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# Clinical characteristics and demographics figures of patients with age-related macular degeneration at a tertiary-level hospital in Denpasar, Bali



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## ABSTRACT

**Introduction:** Age-Related Macular Degeneration (AMD) is a macular disease that characteristically affects the loss of central vision of the elderly. Unlike the western world, Indonesia has a relatively undocumented AMD epidemiology due to a lack of scientific attention, as indicated by few AMD publications. As a result, it is difficult to determine AMD's features and characteristics in the Indonesian population. This study aimed to evaluate AMD patients' characteristics and demographics at a tertiary hospital in Bali.

**Methods:** This is a Cross-Sectional study. Data were collected from medical records on Sanglah General Hospital from January 2017 until December 2019. The characteristics and features were collected and analyzed. The characteristics and demo-figure were analyzed with descriptive statistics and a Chi-square

test.

**Results:** This study data consist of 172 patients, 90 (52.33 %) male and 82 (47.67 %) female. Most of the patients in the age group 66-83 years. The distribution of dry AMD showed the highest number on males, but the inverse occurs in wet AMD. Subjects had a smoking lifestyle in 50% of the patients. The smoking history more likely in dry AMD, but the inverse occurs in wet AMD. Hypertension occurs in more than half (51.16 %), with larger distribution in wet AMD. The proportion of gender, smoking history, hypertension but not age are significantly different between wet and dry AMD.

**Conclusion:** Age-related macular degeneration is a common cause of blindness in the elderly population. This study found that the prevalence of AMD increases with age. The significant factors associated with AMD were sex, hypertension and smoking habit.

**Keywords:** Age-Related Macular Degeneration, AMD, ARMD, Vitreous-Retina.

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## INTRODUCTION

Age-Related Macular Degeneration (AMD) is a macular disease that characteristically affects the loss of central vision of the elderly.<sup>1,2</sup> The etiology of AMD is not determined yet, but few factors have been shown to increase the risk, for example, the history of smoking and hypertension.<sup>2</sup> The AMD is one of the main causes of blindness, accounting for about 8.7% of all world blindness. It is estimated that almost 20-25 million people will be affected and increase about three times in the next 30-40 years.<sup>3,4</sup> For western countries, AMD has become one of the main causes of blindness. The

incidents are also increasing as people getting older.<sup>3,5</sup> Unlike the western world, Indonesia has a relatively undocumented AMD epidemiology due to a lack of scientific attention, as indicated by few AMD publications. As a result, it is difficult to determine AMD's features and characteristics in the Indonesian population.<sup>6,7</sup> In this study, we conducted a retrospective study to uncover AMD patient's characteristics and demographics in one of the country's Tertiary hospitals.

## METHODS

This is a cross-sectional study conducted at Sanglah General Hospital, Denpasar,

Bali. This study has been approved by the Institutional Review Board of Universitas Udayana/Sanglah General Hospital, Denpasar-Bali (No. 2081/UNI14.2.2.VII.14/LT/2020). The medical records dated between January 2017 and December 2019 were reviewed to obtain the relevant patient's data. The inclusion criteria were patients diagnosed with AMD from January 2017 until December 2019 and contain the complete relevant demographics and clinical records. Otherwise, the sample data were excluded. Data regarding age, gender, residence, underlying disease, history of smoking were collected. The characteristics and demo-figure were analyzed with

descriptive statistics. For statistical comparison of categorical data, a Chi-square test was performed. The statistical analyses were performed using SPSS 16.0 for Windows (SPSS, Chicago, IL).

## RESULTS

The data were collected from 172 patients, which included 218 eyes. Characteristics of patients are summarized in table 1. There were 90 (52.33%) male patients with a median age of 62.3 years (51-83). In this study, the most common type of AMD is the wet AMD (n= 96, 55.81%). Most of the patients have resided at Denpasar (n=82, 47.67%). The majority of patients were smokers (n=86, 50%) and had been diagnosed with hypertension previously (n=88, 51.16 %).

## DISCUSSION

AMD is a degenerative eye disease so prevalent that it is among the main cause of blindness in the world. The WHO also recognizes that AMD is in the top four accounting for 8.7% of blindness.<sup>3,4</sup> In Indonesia, however, there is no exact data about the incidence, prevalence and morbidity of AMD. One study from the Faculty of Medicine, University of Indonesia (study period March 03, 2008-January 05, 2009) that involve 1259 responders found the prevalence of AMD to reach 4.3%. The prevalence of AMD increased as age increase.<sup>7</sup>

In this study, the age distribution showed that the most AMD occurs in the 66-83 years old age range, about 61.63 %. In one study conducted in Indonesia by Tany et al. (2016), the average ages on their research are between 60 and 70.<sup>8</sup> It is quite similar to the results of Brand et al. and Singare et al., which the national eye institute also corroborates that the prevalence of AMD obtained increased with increasing age.<sup>3,4,10</sup> Wong et al. also assented that increasing age is an important risk factor.<sup>11</sup>

Some textbooks such as AAO and Kanski revealed that the female composes the majority of AMD patient.<sup>2,12</sup> Some research, such as that done by Cheung et al. (2013) and Singare et al. (2013), gives the same results, which point out that women are more likely to suffer from

**Table 1. Characteristics of patients with AMD**

Characteristics	Number of patients
Gender	
Male	90 (52.33%)
Female	82 (47.67 %)
AMD subtype	
• Wet	96 (55.81%)
• Dry	65 (37.79%)
• Dry + Wet	11 (6.4%)
Place of Origin	
• Denpasar	82 (47.67 %)
• Badung	37 (21.51 %)
• Buleleng	16 (9.3%)
• Karang asem	12 (6.98%)
• Tabanan	11 (6.39 %)
• Gianyar	7 (4.07 %)
• Negara	4 (2.32%)
• Outside of Bali	3 (1.76%)
Smoking Lifestyle	86 (50 %)
Systemic Disease	
• Hypertension	88 (51.16%)
• Diabetic and Others	6 (3.49 %)
• Normal	78 (45.35%)

**Table 2. Distributions Patients Characteristics based on AMD type**

Parameters**	Wet n(%)	Dry n(%)	p-value
Age (years)			
50-65	45 (20.64 %)	38 (17.43%)	>0.05*
66-83	80 (36.70%)	55(25.23%)	
Sex			
Male	56 (26.69%)	63 (28.90%)	<0.05*
Female	71 (32.57%)	28 (11.84%)	
Lifestyle			
Smoking	59 (27.06%)	59 (27.06%)	<0.05*
No smoking	63 (28.90%)	37 (16.98%)	
Systemic Disease			
Hypertension	75 (34.40%)	40 (18.35%)	<0.05*
Without Systemic Disease	47 (21.56%)	56 (25.69%)	

\*) Pearson Chi-square test

AMD.<sup>9,13</sup> Research in Indonesia by Tany et al. (2016) also gives a similar result.<sup>8</sup> But there are also some theories, such as Laitinen et al. (2009) and Chakravarthy et al. (2010), that state gender does not significantly influence AMD incidence.<sup>5,14</sup> This study shows that the proportion of men (60.65%) slightly higher than women. The proportion gender in wet AMD also shows females slight dominant, which contrasts to dry AMD.

Based on the type, wet AMD is more common than dry AMD. This study's results differ with the opinion of Ilyas and

Yulianti, which states dry AMD is more common, accounting for about 70-90% compared with wet AMD that only 10%.<sup>6</sup> This difference could be due to the site of research, which is a tertiary level hospital. The referral system had filter the dry AMD or early AMD, as it has been handled by the ophthalmologist in the primary or secondary hospital.

If we look at the context of systemic comorbidity, the highest percentage was hypertension (51.16 %). Following Chakravarthy et al. and Tany et al., this study's results found an association between

AMD and hypertension.<sup>5,8</sup> This study also showed that the impact of Diabetes Mellitus and hypercholesterolemia in AMD are small compared to hypertension, which is also in line with previous studies that conclude both were weak risk factors even unrelated to AMD.<sup>5,15,16</sup> Another intriguing finding was the proportions between wet AMD based on systemic disease, the majority of patients suffering from hypertension. However, the caveats lie in the proportions of dry AMD, which tend not to have any systemic comorbidity. These numbers, however, need to be questioned. It was our ignorance for the detection of hypertension on those patients, or it does reflect the true picture in these populations.

Like hypertension, smoking is shown as the risk factor of AMD.<sup>11</sup> This study found almost a similar proportion of respondents with and without a smoking habit history. Patients with a history of smoking were more likely to have a dry AMD (ratio 59:37), while the ratio of the smoking habit in relation to wet AMD only shows a small difference. Previous research, such as by Cheung et al. (2013) and Jayashere et al. (2018), also concluded that smoking is one of AMD's risk factors, supporting our finding.<sup>13,17</sup> Other important information that we need to uncover is whether the non-smoking AMD patient lives with other family members with a smoking lifestyle for at least five years. In one research, Vevilla et al. (2013). state that subjects who live with a smoking partner for more than five years had more risk of developing AMD.<sup>18</sup> This is a good point for improvement in future research and a note for our ophthalmologist when taking a patient's history.

This study also had several other limitations. First, because of our study's retrospective nature and based on tertiary level hospital data, it was impossible to analyze AMD's actual characteristics and features at the community level. Second, incomplete medical records in some critical information limit the amount of data for this research. This type of bias may be inherent and was consistent in many other studies on similar topics. Despite these shortcomings, we believe our results represent a reasonable reference of AMD characteristics in our center. We hope that

another research with a wider timespan, multicenter involvement and larger sample size will be conducted in the future to provide accurate and meaningful data.

## CONCLUSION

Age-related macular degeneration is a common cause of blindness in the elderly population. The study found that the prevalence of AMD increases with age. The significant factors associated with AMD were sex, hypertension and smoking habit.

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## AUTHOR CONTRIBUTION

All authors contributed equally in all phases of the study.

## CONFLICT OF INTEREST

The authors declared no potential conflicts of interest concerning the research, authorship and/or publication of this article.

## DATA AVAILABILITY STATEMENT

The dataset generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

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