and Hospital, Ghaziabad. A total of 100 patients aged ≥ 50 years were included. Each participant underwent a comprehensive ocular examination, including Snellen's visual acuity test, slit-lamp biomicroscopy, Amsler grid test, and fundus evaluation using direct and indirect ophthalmoscopy. Data on systemic health, lifestyle factors, and sociodemographic parameters were collected through interviews. Statistical analysis was performed using SPSS v25. **Results:** Among 580 screened individuals, 100 patients were diagnosed with ARMD, indicating a prevalence of 3.8%. Non-exudative ARMD accounted for 89% of cases, while 11% had exudative ARMD. The mean age was 63.6 ± 9.4 years, with higher prevalence observed in the 50-60 age group. Female patients had 2.4 times higher odds of developing ARMD than males. Smoking history was significantly associated with ARMD ($p=0.047$), while obesity, diabetes, and hypertension showed no significant associations. Intermediate drusen was the most common fundoscopic finding. **Conclusions:** ARMD prevalence in this North Indian population is consistent with national estimates. Age, female gender, and smoking emerged as significant risk factors. Early detection and awareness programs targeting high-risk groups are essential for reducing the burden of ARMD-related visual impairment.

KEYWORDS

Age-related macular degeneration, ARMD, prevalence, risk factors, India, ophthalmology, visual impairment

1. INTRODUCTION

Age-related macular degeneration (ARMD) is an acquired retinal degenerative condition affecting the macula, leading to progressive central vision loss. It is the leading cause of blindness in developed countries and is becoming a public health challenge in developing nations like India. The macula, though a small part of the retina, is essential for high acuity vision. Lesions in this area result in significant functional impairment, especially in the elderly.

According to WHO projections, ARMD will affect 288 million individuals globally by 2040 if current trends continue. The increase is more significant in low- and middle-income countries, where awareness and access to healthcare services are limited. ARMD is categorized into two forms: non-exudative (dry) and exudative (wet), with the former being more prevalent but slower in progression. The latter, though less common, leads to rapid vision loss.

Understanding the prevalence and determinants of ARMD is crucial for early diagnosis, management, and planning preventive strategies. This study aims to assess the prevalence and risk factors of ARMD among individuals aged 50 years and above in the Delhi NCR region.

2. MATERIALS AND METHODS

2.1 Study Design And Setting: A cross-sectional study was conducted at the Department of Ophthalmology, Santosh Medical College and Hospital, Ghaziabad, over a period of two years from December 2017 to October 2019.

2.2 Participants: Inclusion criteria comprised all patients aged ≥ 50 years visiting the ophthalmology outpatient department. Exclusion criteria included individuals below 50 years of age, those with retinal pathologies other than ARMD, and those with systemic diseases excluding diabetes and hypertension.

2.3 Sample Size And Sampling Technique: Based on a 4% prevalence rate from previous studies and a precision of 5%, the sample size was estimated at 96.41, rounded to 100 for convenience.

2.4 Data Collection: Demographic data, medical history, and lifestyle factors were recorded. Ocular examinations included:

- Visual acuity using Snellen's chart
- Slit-lamp biomicroscopy

- Fundus examination with direct and indirect ophthalmoscopy
- Amsler grid testing

2.5 Statistical Analysis: Data were analyzed using SPSS v25. Continuous variables were expressed as mean $\pm$ SD. Chi-square and t-tests were used for comparisons. Logistic regression identified independent risk factors. A p-value < 0.05 was considered statistically significant.

3. RESULTS

Table 1. Age Distribution

Age Group (Years)	Frequency	Percentage
50-60	46	46%
61-70	29	29%
71-80	22	22%
>80	3	3%

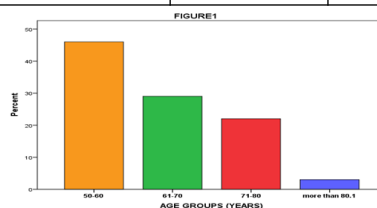


Table 2. Gender Distribution

Gender	Frequency	Percentage
Male	59	59%
Female	41	41%

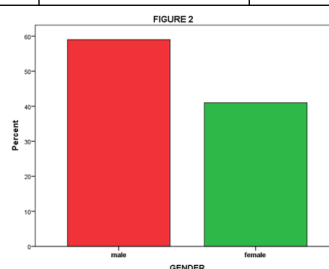


Table 3. ARMD Types

Type of ARMD	Frequency	Percentage
Non-exudative	89	89%
Exudative	11	11%

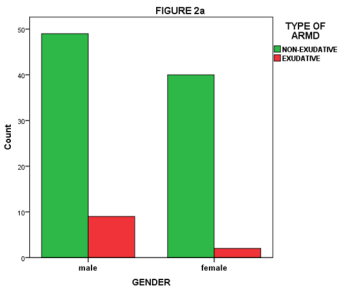


Table 4. Smoking History

Smoking Status	Frequency	Percentage
Smoker	42	42%
Non-Smoker	58	58%

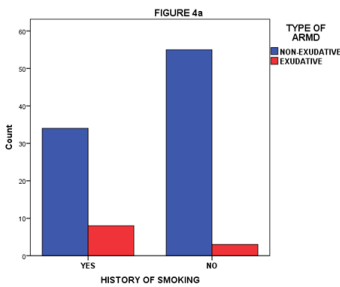
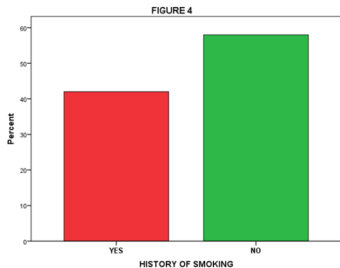


Table 5. Obesity

Obesity Status	Frequency	Percentage
Obese	40	40%
Not Obese	60	60%

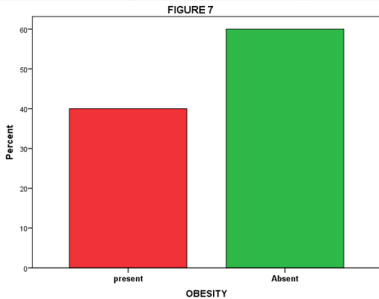


Table 6. Diabetes

Diabetes Status	Frequency	Percentage
Diabetic	[N/A]	[N/A]
Non-Diabetic	[N/A]	[N/A]

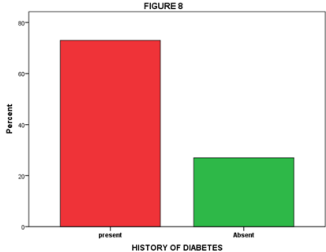


Table 7. Pigment Abnormalities

Pigment Changes	Frequency	Percentage
Present	12	12%
Absent	88	88%

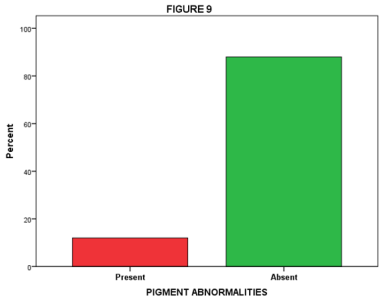


Table 8. Hypertension

Hypertension	Frequency	Percentage
Present	31	31%
Absent	69	69%



4. DISCUSSION

The findings of this cross-sectional study provide insight into the prevalence and associated risk factors of age-related macular degeneration (ARMD) in a regional North Indian population. With a documented prevalence of 3.8%, our results fall within the range reported in similar studies conducted in India and other parts of Asia. Notably, the high proportion of non-exudative ARMD (89%) aligns with the global understanding that dry ARMD is more common, although typically less aggressive than the wet form.

Age emerged as a significant determinant in the development of ARMD. Patients over the age of 60 had a noticeably higher prevalence, which supports a well-established association between increasing age and degeneration of retinal structures, particularly in the macular region. This reinforces the need for routine ophthalmologic screening as part of geriatric healthcare.

Gender-based analysis revealed that females had 2.4 times higher odds of developing ARMD than males. While the exact biological rationale remains uncertain, possible explanations include differences in life expectancy, hormonal changes post-menopause, and possibly lower access to eye care services among elderly women in this region.

Smoking showed a statistically significant association with ARMD, corroborating findings from studies like the Beaver Dam Eye Study and the Blue Mountains Eye Study. Smoking is believed to accelerate oxidative stress and vascular damage in retinal tissues, increasing the risk of both the onset and progression of ARMD. This finding highlights the importance of public health strategies focused on smoking cessation to reduce ocular morbidity.

Interestingly, systemic conditions such as hypertension, diabetes mellitus, and obesity did not show significant associations with ARMD in this cohort. While some global studies have reported mixed findings regarding these variables, the absence of a strong link in our study may be attributed to the limited sample size or underreporting of comorbidities.

Our study's strengths include a focused demographic (age ≥50 years), a comprehensive clinical examination including Amsler grid and fundus assessment, and a structured logistic regression model to evaluate risk factors. However, limitations must be acknowledged. The relatively small sample size limits the generalizability of our findings.

Additionally, the reliance on direct and indirect ophthalmoscopy without confirmatory imaging such as optical coherence tomography (OCT) may have resulted in under-detection of early or subclinical ARMD.

Future studies with larger, multi-centric populations and access to advanced diagnostic modalities are warranted. Integration of digital imaging and genetic profiling could further refine our understanding of ARMD pathogenesis and aid in personalized risk prediction.

5. CONCLUSION

This study provides valuable regional data on ARMD prevalence and risk profiling among individuals aged 50 and above in Delhi NCR. The overall prevalence of ARMD was 3.8%, with non-exudative ARMD being the dominant form. Advanced age, female gender, and history of smoking were found to be significant independent risk factors.

Despite its limitations, the study highlights critical areas for clinical and public health attention. Regular screening programs, especially targeting high-risk groups such as elderly women and smokers, are essential for timely diagnosis and intervention. Public education campaigns emphasizing smoking cessation and eye health awareness should be integrated into broader geriatric care strategies.

In conclusion, ARMD represents an increasing burden in aging populations. Proactive prevention, early detection, and effective management remain the cornerstones of reducing ARMD-associated vision loss and improving quality of life for affected individuals.

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