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Original Artide

A Survey of the Management of Diabetic Macular Oedema in Sub-Saharan Africa

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Abstract

Background: There is minimal information about the availability of treatment for Diabetic macular oedema (DMO) in sub-Saharan Africa (SSA). The principal aim of this survey was to determine the 'real world' management of DMO amongst ophthalmologists working in SSA.

Methodology: Questionnaires were distributed to members of retinal and ophthalmological societies in SSA.

Results: Ninety-Three ophthalmologists from 24 countries participated with the majority working in Nigeria (51, 55%). Most were retina specialists (50, 54%) and consultants (67, 62%). Clinically significant macular oedema prompted treatment for 62 (67%) ophthalmologists, whilst visual acuity (81, 87%) and OCT changes (76, 82%) were more common reasons to treat DMO. Treatment included intravitreal anti-VEGF (91, 98%), laser (70, 75%), intravitreal steroid (57, 61%), topical drops (52, 56%), oral tablets (32, 34%) and surgery (20, 22%). The commonest intravitreal anti-VEGF agents used were bevacizumab (89, 96%) and ranibizumab (71, 76%). Intravitreal triamcinolone was used by 69 (74%), topical NSAIDs by 51 (55%), and acetazolamide tablets by 22 (24%) ophthalmologists as a treatment for DMO.

Conclusion: Sub-Saharan African ophthalmologists commonly use intravitreal anti-VEGF, laser, intravitreal steroid, and topical NSAIDs to treat DMO. Economic constraints and/or the inability to maintain the intensive regimen required for successful intravitreal anti-VEGF therapy probably influence some treatment choices.

Keywords: Diabetic Macular Oedema; Diabetic Retinopathy; Anti VEGF; Laser; Sub-Saharan Africa; Resource Constraints.

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Quick Response Code:

Introduction

Worldwide, diabetes is a significant health problem that arises as a consequence of a number of genetic, social, and environmental factors. Recent data published by the International Diabetes Federation show that diabetes affects 463million of the world's population and is estimated to increase to 700 million by 2045; representing a predicted increased prevalence of 51%[1]. Whilst diabetes prevalence is currently 19 million in Africa, by 2040 the projected increase to 47 million represents the greatest impact of rising diabetes prevalence in the world of 141%[1].

Globally, diabetic retinopathy (DR) is a leading cause of blindness, particularly in people of working age[2,3]. Vision loss in people with diabetes is associated with sight threatening sequelae of DR, namely, diabetic macular oedema (DMO) and proliferative diabetic retinopathy.[4,5] DMO is the commonest cause of visual impairment, especially in people with Type 2 diabetes[6]. The overall global prevalence of DMO is estimated to be 7.5%.[2] with higher prevalence in people from sub-Saharan African countries.[7–9] compared to predominantly white populations.[10–12]

Treatable DMO is usually classified as clinically significant macular oedema (CSMO) and requires a three-dimensional assessment of the macula. It is defined by the Early Treatment Diabetic Retinopathy Study (ETDRS) as one or more of the following: retinal thickening at or within 500μm of the centre of the fovea; exudates at or within 500μm of the centre of the fovea if associated with adjacent retinal thickening; or a zone or zones of retinal thickening one disc area within one disc diameter of the fovea.[13] Assessment of the macula usually involves measurement of visual acuity and dilated fundus examination. Imaging in the form of retinal photography is commonly used for documentation and optical coherence tomography (OCT) enables identification of pooled macular fluid within intraretinal and subretinal spaces. Fundus fluorescein angiography is invasive and identifies areas of leakage and capillary non-perfusion.

There are a number of modifiable and non-modifiable risk factors responsible for the onset of DMO. The commonest reason for progression of DMO is poor control of modifiable risk factors such as hyperglycaemia, hypertension, hyperlipidaemia and obesity.[14–17] Patient education and awareness of the impact that diet and lifestyle factors have on diabetic eye complications are important in the management of the aforementioned risk factors.[1] Modern medicine has enabled the treatment of DMO with laser and in recent years intravitreal injection therapies that include anti-vascular endothelial growth factor (VEGF) and steroid agents.[18]Whilst laser and pharmacological treatments for DMO are readily available in high resource countries, very little is known about the availability in sub-Saharan Africa.

The principle aim of this survey was to determine the 'real world' management of DMO amongst ophthalmologists working in sub-Saharan Africa. Additional aims of this survey were to identify tools used to investigate patients with diabetic maculopathy in SSA.

Methods

Sub-Saharan African ophthalmologists managing patients with DR were identified through their national societies, retinal societies and regional societies. They were invited to participate in this online survey. Ethical approval was sought from the Health Research Ethics Committee of Lagos University Teaching Hospital, ADM/DCST/HREC/APP/3313. Information about the survey and an online questionnaire were distributed to members of retinal and ophthalmological societies across SSA. Participants were reminded to fill the online questionnaire and over a four-week period the survey was open for responses. Results were collated at the end of the survey period. Data was entered into an excel spreadsheet and all analysis and reporting was done in numbers and percentages.

Results

A total of 93 ophthalmologists from 24 sub-Saharan African countries participated in the study. The largest group of respondents managing patients with Diabetic macula oedema worked in Nigeria, 53(55.8%) while another 12(12.6%) worked in Kenya and 11(11.6%) worked in Ghana with the remainder of 17 (18.3%) spread across the remaining countries (Figure 1).

Most were retina specialists (50, 54%) of which 20% were combined medical and surgical retina specialists, 20% were Medical Retina (MR) ophthalmologists and 14.7% were Vitreo-Retina (VR) ophthalmologists. 37.9 % were General Ophthalmologists. (Figure 2).

Most of the participants self-identified as consultants 61 (64.2%) while 21.1% were specialists and 10.5% were Senior Registrars or Residents. Majority of the respondents review patients with DMO in either the General ophthalmology or retinal Specialist Clinic. (Figure 3) Slit lamp binocular indirect ophthalmoscopy was mainly used for retinal examination, although a few use the direct ophthalmoscope. There was access to Retinal Photography (Digital) and Optical Coherence Tomography (OCT mostly Spectral Domain) but not Fundus Fluoresce in Angiography (FFA) in most practices.

Visual acuity prompted treatment for 81 (87%) ophthalmologists whilst clinically significant macular oedema 62 (67%), OCT changes 76 (82%) and FFA 13 (14%) were other common reasons to treat DMO. Figure 4

About 91 (98%) of respondents responded to using intravitreal anti VEGF in the management of DMO. Laser treatment was used by 70 (75%), intravitreal steroid 57 (61%), topical drops 52 (56%), oral tablets 32 (34%) and surgery 20 (22%). Figure 5.

About 34 (36.6%) had 0-5 years of experience in treating DMO, 32 (34.4%) had 5-10 years of experience, 13 (14%) responded to having 10 – 15 years of experience while 21 (23%) had over 15years of experience (Figure 6)

The commonest laser used was argon 38 (40.9%) and diode (31, 33.3%). Another 11(11.8%) used frequency doubled YAG, 1 (1.1%) used micro pulse, 1(1.1%) used Iridex 532nm green with micro pulse, 14 (15.1%) used Sub-threshold laser, 23 (24.8%) used no form of Laser therapy. (Figure 7).

The commonest intravitreal anti-VEGF agents used were Avastin (Bevacizumab), 89 (95.7%) and Lucentis (Ranibizumab), 71 (76.3%). Another 7 (7.5%) used Zaltrap (Zivaflibercept), 43(46.2%) used Eylea (Aflibercept) and 1(1.1%) used no form of Anti- VEGF (Figure 8).

Intravitreal triamcinolone was used by 69 (74%), topical NSAIDs by 51 (55%) and acetazolamide tablets by 22 (24%) ophthalmologists as treatment for DMO.

All the respondents offered some forms of systemic advice to patients which included blood sugar (92, 99%), blood pressure (91, 98%) and lipid (84, 90%) control.

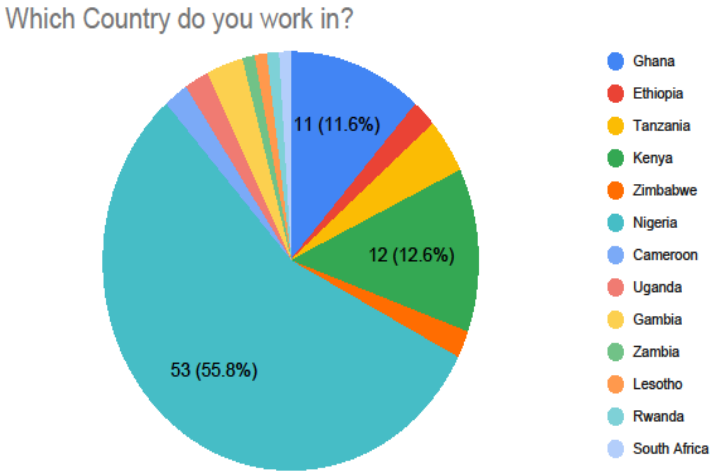

Figure 1: Country of Residence

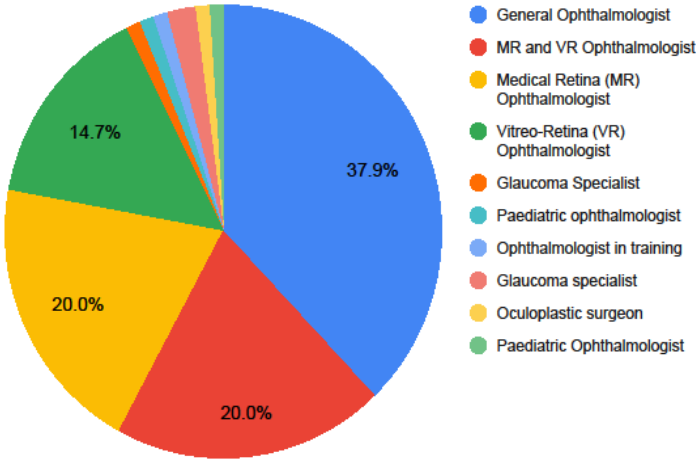

Figure 2: Type of Ophthalmologist

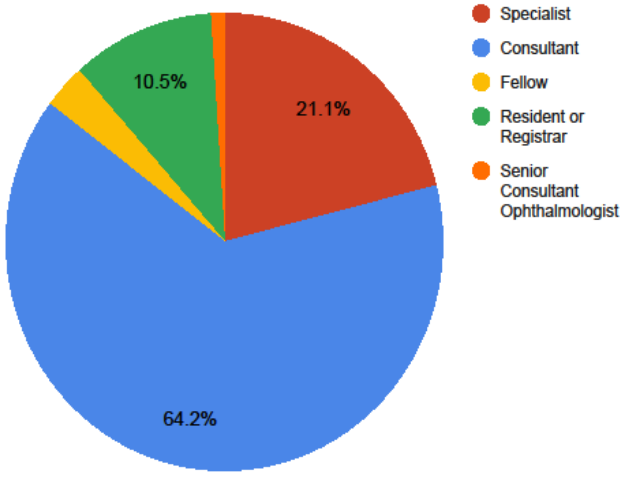

Figure 3: Grade of Ophthalmologist

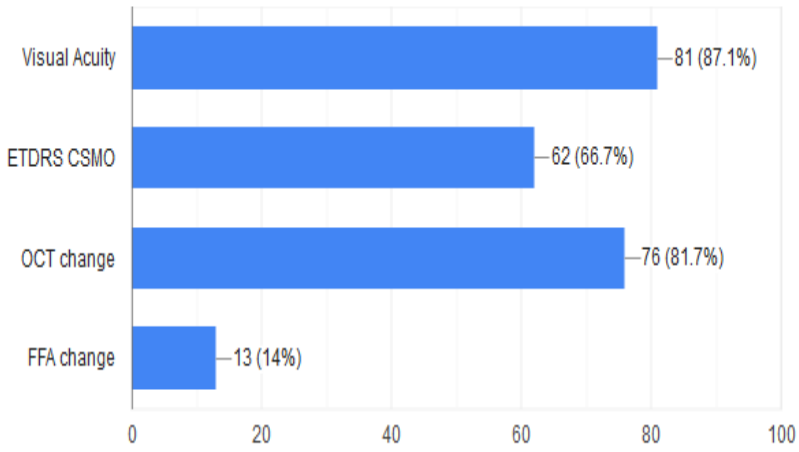

Figure 4: Reasons for treating Diabetic Macular oedema

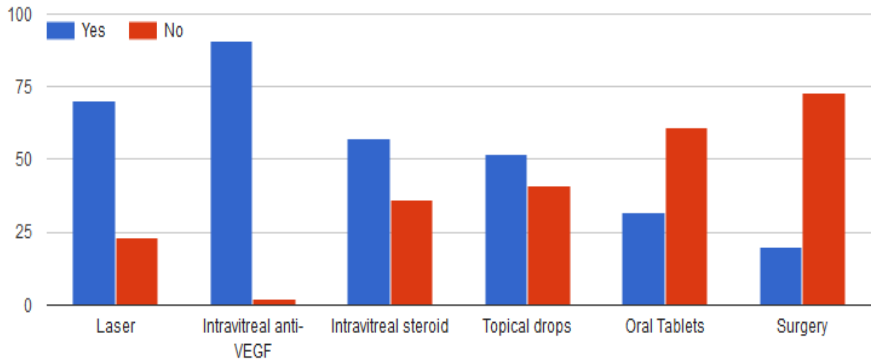

Figure 5: Type of DMO Treatment

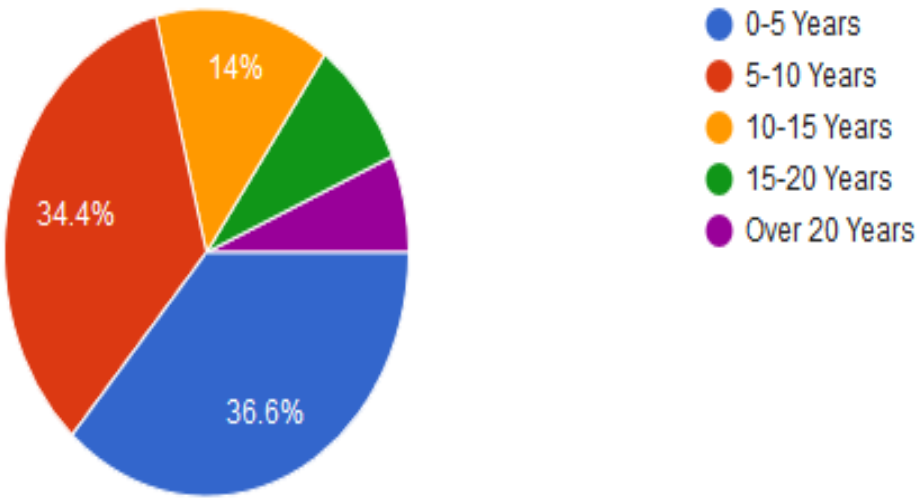

Figure 6: Years of Experience of Opthalmologist

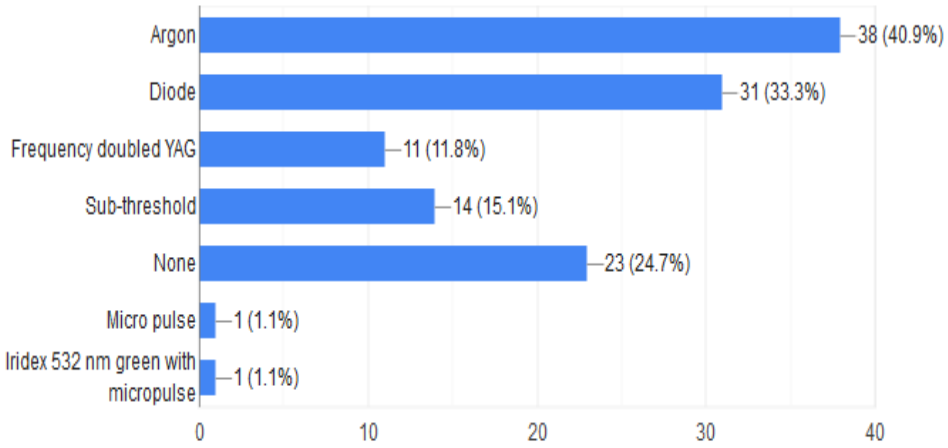

Figure 7: Laser Types used in treatment

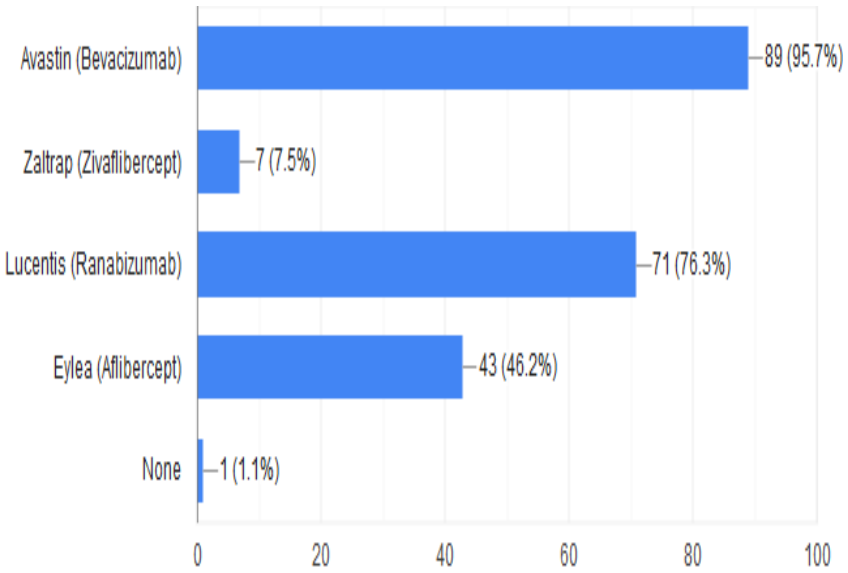

Figure 8: Anti-VEGF treatment Types

Discussion

This paper outlines the management of diabetic macular oedema by a group of 93 Sub-Saharan African ophthalmologists with an interest in the management of retinal conditions. To the best of our knowledge, this paper is one of the first of its kind to interrogate the management practices of ophthalmologists in Sub-Saharan Africa who are known to work under very resource constrained conditions.[19]According to the International Diabetes Federation, Africa is envisaged to have the highest rise in incidence of diabetes and the complications of diabetes, they state that by 2045 there will be a 135% increase in the number of persons living with diabetes in Africa.[20] Several studies have noticed a rise in the incidence of complications of diabetic retinopathy.[21–23]This anticipated rise in prevalence will unfortunately mean a rise in the complications of diabetes as well. Sub Saharan African ophthalmologists need to be prepared to manage all the sequalae of diabetic retinopathy. Our survey, which is the first of its kind in SSA on the practices of SSA ophthalmologists shows that diagnostically there is a higher use of visual acuity and OCT changes to determine treatment thresholds rather than clinically significant macular oedema. This paper highlights that intravitreal anti-VEGF is commonly used in SSA. This compares with previous work done by the UK Consensus Working Group of Diabetic retinopathy which suggested that generally intravitreal anti-vegf agents should be the first line in treatment of DMO.[18] The use of laser by this group of ophthalmologists was not as high as one would have thought, particularly given the potential incremental cost-effectiveness of

laser treatment as highlighted by Vetrini et al in their work from Malawi.[24] The use of intravitreal steroids by 74% of ophthalmologists shows that there is still a role of intravitreal steroids in SSA, despite the well documented issues of cataract, glaucoma and effectiveness.[25] This is highly likely due to the direct cost of triamcinolone being lower than all the anti-vegf agents.[26]Das et al in India published guidelines that showed the role of implantable dexamethasone in an Indian population, particularly when considering the cost implications.[27]Surprisingly some ophthalmologists used topical NSAIDs to treat DMO, once again this is assumed to be due to the resource constrained environment in which a lot of SSA ophthalmologists find themselves. Combined therapy is used a lot in Sub Saharan Africa as per other studies such as the DRCR.net.[25]This survey relied on the recollection of the participating ophthalmologists and would also suffer from reporting bias as not all SSA ophthalmologist responded to our request for participation.

Our survey hints at the fact that availability of equipment and medication as well as the general cost of management of DMOand diabetes in SSA will go a long way to determine treatment choices. There were some surprising findings such as the use of NSAIDs as part of the armamentarium of the ophthalmologists. Cost of treatment may explain why NSAIDs are used for the management of DMO in SSA. Although NSAIDs drops are not recognised as evidence-based treatment for DMO, we postulate that its use is possibly adjunct or primary treatment for populations with economic constraints and/or the inability to maintain the intensive regimen required for successful intravitreal anti-VEGF therapy. This hypothesis is supported by work done by Kelkar et al in India where it was shown that 37.5% of non-compliant persons requiring anti-vegf cited non-affordability as the main reason.[28] This survey shows that a large proportion of ophthalmologists in SSA have access to equipment and medication to manage DMO effectively. Sub-Saharan African ophthalmologists commonly use intravitreal anti-VEGF, laser, intravitreal steroid and topical NSAIDs to treat DMO

Conclusion
Sub-Saharan African ophthalmologists commonly use intravitreal anti-VEGF, laser, intravitreal steroid and topical NSAIDs to treat DMO. Economic constraints and/or the inability to maintain the intensive regimen required for successful intravitreal anti-VEGF therapy probably influence some treatment choices.

Limitations
Ideally wavelength should have been used to identify the types of lasers used. Also, it is unlikely we have reached all sub-Saharan African Ophthalmologists.

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None

Conflicts of Interest
The authors have declared no conflict of interest or competing interest.

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