RESEARCH ARTICLE

Age-Related Macular Degeneration in Khartoum locality, Sudan

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Abstract:

Introduction: Age-Related Macular Degeneration (AMD or ARMD), also known as Macular Degeneration, is an eye disorder that slowly destroys sharp, central vision. The causal factors of ARMD remain a controversy. The proposed study aimed to participate in controversy in focusing on the magnitude of ARMD in tertiary hospital in Khartoum state.

Methods: A hospital-based retrospective cross sectional study design was implemented in Makkah Eye Complex. Data on ARMD was derived from an electronic data based made available to the researcher. The data in excel format was uploaded in the SPSS version 21. All the 79 cases of ARMD was retained and summarized through descriptive statistics to produce graphics and frequency tables to address the research objectives and chi square test was performed to assess the association between ARMD and gender and age. A decision role was set prior to the test to reject the null hypothesis that there was no association whenever the p value is < 0.05.

Results: During the period covered by the study a total of 86,788 patients attended Makkah Eye Complex, 79 patients among those was diagnosed as Age Related Macular Degeneration disease. This represents a prevalence of Age Related Macular Degeneration (ARMD) of 0.09 % (79/86,788).

Discussion:Regarding age, our findings confirmed that the condition is related to aging. It occurred earlier in our research contrary to the commonly reported years of occurrence. However, the limited data available to us indicates the need to establish an electronic patient registry to enable to describe patients sociodemographic characteristics, the disease risk factors and patient management and related outcomes.

Introduction

Eyes, sensitive organ of visual system need to be protected to prevent ocular abnormalities. Eyes have the ability to process visual details, as well as enabling several photo response functions.[1].

Age-Related Macular Degeneration (AMD or ARMD), known also as Macular Degeneration, is an eye disorder that slowly destroys sharp, central vision.[2] ARMD is a degenerative disease of the central part of the retina,known as the macula. It is also defined as a degenerative disease of the photoreceptors and retinal pigment epithelium (RPE) in the human macula.[3] At early stage there are often no symptoms; however, over time, people may experience a gradual worsening of their vision that may affect one or both eyes. If it does not result in complete blindness, losses of central vision maybe a consequence with its related complications as difficulties to recognize faces, drive, read, or perform daily life activities. Visual hallucinations, which are not a mental illness may also occurred.[4]

Age-related macular degeneration (AMD) is the first cause of blindness in the Western countries according to World Health Organization [5]; It can significantly reduce the quality of life.[6] Risk factors related to blindness were cataracts, age-related macular degeneration, diabetic retinopathy, and glaucoma.[7]

The American Optometric Association[8] suggested that Management of the patient should differ whether the AMD is no exudative (dry) or exudative (wet), the last required an immediate treatment. This classification will enable to consider three treatment options, which should be associated education of the patient, an evaluation of the prognosis and follow up of the condition. The three treatment options to be considered are for Low risk patients with no exudative AMD for whom Ultra Violet Ray protective spectacle lenses and antioxidant supplementation, patient counseling and education, Amsler grid self-assessment management of patients suspected of or diagnosed with AMD. For high risk patients with nonexudative AMD may require consultation with retina specialist to rule out choroidal neovascularization (CNV), low vision evaluation and prescription of appropriate low vision optical devices. For patients with exudative AMD and clinical signs and/or symptoms of CNV laser treatment may be required.

The National Center for Health Statistics[9], reported the prevalence of Age-Related Macular Degeneration in the US population. Its reported prevalence in all ethnic groups was 6.5% 95% CI: 5.5 - 7.6.

A meta-analysis[10] carried out on a sample of 129,664 individuals (aged 30–97 years), revealed an overall prevalence of age-related macular degeneration of 8.69% (95% CI: 4.26–17.40) .

Derived data from various eye disease registered in US population aged ≥ 18 estimated the prevalence of Age-Related Eye Diseases and Visual Impairment in Aging[11]. The prevalence of ARMD increased with age ranging from 0.2% [95%

CI: 0.1 – 0.2] in the age group of 18 – 44 years to 8.7% [95% CI:7.5- 9.8] in ≥75 years.

The prevalence and incidence of late stage age related macular degeneration was estimated in UK in a population aged 50 to 97 years using the Bayesian model[12]. The findings revealed that the prevalence of late AMD standardized to the United Kingdom population aged 50 years or more was 2.4% (95% CI: 1.7% to 3.3%), increasing to 4.8% (95% CI 3.4% to 6.6%) in those aged 65 years or more and 12.2% (95% CI: 8.8% to 16.3%) in those aged 80 years or more .

A retrospective observational study, on 5,035 participants attending the Irish Longitudinal Study on Ageing (TILDA), revealed an estimated prevalence of any form of ARMD at 7.2%, after adjusting for different nonresponse rates. the research concluded that increasing age was the only variable exhibiting a statistically significant association (p<0.005. [13]

A cross sectional observational epidemiological survey in Poland on a sample of 1,107 subject aged ≥ 18 years, of the city of Lodz, estimated for the first time the prevalence of age related eye disease among older adults.[14] The prevalence of ARMD was 4.33% [95% CI: 3.14 – 5.54].

A cross sectional population based survey conducted between January 2012 in in Puzih, a south-western seaside city in Chiayi County, Taiwan, on farmers, fishermen, or brine evaporators targeted 3,000 residents aged ≥ 65 years and 708 people voluntary participate.[15] The research pointed out that early AMD prevalence was 15.0% with a no statistical significance between groups (p=0.518). The prevalence of late AMD was 7.3% with a statistically significant difference between groups (p<0.001).

In Korea a population based cross sectional study[16] on a sample of 10,449 subjects aged ≥ 50 years revealed a prevalence of early AMD of 3.18% (332/10,449).

An Indian [17] hospital based descriptive cross sectional study on a sample of 19,140 persons aged 50 years and above revealed a prevalence of ARMD of 4.8% with 95% CI and 3.0% marginal errors and a design effect of 2.

A cohort study[18] in the framework of a Health and Aging Project in Amirkola, Iran, on 1616 participants aged ≥ 60 years revealed a crude prevalence rate of ARMD of 17.6% with a statistically significant association with smoking (p<0.001). On the African continent, a population based study from Kenya[19] using a stratified random sampling technique revealed an overall prevalence of ARMD of 11.3% [95% CI: 10.0 – 12.7]. Early AMD was reported to be 10.2% [95% CI: 9.0 – 11.5] whereas late AMD was prevalent in 1.1% [95% CI: 0.8–1.6].

Hence, the proposed article aimed to present the prevalence of age related macular degeneration disease in a specialized eye hospital of Sudan Capital City, Khartoum.

Materials and Methods

A hospital based retrospective cross sectional study was conducted in Makkah Eye Hospital during the period from September 2015 to September 2016.The implementation of the research was approved   by the Ministry of health and the administration of the hospital. Makkah Eye complex was established in 1995 by

AL-Basar International Foundation. In 2003, in a new hospice, took named of "Makkah Eye Complex". It is located in Khartoum, Ryadah Area, El-nous street (Latitude: 15.577292, longitude: 32.567128) and has a hospitalization capacity of 60 beds. Makkah Eye Complex includes a number of specialized ophthalmic clinics which contribute in the domestication of treatment in Sudan.

Data on Age Related Macular Degeneration was derived from an electronic data based made available to the researcher. This database of 86,788 patients includes 79 ARMD subjects which was extracted and retained as study population. The data collected include the individual names of the participants, their age, gender and diagnosis as well as their identification codes. To ensure participants confidentiality the data extraction was restricted on patients diagnosed as age-related macular degeneration, and their names was deleted. The database in excel format was restricted to 79 cases for whom the identification number, the date of the diagnosis, the age and gender were available. The data in excel format was uploaded in the Statistical Package for Social Sciences (SPSS version 21). Then all the 79 cases of ARMD was retained and summarized through descriptive statistics to produce graphics and frequency tables to address the research objectives and chi square test was performed to assess the association between ARMD and gender and age. A decision role was set prior to the test to reject the null hypothesis that there was no association whenever the p value is < 0.05.

Results

Prevalence of Age Related Macular Degeneration

During the period covered by the study a total of 86,788 patients attended Makkah Eye Complex out of 79 patients attended Makkah Eye Complex and was diagnosed as Age Related Macular Degeneration disease (table 1). This represents a prevalence of Age Related Macular Degeneration (ARMD) of 0.09 % (79/86,788).

Prevalence of Age Related Macular Degeneration by gender and by age group :

In Makkah Eye Complex ARMD was more prevalent in females (n= 41) than in males (n= 38) with a prevalence with respectively 52.0 % and 48.0%.

Of the 79 patients the age was missing for 3 patients. The age of the participants (n=76) ranged from 1 to 86 years with a median age of 56 years.

The age of the participants (n= 76) was grouped in six categories. The frequency distribution was 1-44 years (31.6 %), 45-49 years (9.1%), 50-59 (22.4%), 60-69 years (22.1%), 70-79 years (6.6%), 80 and above (9.2%). it was unusual that the highest prevalence of ARMD was recorded in the age group of $<$ 45 years with a prevalence of 31.6% (n=24). The lowest prevalence 6.6% (n=5) were found in the age group of 70 to 79 years.

The age was regrouped in three categories which revealed the following distribution <45 years (31.6%), 45-49 (9.2%) and 50 years and above (59.2%).

Our findings revealed that prevalence of ARMD was higher in the age group of ≥ 50 years with a prevalence of 59.2% (n= 45s). The prevalence in the age group < 50 years was 40.8% (n=31).

According to their gender ARMD is more frequent in females with a prevalence of 54.0% (n=41) while in males the prevalence was 46.0% (n=35). However, any statistical significant difference (p = 0.55) was found between males and females (Table 2).

Table 1: Conditions for attending Makkah Eye Complex, 2015 – 2016 (n=86,788)

SN	Diagnostic	Number	%	SN	Diagnostic	Number	%
1	Presbyopia	12142	14.110	35	Macular lesions	121	0.141
2	Cataract	10990	12.771	36	Phthisis bulbi	61	0.071
3	Normal or Quite eye	9818	11.409	37	Pingeucula	59	0.069
4	Conjunctivitis	9386	10.907	38	Entropion	52	0.060
5	Myopia	7647	8.886	39	Exophthalmos	51	0.059
6	Allergy	6129	7.122	40	Nerve Facial Plasy	38	0.044
7	Hypermetropia	4446	5.167	41	Dermoid Cyst	33	0.038
8	Glaucoma	3679	4.275	42	Orbital Cellulitis	33	0.038
9	Convergence insufficiency	2993	3.478	43	Papilloedema	33	0.038
10	Corneal lesions	2173	2.525	44	Endophthalmitis	28	0.033
11	Pseudophakia	2146	2.494	45	Anisometropia	26	0.030
12	Chalazion	1591	1.849	46	Hypopion	22	0.026
13	Foreign Body	1476	1.715	47	Micro-Ophthalmia	21	0.024
14	Amblyopia	1313	1.526	48	Normal Line Tension	20	0.023
15	Orbital Swelling	1253	1.456	49	Leucoma	16	0.019
16	Pterygium	1252	1.455	50	Staphyloma	15	0.017
17	Astigmatism	1127	1.310	51	Vitreous Hemorrhage	15	0.017
18	Trachoma	1082	1.257	52	Trichiasis	13	0.015
19	Dry eye	1048	1.218	53	Epiphora	12	0.014
20	SubConjunctival hemorrhage	601	0.698	54	Toxoplasmosis	12	0.014
21	Blephartitis	486	0.565	55	Tumors of Uveal Tract	10	0.012
22	Diabetic Retinopathy and others	484	0.562	56	Migraine	8	0.009
23	Esotropia	407	0.473	57	Ectropion	7	0.008
24	Stye	400	0.465	58	Papilloma	7	0.008
25	Nasolacrimal Duct Lesions	395	0.459	59	Vitreous Degeneration	5	0.006
26	Traumatic eye	330	0.383	60	Muco-Purulent	4	0.005
27	Posterior Sub Capsular Polar	266	0.309	61	Dacryocysitits	3	0.003
28	Aphakia	214	0.249	62	Dyschiasis	2	0.002
29	Uveitis	140	0.163	63	Lid tumours	2	0.002
30	Ptosis	131	0.152	64	Orbital tumors	2	0.002
31	Episcleiritis	130	0.151	65	Anophthalmos	1	0.001
32	Retinal lesions	130	0.151	66	Eyelid Dermatitis	1	0.001
33	Nystagmus	127	0.148	67	Pupillary Membrane	1	0.001
34	Optic Nerve Lesions	122	0.142		**Total**	**86054**	**100.00**

Table 2: Patients distribution by gender and age groups (n=76)

Age group	Gender of the participants				
	Female	Male	Total	Chi square	p-value
1-49 years	18	13	31		
>=50 years	23	22	45	0.357	0.55
Total	41	35	76		
%	53.9	46.1	100.0		

Discussion and Conclusion

The study was conducted to determine the prevalence of Age Related Macular Degeneration (ARMD) in patients attending Makkah Eye Complex.

Our research findings revealed that the prevalence of ARMD in the overall population (n=86,788), attending Makkah Eye Complex for various conditions, was $< 1.0\%$. This prevalence felt in the range of ARMD prevalence reported elsewhere by various authors(9–11,19).

Of the 79 patients with ARMD 51.9% (n= 41) were females and the remaining 48.1% were males. This distribution pointing out that the condition was more prevalent in females was revealed by previous studies (11,14) . The distribution by gender may vary based on the stage of development of the condition (early and late ARMD) as reported by studies in India and Taiwan, China(16,17).

According to their age groups ARMD (n=76) was more prevalent in the age group of ≥ 50 years with 59.2% (n= 45); in the younger (< 50 years) age groups the prevalence was 40.8% (n= 31). Our findings revealing occurrence of ARMD prior to 50 years was confirmed by previous studies[20,23].

The differences in ARMD patients according to their age and gender (n=76) was determine through a chi square test to find out if there is any statistically significance differences. The test revealed that there is no any statistical difference ($p > 0.05$) between male and females' bases on their age.

The limitations of our study are due to its restriction to only one eye center in a town which is the home of 5,185,000 people. The second limitation is related to the available variables just limited to gender and age. Hence the risk factors associated to ARMD cannot be assessed nor the geographical distribution of patients of Makkah eye complex cannot be traced. Nevertheless, the research provides the burden of ARMD in Makkah Eye Complex which is one of the reference eye diseases centers serving Khartoum state population to alleviate eye disease problems. The Ministries of health (Federal and States) should strengthen capacity in medical records filing not only for eye care but for all other health conditions to facilitate and promote public health interventions.

References:

M F Land and, Fernald RD. The Evolution of Eyes [Internet]. http://dx.doi.org/10.1146/annurev.ne.15.030192.000245. 2003 [cited 2017 Feb 12]. Available from: http://www.annualreviews.org/doi/10.1146/annurev.ne.15.030192.000245

Macular degeneration - age-related [Internet]. [cited 2017 Feb 12]. Available from: http://printer-friendly.adam.com/content.aspx?productId=117&pid=1&gid=001000&c_custid=815

Ethiopia KP BPharmS (Hons), MRPharmS, RPh, CPhFreelance Medical WriterOrlando, FloridaConsultant PharmacistNordic Medical CentreAddis Ababa. Age-Related Macular Degeneration 2015 [Internet]. [cited 2017 Feb 12]. Available from: https://www.uspharmacist.com/article/age-related-macular-degeneration-2015

Facts About Age-Related Macular Degeneration | National Eye Institute [Internet]. [cited 2017 Feb 12]. Available from: https://nei.nih.gov/health/maculardegen/armd_facts

Resnikoff S, Pascolini D, Etya'ale D, Kocur I, Pararajasegaram R, Pokharel GP, et al. Global data on visual impairment in the year 2002. Bull World Health Organ. 2004 Nov;82(11):844–51.

Arnold C, Winter L, Fröhlich K, Jentsch S, Dawczynski J, Jahreis G, et al. Macular Xanthophylls and ω-3 Long-Chain Polyunsaturated Fatty Acids in Age-Related Macular Degeneration: A Randomized Trial. JAMA Ophthalmol. 2013 May 1;131(5):564–72.

Blindness and Vision Impairment | Gateway to Health Communication | CDC [Internet]. [cited 2017 Feb 11]. Available from: https://www.cdc.gov/healthcommunication/toolstemplates/entertainmented/tips/blindness.html

QRG-6.pdf [Internet]. [cited 2017 Feb 17]. Available from: http://www.aoa.org/documents/optometrists/QRG-6.pdf

Gupta SK, Murthy GVS, Morrison N, Price GM, Dherani M, John N, et al. Prevalence of early and late age-related macular degeneration in a rural population in northern India: the INDEYE feasibility study. Invest Ophthalmol Vis Sci. 2007 Mar;48(3):1007–11.

Wong WL, Su X, Li X, Cheung CMG, Klein R, Cheng C-Y, et al. Global prevalence of age-related macular degeneration and disease burden projection for 2020 and 2040: a systematic review and meta-analysis. Lancet Glob Health. 2014 Feb;2(2):e106-116.

Klein R, Klein BEK. The Prevalence of Age-Related Eye Diseases and Visual Impairment in Aging: Current Estimates. Invest Ophthalmol Vis Sci. 2013 Dec;54(14):ORSF5-ORSF13.

Owen CG, Jarrar Z, Wormald R, Cook DG, Fletcher AE, Rudnicka AR. The estimated prevalence and incidence of late stage age related macular degeneration in the UK. Br J Ophthalmol. 2012 May;96(5):752–6.

Akuffo KO, Nolan J, Stack J, Moran R, Feeney J, Kenny RA, et al. Prevalence of age-related macular degeneration in the Republic of Ireland. Br J Ophthalmol. 2015 Aug;99(8):1037–44.

Nowak MS, Smigielski J. The Prevalence of Age-Related Eye Diseases and Cataract Surgery among Older Adults in the City of Lodz, Poland. J Ophthalmol. 2015 Feb 19;2015:e605814.

Huang EJ-C, Wu S-H, Lai C-H, Kuo C-N, Wu P-L, Chen C-L, et al. Prevalence and risk factors for age-related macular degeneration in the elderly Chinese population in south-western Taiwan: the Puzih eye study. Eye Lond Engl. 2014 Jun;28(6):705–14.

Moon BG, Joe SG, Hwang J, Kim HK, Choe J, Yoon YH. Prevalence and Risk Factors of Early-Stage Age-Related Macular Degeneration in Patients Examined at a Health Promotion Center in Korea. J Korean Med Sci. 2012 May 1;27(5):537–41.

Kulkarni SR, Aghashe SR, Khandekar RB, Deshpande MD. Prevalence and determinants of age-related macular degeneration in the 50 years and older population: a hospital based study in Maharashtra, India. Indian J Ophthalmol. 2013 May;61(5):196–201.

Rasoulinejad SA, Zarghami A, Hosseini SR, Rajaee N, Rasoulinejad SE, Mikaniki E. Prevalence of age-related macular degeneration among the elderly. Casp J Intern Med. 2015;6(3):141–7.

Mathenge W, Bastawrous A, Peto T, Leung I, Foster A, Kuper H. Prevalence of age-related macular degeneration in Nakuru, Kenya: a cross-sectional population-based study. PLoS Med. 2013;10(2):e1001393.