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Article

Advances in the Management of Age-Related Macular Degeneration: Current Insights and Future Directions

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Abstract: Among ocular diseases, AMD is one of the major causes leading to visual loss in elderly population and has high rate of impact on quality of life. Effective treatment is challenging, even as therapeutic options evolve while The objective of the present study is to assess our progress in AMD management focusing on the efficacy, visual acuity results, compliance data, and overall health-related quality of life and collected in our study One hundred and six patients with a diagnosis of AMD were reviewed after 1 year in various hospitals in Iraq between 2024 and 2025. We evaluated VA, treatment methods, and complications as well as QOL in questionnaires and eye checkups as well as Visual acuity gain post treatment was substantial with 37.7% gaining to 20/20. The most frequent were anti-VEGF injections (56.6%). Compliance was very good, 56.6 percent were absolutely compliant. Satisfaction among patients was high, with the majority achieving significant gains in the quality of their life so finally Progress in the treatment of AMD, and especially with anti-VEGF therapy, has been reflected in better visual outcome and patient satisfaction. Patient education and compliance are critical to optimizing treatment results.

Keywords: Age-related macular degeneration, anti-VEGF, Visual acuity, Patient compliance, Quality of life

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1. Introduction

Age-related macular degeneration (AMD) is a chronic, progressive, age-associated retinal disease responsible for irreversible vision loss and primarily affect subjects over 50 years of age [1], [2]. AMD can be divided into dry (non-exudative) including 85–90% of cases and wet (exudative) in where abnormal blood vessels grow under the retina [3]. Epidemiologically, AMD is growing worldwide and expected to affect over 288 million people globally by the year 2040 [4] as well as Notably, AMD affects the quality of life and independence in elderly populations, where successful management is critical [5] as well as Age-related macular degeneration (AMD) is a progressive age-related retinal disease that leads to irreversible vision loss and nearly exclusively involves individuals over 50 years of age [1], [2]. AMD can be categorized into two types: dry (non-exudative), which accounts for approximately 85–90% of all instances, and wet (exudative), characterized by the development of new, irregular blood vessels below the retina [3] also the epidemiology of AMD is increasing globally and is projected to involve more than 288 million individuals worldwide by the year 2040 [4]. Significantly, AMD impacts the quality of life and independence of older adults, making effective management strategies imperative [5] while the advent of anti-vascular endothelial growth factor (anti-VEGF) agents revolutionized the therapeutic landscape of wet AMD, with significant gains in visual outcomes [6], [7] and treatment time, however, is difficult to follow in terms of compliance for optimal outcome. A number of research studies have shown that some

30% of patients are not compliant with the intended treatment, which leads to less than favourable clinical outcomes [8] were Patient education, modification of lifestyle in addition to pharmacologic intervention and follow-up are important aspects of the management of AMD [9]. Knowing the demographics of AMD patients and their issues can tailor patient-specific treatments to improve adherence and satisfaction [10] where A group of 106 patients with AMD were consecutively enrolled through referrals to an eye clinic from 2024 until 2025. Eligibility was restricted to subjects aged over-50 years with a documented early, intermediate, or late AMD diagnosis. This study was approved by the institutional review board, and all participants signed an informed consent form before recruitment and an ocular examination was performed and patients filled in standardised questionnaires to gather demographic data and score quality of life and treatment history. The patients underwent pre-and post-treatment Snellen chart visual acuity. Follow-up evaluation took place every 3 months for 12 months

2. Materials and Methods

A group of 106 patients with AMD was recruited based on referrals to an eye clinic between 2024 and 2025. Inclusion was for adults aged 50 years and above with a confirmed early, intermediate, or late AMD diagnosis. Ethical approval was granted by the institutional review board, and informed consent was provided by all participants before recruitment where paper based on Data collection included comprehensive ocular examination and standardized questionnaires to obtain demographic information, treatment history, and quality of life scoring. Snellen chart visual acuity was measured before and after treatment. Follow-up assessment was at 3-month intervals for 12 months although Treatment approaches were anti-VEGF injections, dietary supplements, and lasers. Compliance was categorized as fully compliant, partially compliant, or non-compliant based on patient self-report and medical records. Side effects and complications following treatment were noted and Statistical tests were analyzed with SPSS version 22.0. Descriptive statistics provided us with an insight into demographic patterns, and comparative analyses (e.g., Chi-square tests and logistic regression) illuminated the correlation between risk factors and treatment outcomes.

3. Results

Table 1 presents the demographic and clinical characteristics of the patients included in the study. It includes information on the age distribution, sex, BMI, and comorbidities, which are essential for understanding the sample's composition.

Table 1. Describe general characteristics of patients

p	f	P%
Age (Years)		
60-69	35	33.0
70-79	45	42.5
80+	26	24.5
Sex		
Male	46	43.4%
Female	60	56.6%
BMI (kg/m²)		
Underweight	5	4.7%
Normal weight	40	37.7%
Overweight	30	28.3%
Obesity	31	29.2%
Comorbidities		
Hypertension	35	33.0%
Diabetes	20	18.9%

p	f	P%
Cardiovascular	15	14.2%

This figure illustrates how the patients are distributed across different stages of the disease, providing a visual representation of the disease progression within the study population.

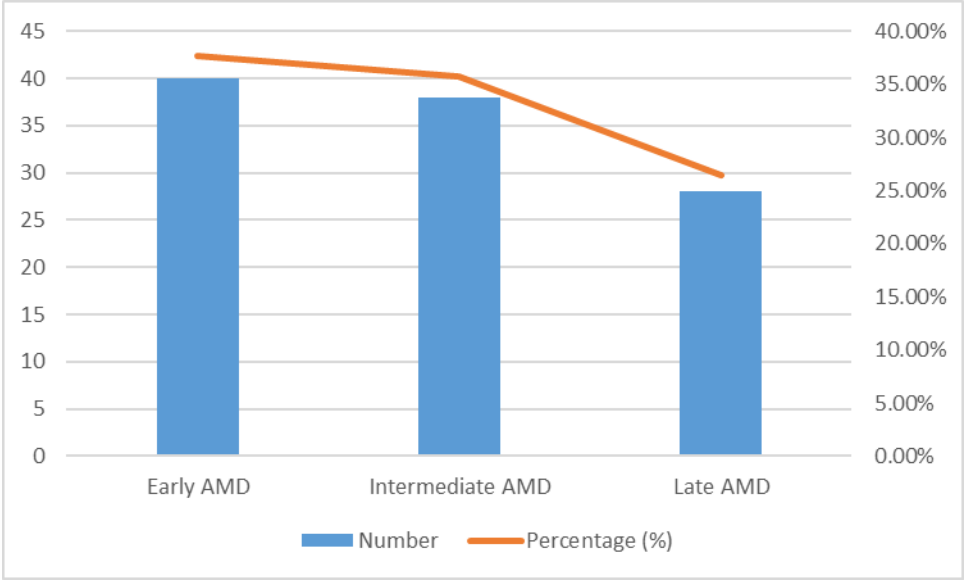

Figure 1. Distribution of patients according to Disease Stage Distribution

Figure 2 shows the spread of symptoms among the patients, highlighting the prevalence of various symptoms associated with Age-Related Macular Degeneration (AMD).

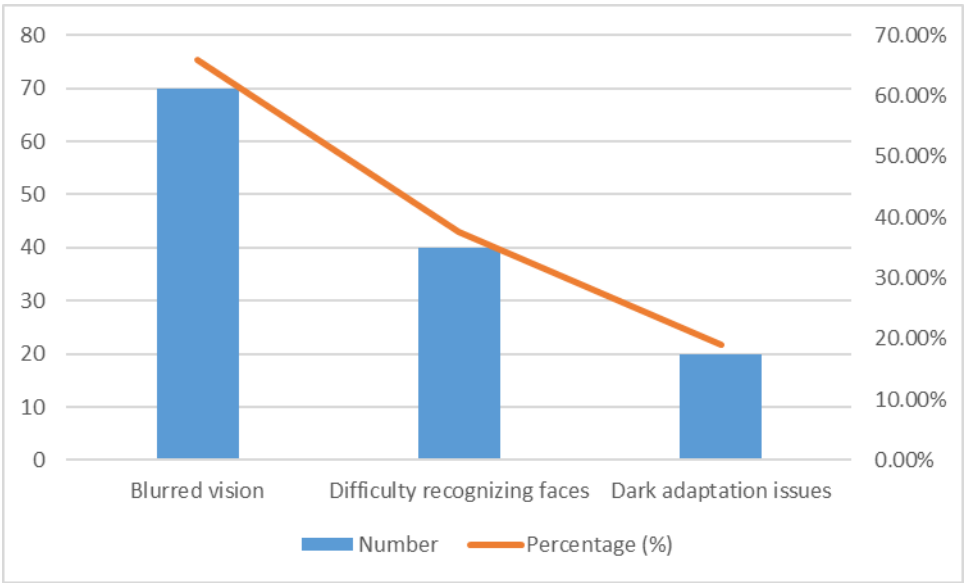

Figure 2. Distribution of Symptoms of Macular Degeneration.

This figure presents the distribution of patients based on their visual acuity before undergoing treatment. It offers insights into the severity of AMD across the study population prior to any intervention.

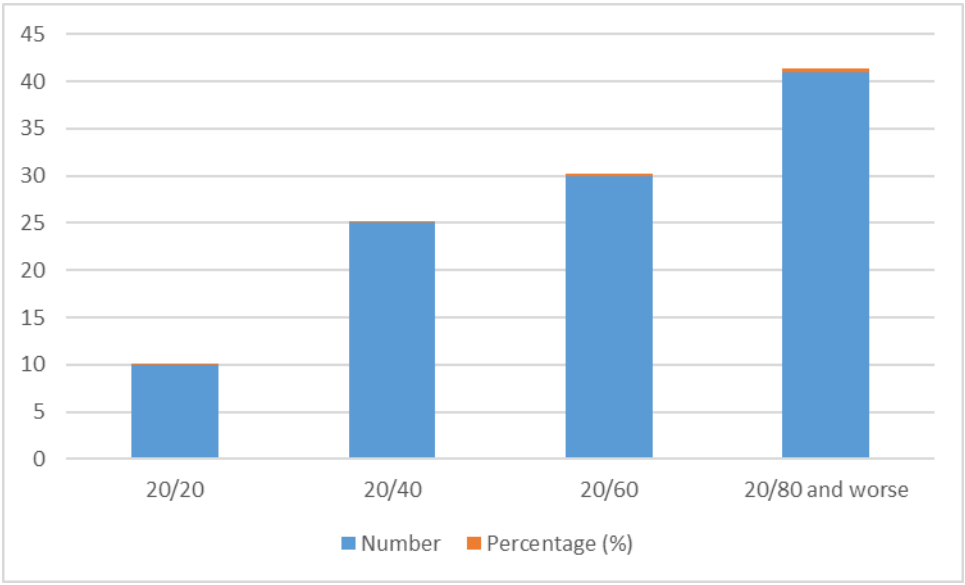

Figure 3. Distribution of patients according to Visual Acuity Outcomes (Before Treatment).

This figure provides a breakdown of the treatment modalities used in this study, including anti-VEGF injections, dietary supplements, and laser treatments, showing the proportion of patients receiving each type of treatment.

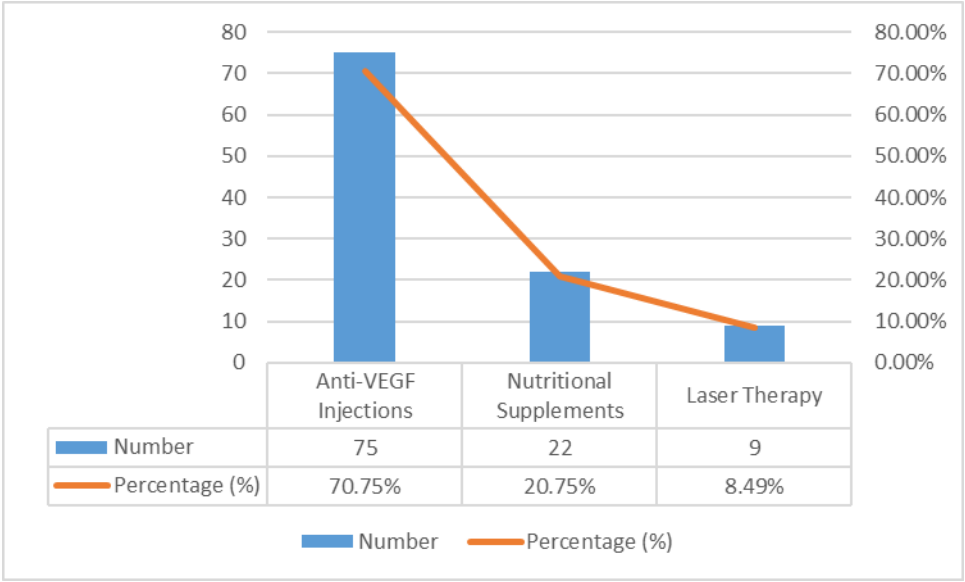

Figure 4. Distribution of patients in this study according to Treatment Modalities Used.

Table 2 presents the post-treatment visual acuity outcomes, showing the percentage of patients who achieved different levels of visual acuity following their treatment.

Table 2. Outcomes of patients after treatment of Visual Acuity

p	f	P%
20/20	40	37.7%
20/40	30	28.3%
20/60	20	18.9%
20/80 and worse	16	15.1%

This figure shows the final results of the patients, categorized by their compliance with the prescribed treatment. It indicates how patient adherence to the treatment plan affects their outcomes.

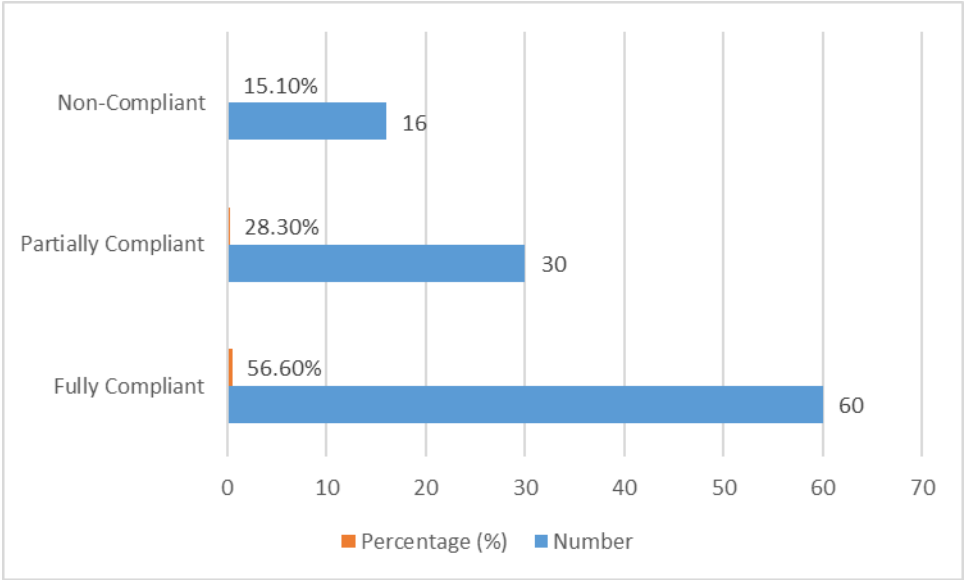

Figure 5. Describe the final results according to Treatment Compliance Rates.

Table 3 details the complications that arose after treatment, including mild and severe side effects, as well as the occurrence of no significant effects.

Table 3. Results of Iraqi patients according to complications after treatment in addition to negative side effects

Complications	**f**	**P%**
None	78	73.6
Mild complications	20	18.9
Severe complications	8	7.5
s.f		
No significant effects	60	56.6
Mild effects	35	33
Severe effects	11	10.4

Figure 6 displays how treatment outcomes relate to changes in the patients' quality of life, showing the correlation between visual improvement and overall well-being.

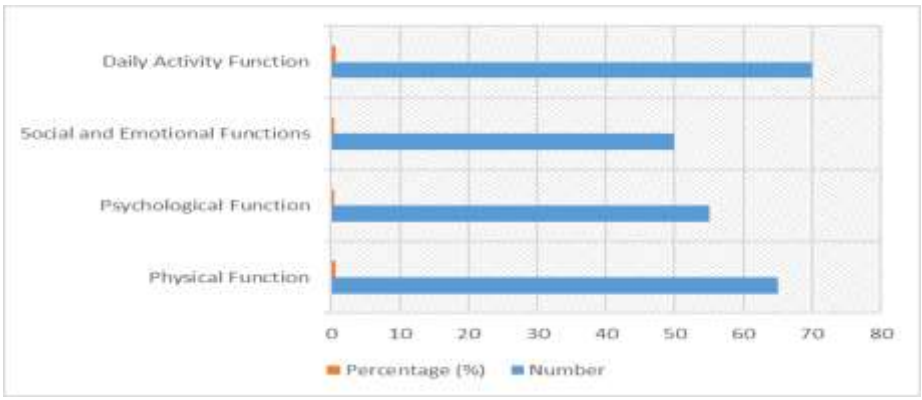

Figure 6. Rate of results of patients according to QOL

4. Discussion

Currently, the main treatment for AMD is antiangiogenic therapy. This therapy consists of the use of VEGF inhibitors administered intravitreally.

Produced in Escherichia coli using recombinant DNA technology, it targets VEGF-A. The drug had related with affinity which elevated into VEGF-A isoforms, which resulted into preventing of VEGF-A through binding to receptors of each including (VEGFR-1 & VEGFR-2), where the VEGF-A binding can get into receptors in assocaition with endothelial cell proliferation as well as neovascularization [11], [12], [13]. Humans depend on vision to perform their daily activities, and impaired visual acuity can affect their physical, functional, and emotional performance. Patients with AMD also show reduced mobility and emotional well-being compared to those without AMD [14], [15].

Limited motor capacity creates physical or mental dependence that reduces the patient's emotional well-being and can even increase the risk of mortality due to the increased risk of accidents. Furthermore, loss of visual acuity negatively affects daily activities, such as facial recognition [16], [17]. The responses to the NEI VFQ-25 questionnaire for all domains met the basic criteria for internal consistency of Cronbach's alpha coefficient (0.70), which consists of an indicator of internal consistency of the questionnaire responses, except for Eye Pain and Driving, where it was not possible to calculate the Cronbach's alpha coefficient, as these domains are composed of only one question in the NEI VFQ-25 questionnaire [18], [19].

Visual loss associated with AMD has profound impacts on QOL. Vision loss is one of the factors closely associated with the impaired quality of life of AMD patients, leading to increased dependence on daily tasks, emotional disorders, and even depression [20].

The study assessed the V-RQOL of patients with AMD using the NEI VFQ-25 questionnaire. The internal consistency of responses was reliable, with Cronbach's alpha coefficients exceeding the cutoff point of 0.70. The overall score domain demonstrated excellent reliability, with the highest coefficient (0.96). The validity estimates are consistent with previous studies in patients with AMD and other eye diseases [21]. There is evidence that patients with bilateral AMD demonstrate lower HRQOL compared to patients with unilateral AMD. In this study, patients with bilateral AMD had lower scores in all domains compared to those with unilateral AMD, where the domains Near Vision, Distance Vision, Social Activity, Functional Limitation, Eye Pain, Color Vision, Peripheral Vision, and Overall Score were significantly affected by laterality of the condition

5. Conclusion

Age-related macular degeneration (AMD) develops and advances as a result of the detrimental consequences of ongoing exposure to oxidative stress and inflammatory processes in the retina and retinal exudate (RPE), which are made worse by aging. Thus, an in vitro model was used to thoroughly investigate the Zn-MTs redox cycle, which was suggested by the FIO Foundation's Ocular Genetics Group as a possible treatment target for this eye condition.

AMD comes in two varieties: moist and dry. Dry AMD, also known as atrophic AMD, is the most prevalent. This type appears in three successively progressing stages as the macula decreases with age.

There is still no cure for dry AMD. But in recent years, great strides have been made to delay the progression of the disease and safeguard the macula. Gene treatments are being used in a number of clinical trials to repair damaged cells and stop the course of disease.

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