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ORIGINAL ARTICLE

Epidemiological Study of Eye Diseases and Demographic Factors: A Case Study at Ayu Siwi Eye Clinic Nganjuk in 2024

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ABSTRACT

Background: Vision impairment remains a significant public health concern, particularly among the elderly. This study aims to analyze eye disease trends and patient demographic characteristics at Ayu Siwi Eye Clinic Nganjuk in 2024 to improve prevention and treatment strategies. **Methods**: This research adopts a descriptive epidemiological approach, utilizing secondary data from patient records. Data on the most common eye diseases and patient distribution based on age, gender, and educational level were analyzed using descriptive statistics, including percentages and frequency distributions. **Results**: The findings indicate that elderly patients are dominate this study, with 36% in the 40–59 age group and 30% over 60 years old. Female patients (56%) outnumber males (44%), possibly due to longer life expectancy and higher healthcare-seeking behavior. The most prevalent eye disease is immature cataract (31%), followed by primary open-angle glaucoma (7%) and astigmatism (6%). Patients with lower educational backgrounds (30% elementary school graduates) highlight the need for better public eye health education. **Conclusions**: The study highlight the importance of early screening and preventive measures, particularly for cataracts and glaucoma, to reduce the burden of vision impairment. Expanding access to routine eye examinations and strengthening community-based eye health programs is crucial for at-risk populations.

Keywords: Eye Diseases, Epidemiology, Cataract, Vision Impairmen

INTRODUCTION

Vision impairment is an escalating global health challenge, particularly in developing countries. According to the World Report on Vision published by (W.H.O., 2019), approximately 2.2 billion people worldwide suffer from visual impairments, with nearly 1 billion cases being preventable or inadequately treated. The primary factors contributing to this issue include limited access to eye care services, low public awareness of early detection, and a shortage of qualified medical professionals and adequate healthcare facilities specializing in eye care.

In Indonesia, eye diseases such as cataracts, glaucoma, and diabetic retinopathy are leading causes of blindness. Siregar et al., (2025) reported that diabetic retinopathy affects approximately 34.6% of individuals with diabetes in Indonesia, making it a major preventable cause of vision loss. Additionally, glaucoma remains a serious concern due to its irreversible nature, with an increasing number of cases observed among the elderly (Nurulkhairani et al., 2023).

At the primary healthcare level, a rise in eye disease cases has become increasingly evident. Ayu Siwi Eye Clinic in Nganjuk Regency, for instance, has recorded a significant increase in conditions such as myopia, presbyopia, cataracts, and glaucoma over recent years. This trend is likely influenced by lifestyle factors such as prolonged digital screen exposure, work

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Vol. 02 | No. 01 | April 2025

habits that neglect eye health, and limited access to high-quality ophthalmic care (Uriel et al., 2024). A similar pattern was observed in a study at Cicendo Eye Hospital in Bandung, which found that infectious corneal ulcers were more prevalent among individuals of working age due to high-risk environmental exposure and insufficient awareness of proper eye care practices (Uriel et al., 2024).

Beyond age-related and comorbid conditions, socioeconomic factors play a crucial role in access to eye care services. Research by Wahyuni et al., (2023) highlights the rising costs of eye disease treatment, particularly for chronic conditions such as glaucoma and diabetic retinopathy. Many patients delay seeking medical attention due to financial constraints, worsening their condition over time. Similarly, Zhalif, (2023) found that hospitalization expenses for patients with eye diseases such as cataracts and macular degeneration impose a significant financial burden on families.

In addition to cataracts and glaucoma, several studies have linked demographic factors to the prevalence of other eye diseases. Sari & Utama, (2024) reported that the blindness rate in Indonesia stands at 3.0%, with a higher incidence among the elderly. Meanwhile, research by Anggraini et al., (2024) found a 0.9% annual increase in Ocular Surface Squamous Neoplasia (OSSN) cases. However, there has been little investigation into how patient demographics at local clinics influence regional eye disease trends. Therefore, further research is needed to explore the relationship between demographic factors and eye disease prevalence at the primary healthcare level.

Recent studies have also emphasized the impact of environmental and lifestyle factors on the development of eye diseases. Cindra Indah Salsabila, (2021) discovered that senile cataract patients at NTB General Hospital often had additional risk factors such as hypertension and diabetes, which accelerate cataract progression. Similarly, a study by Jaftoran, (2024) at Bethesda Hospital Yogyakarta identified prolonged UV exposure as a major contributing factor to cataract development, particularly among older individuals.

Further research on patient characteristics has provided valuable insights. Wahyu Afif Mufida et al., (2023) found that most senile cataract patients undergoing phacoemulsification surgery at Simpang Lima Gumul Regional Hospital in Kediri had a history of hypertension and diabetes mellitus, highlighting the strong link between metabolic diseases and cataract occurrence. This suggests the need for a multidisciplinary approach to both prevention and treatment. Meanwhile, a study by Berliani Tanaya, (2023) in East Nusa Tenggara highlighted that conjunctivitis remains one of the most common infectious eye diseases encountered in primary healthcare facilities. Environmental factors, such as prolonged exposure to dust and poor sanitation, were identified as the primary contributors to its high prevalence.

Given these findings, this study aims to evaluate eye disease trends and patient demographic characteristics at Ayu Siwi Eye Clinic Nganjuk throughout 2024. By identifying disease patterns, this research seeks to provide valuable insights for designing more effective prevention and treatment strategies. Additionally, it examines how demographic factors such as age, gender, and underlying health conditions contribute to the prevalence of eye diseases observed in the clinic.

Academically, this study aims to enrich the existing literature on the epidemiology of eye diseases in Indonesia, particularly within primary healthcare settings. From a practical perspective, the findings can serve as a foundation for healthcare professionals and policymakers to develop targeted interventions for eye disease prevention and management. Ultimately, this research is expected to contribute not only to scientific knowledge but also to tangible

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Vol. **02** | No. **01** | **April 2025**

improvements in eye healthcare services for the broader community.

METHODS

This study employs a descriptive approach with an epidemiological perspective to analyze eye disease patterns. Secondary data collected in 2024 from all patients at Ayu Siwi Eye Clinic Nganjuk is used to identify the most prevalent eye conditions and examine patient distribution based on age, gender, and educational background. The data is processed using descriptive statistical methods, with findings presented in percentages and frequency distributions to provide a clear and comprehensive understanding of emerging trends.

To ensure that patient privacy is fully respected, all personal details such as names, addresses, and medical record numbers were removed before the data was processed. Only general information relevant to the study was used. This research follows the ethical guidelines set by the Indonesian Ministry of Health and adheres to the clinic's internal policies on medical data confidentiality. The data was only accessible to the research team and stored securely using encrypted, password protected systems to prevent any unauthorized access

RESULTS AND DISCUSSION

The majority of cataract patients in this study fall within the age groups of 40–59 years (36%) and those over 60 years old (30%), highlighting a clear trend of increasing cataract incidence with age. This supports the understanding that cataracts are primarily age-related, resulting from degenerative changes in the lens. A study by Giloyan et al. (2025) conducted in Armenia similarly found a significant rise in cataract prevalence after the age of 50, particularly in regions with high environmental exposure, such as intense ultraviolet (UV) radiation, and limited access to eye healthcare services. These findings emphasize the importance of early prevention strategies and regular eye examinations, especially as individuals approach middle age.

Interestingly, the data also reveals a higher proportion of female patients (56%) compared to males (44%). This aligns with findings by Bugg et al. (2025), who noted that women are more susceptible to vision problems due to a longer life expectancy and greater barriers to accessing healthcare during their productive years. Additionally, biological and socio economic factors contribute to this gender disparity in eye care services. These insights underscore the need for gender sensitive policies in ophthalmic healthcare, particularly in communities where women face systemic inequalities in accessing medical treatment.

The most commonly diagnosed type of cataract among patients was immature cataract, accounting for 31% of cases. According to Mishra et al. (2024), this type is frequently observed in developing countries, largely due to delays in diagnosis and limited access to early medical intervention. Often, patients seek treatment only after experiencing significant visual impairment, which complicates surgical outcomes and increases the risk of irreversible blindness. Therefore, strengthening early detection efforts and expanding access to routine eye check-ups is essential in preventing severe visual disability.

A significant proportion of patients also had a low level of education, with 30% having only completed elementary school. This trend reflects the strong link between educational background and awareness of eye health. Lange et al. (2025) emphasized that individuals with limited education are less likely to understand the importance of regular eye screenings and early preventive measures, particularly among the elderly. Public health campaigns targeting populations with lower educational attainment

e-ISSN: 3047-9126
Vol. 02 | No. 01 | April 2025

are vital to improve early diagnosis rates and reduce the burden of preventable blindness.

Furthermore, the study identified a 7% prevalence of primary open-angle glaucoma (POAG) among patients, highlighting the need for proactive screening. Gao and Johnson (2025) pointed out that many glaucoma cases are only discovered during cataract surgery, suggesting that early-stage POAG often goes undiagnosed. Since glaucoma can progress silently without symptoms, public education and routine glaucoma screenings should be integral parts of community eye health programs.

Comorbid conditions such as hypertension and diabetes mellitus were also frequently observed among the patient population, reinforcing findings from Zhang et al. (2025), who reported that high body mass index (BMI) and diabetes significantly increase the risk of developing cataracts. These findings underscore the importance of a multidisciplinary approach to healthcare, where managing systemic diseases is considered a key component of preventing early onset cataracts.

Refractive errors, such as astigmatism (6%) and presbyopia (5%), were also prevalent, particularly among individuals aged 20–40. This demonstrates that vision problems are not confined to older adults but can also affect younger populations, potentially impacting their quality of life and productivity. Alvarado-Villacorta (2023) emphasized that presbyopia is a widespread global issue requiring accessible corrective interventions, such as eyeglasses or affordable refractive surgery. Ensuring access to affordable vision correction services is crucial in minimizing the socio-economic impact of untreated refractive errors.

Given that many visual impairments are preventable through early detection, community-based screening initiatives have become increasingly important. Lu et al. (2025) highlighted the success of the Rapid Assessment of Avoidable Blindness (RAAB) method in China, which significantly reduced blindness rates through organized community outreach and intervention. Implementing similar models in areas with high cataract prevalence and limited access to formal healthcare systems can greatly improve early case identification and treatment outcomes. Community-driven programs are not only cost-effective but also capable of reaching underserved populations that often fall outside the scope of traditional healthcare infrastructure.

Table 1. Patient demographic characteristics: age distribution

No	Age Group	Percentage
1	0-12 years	7
2	13-19 years	7
3	20-39 years	21
4	40-59 years	36
5	>60 years	30

Table 2. Patient demographic characteristics: gender distribution

No	Gender	Percentage
1	Male	44
2	Female	56

Table 3. Patient demographic characteristics: educational level distribution

No	Education Level	Percentage
1	No/Incomplete Education	4
2	Elementary School	30
3	Middle School	12
4	High School	27
5	Higher Education	18

Table 4. Eye disease trends

No	Disease Name	Percentage
1	Immature Cataract	31
2	Primary Open-Angle Glaucoma (POAG)	7
3	Astigmatism	6

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Vol. **02** | No. **01** | **April 2025**

No	Disease Name	Percentage
4	Dry Eye Syndrome (SMK)	5
5	Presbyopia	5
6	Glaucoma Suspect	4
7	Mature Cataract	3
8	Primary Angle-Closure Glaucoma	3
9	Pterygium	3
10	Other Eye Diseases	35

CONCLUSIONS

The 2024 eye disease trends at Ayu Siwi Eye Clinic Nganjuk highlight a predominance of elderly patients, with a higher proportion of female cases. While various eye conditions collectively make up the largest percentage, immature cataract remains the most frequently diagnosed individual disease. These findings provide valuable insights for improving eye healthcare services, particularly in strengthening prevention efforts and enhancing disease management for at-risk populations.

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e-ISSN: **3047-9126**
Vol. **02** | No. **01** | **April 2025**

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