

Eye diseases in Akon Payam, South Sudan

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Objectives: To determine the prevalence and causes of blindness and visual impairment among patients in Akon payam, Warrap State, South Sudan.

Methods and materials: This was a cross-sectional study of 862 patients conducted at Akon in the period 18 – 31 September 2015. The Snellen E chart was used to measure visual acuity, and all patients had a basic eye examination. Their vision status was categorized according to the World Health Organization classification. Data were entered and analyzed using SPSS version 22 (IBM).

Results: The age range of the study population was 3 - 86 years; 81.9% were aged 41-80 years. 50.8% were males and 49.2% were females. There were 1483 bilaterally blind eyes giving a prevalence of blindness of 86% (95% CI: 3.2497-3.3531) with prevalence of visual impairment of 3.9 % (95% CI: 2.5001-3.0944).

Cataract (59.7%) was the commonest eye disease, followed by glaucoma (15.1%), corneal dystrophy (9.3%), allergic conjunctivitis (5.5%), corneal scar (1.9%), refractive errors (1.8%) and others (6.7%). Among those who are blind cataract (66%) was the major agent with females affected more than males. It was followed by glaucoma (16.7%), corneal dystrophy (10%), corneal scar(1.8%) and the rest of agents (5.4%). The main age group affected by blindness was the 41- 80 years age group (87%) and the least was below 20 years (1.1%). There was a strong association between age and sex with the causes of blindness.

Conclusion: There was equal sex preponderance with more blindness in 41 years or above. Cataract and glaucoma still remained major cause of blindness in this payam. More effort is needed by the government to reduce the burden of these diseases.

Key words: cataract, glaucoma, Akon payam, blindness, eye diseases.

Introduction

Globally, the patterns of eye diseases differ from one region to another and within communities. These variations are influenced by their demographic data, life style, socioeconomic status, etc. Such patterns of eye diseases are important since some can lead to ocular morbidity while others can cause blindness [1]. The common eye diseases include: cataract, glaucoma, conjunctivitis, corneal ulcers, uveitis, refractive errors, and pterygium [2].

The World Health Organization (WHO) estimates that the number of people with visual impairment worldwide in 2002 was over 161 million, of whom about 37 million (23%) were blind [3]. If there are no proper and efficient eye care services, this will result by 2020 in 76 million being blind. More than 90% of the world's visually impaired live in developing countries which includes South Sudan [4]. The majority are in rural areas. It is estimated that 75% of visual impairment is preventable and treatable [5]. This can be achieved through the WHO programme for the Prevention of Blindness "VISION 2020: The Right to Sight Initiative" whose objective is to eliminate avoidable

blindness by the year 2020 [6]. This initiative advocates eye outreach programmes as one way of achieving the vision 2020 target. Hence bringing eye care services to the rural areas through outreach programmes will help to reduce avoidable blindness since the prevalence of blindness and visual impairment is higher among those living in rural areas compared to those in urban areas [7].

The aim of this study is to determine the pattern of eye diseases seen at an eye outreach programme in Akon payam, Warrap State. This will help to obtain baseline data that can be used to design and plan community-based eye care services in rural areas in the state.

Materials and methods

The cross-sectional study was conducted in Akon payam in Warrap State in the Egyptian Hospital over a period of 2 weeks from 18 – 30 September 2015. All age groups with eye problems attending the eye clinic.

The sample size was based on all patients who presented to the Egyptian Hospital with eye problems within the study period.

The study team comprised of 2 ophthalmologists, 2 cataract surgeons, 2 ophthalmic clinical officers, 2 ophthalmic nurses, 2 clerks and 1 coordinator.

Basic eye examination

- Visual acuity (VA) was measured using the Snellen E chart at 6 m in adequate daylight. In patients with vision less than 6/60, VA was evaluated with the Snellen chart at 3m. Those with visual acuity less than 3/60 were assessed with finger counting, hand motion or light perception depending on the patient vision. Patients whose vision was less than 6/18 were subjected to the pinhole test. After VA testing, basic eye examination was done using a torch and a magnifying binocular loupe. Direct ophthalmoscope was used to examine the posterior segment of the eye after pupil dilatation. Diagnosis of glaucoma was based on optic disc cupping. Diagnosis was then made by each examiner. The WHO classification of visual acuity was used [5].
- Blindness was defined as Visual Acuity less than 3/60 in the better eye, Severe visual impairment as VA less than 6/60-3/60 in better eye, Visual impairment as VA <6/18-6/60 in better eye. Normal was defined as vision of 6/18 or better

Data were recorded on a customized form and patients with medical treatable conditions were issued with medications. Patients with surgical conditions (cataract and trichiasis) were booked and operated on the following day.

Statistical Analysis

Data were double entered and analyzed using SPSS version 22 (Statistical Package for the Social Sciences, IBM). Simple frequency analysis, means, standard deviation (SD), and percentages were calculated. Chi-squared test was used to determine the level of statistical significance for categorical variables. The level of significance was set at $P < 0.05$.

Ethical Considerations

Ethical approval was issued by the South Sudan National Ministry of Health (SSNMH).

Results

The studied population was 862 patients (1724 eyes). The age range was 3 to 86 years with a mean of 55.3 ± 15.0 . There were 438 (50.8%) males and 424 (49.2%) females in the ratio of 1:1.03 (Table 1). The majority 706 (81.9%) were aged 41-80 years (95%CI: 0.4074-0.5072) (Table 1). There were 1483 bilaterally blind eyes giving a prevalence of blindness of 86% (95% CI: 3.2497-3.3531) with prevalence of visual impairment of 3.9 % (95% CI: 2.5001-3.0944) (Table 2).

Table 1. Age and sex distribution among patients with eye disease

Age (years)	Sex		Total	95% CI
	Male	Female		
0-20	11	13	24	0.3267-0.7566
21-40	48	74	122	0.5186-0.6945
41-60	154	244	398	0.5650-0.6611
61-80	213	92	308	0.2498-0.3534
81-100	12	1	13	0.0907-0.2445
Total	438	424	862	0.4584-0.5253

P value = 0.000

Table 2. Frequency and percentage distribution of VA among patients

VA	Both eyes n (%)	95% CI
<3/60	1483(86)	3.2497-3.3532
<6/60-3/60	38(2.2)	2.7986-3.3435
<6/18-6/60	66(3.8)	2.5000-3.8944
=or>6/18	137(7.9)	1.4614-2.3446
	1724(100)	

Table 3. Frequency and percentage distribution of common eye diseases among patients

Disease	Total		95% CI
	n	%	
Cataract	1030	59.7	3.23935-3.35865
Glaucoma	260	15.1	3.11555-3.3691
Corneal Dystrophy	160	9.3	3.2881-3.6119
Allergic Conjunctivitis	95	5.5	1.8166-2.28845
Corneal Scar	32	1.9	2.7539-3.7461
Refractive Error	31	1.8	2.2187-3.2063
Others	116	6.7	2.2138-3.2354
Total	1724	100	

P value = 0.000

Cataract (59.7%) was the commonest eye disease, followed by glaucoma (15.1%) (Table 3).

Among those who were blind, cataract (66%) was the major cause (Table 4). Females were affected more than males ($p = 0.000$.) Glaucoma (16.7%) was the second followed by corneal dystrophy (9.3%). The main group contributing to blindness was aged 41 - 80 years (87%) and the least was aged below 20 years (1.1%) (Table 5).

Table 4. Distribution of causes of blindness among patients with VA <3/60 in the better eye

	Male n (%)	Female n (%)	Total n (%)
Cataract	457(62.3)	523(69.8)	980(66.1)
Glaucoma	126(17.2)	122(16.3)	248(16.7)
Corneal Dystrophy	95(12.9)	54(7.2)	149(10.0)
Allergic Conjunctivitis	2(0.3)	0(0.0)	2(0.1)
Corneal Opacity	5(0.7)	3(0.4)	8(0.5)
Trichiasis	2(0.3)	4(0.5)	6(0.4)
Refractive Error	3(0.4)	3(0.4)	6(0.4)
Phthisis Bulbi	2(0.3)	5(0.7)	7(0.5)
Leukoma	1(0.1)	3(0.4)	4(0.3)
Corneal Scar	19(2.6)	7(0.9)	26(1.8)
Pterygium	1(0.1)	2(0.3)	3(0.2)
Maculopathy	1(0.1)	4(0.5)	5(0.3)
Optic Atrophy	4(0.5)	0(0.0)	4(0.3)
Keratitis	1(0.1)	5(0.7)	6(0.4)
Anterior Staphyloma	6(0.8)	4(0.5)	10(0.7)
Ruptured Globe	0(0.0)	1(0.1)	1(0.1)
*Others	9(1.2)	9(1.2)	18(1.2)
Total	734(100)	749(100)	1483(100)

*Others: vitamin deficiency, foreign body in cornea, blepharitis and dryness

Table 5. Frequency and percentage distribution of age groups among patients with VA <3/60 in both eyes.

Age group (years)	Male n (%)	Female n (%)	Total n (%)
0-20	6(0.8)	10(1.3)	16(1.1)
40-21	45(6.1)	108(14.4)	153(10.3)
60-41	253(34.5)	453(60.5)	706(47.6)
80-61	408(55.6)	176(23.5)	584(39.4)
100-81	22(3.0)	2(0.3)	24(1.6)
Total	734(100)	749(100)	1483(100)

Discussion

Outreaches play a very essential role in reduction of avoidable blindness in rural areas where there are poor or absent eye care services.

Most outreach services are conducted and sponsored by non-governmental organizations and Faith-based organizations in South Sudan. To sustain such programmes, the government should get involved. This

is the first outreach ever funded by the government and implemented by government eye health workers. Furthermore this is the first outreach done in Akon payam.

In this study, almost equal number of males and females attended the outreach programme. This was similar to studies conducted in Ethiopia [8] and Nepal [9]. Other studies in Nepal [10] and Nigeria [11] showed a female preponderance. These differences may be due to variation in response to attendance at outreaches, transport, culture attitude, environment and socio economic factors. In this study, eye care services were brought to the community and therefore most of the barriers that reduce the uptake of health to females were either eliminated or reduced. Hence females were competing equally with males.

The prevalence of blindness in this study was 86%. This was the highest in the world as well as in a previous study done in 2005 in South Sudan [12]. This is because our study was an outreach programme in which those who attended were having symptomatic ocular problems with largest percentage contributed by cataract and glaucoma (82.7%). Most, if not all of the prevalence of blindness was obtained from eye surveys. Furthermore, this was an area where eye care services had never being implemented before.

Cataract and glaucoma were the main cause of blindness as well as commonest eye diseases. These results were similar to study done in Nigeria [14]. The 2005 South Sudan survey [12] showed cataract and trachoma to be the commonest. This disparity was due to variation in disease patterns within the communities. Our study showed cataract to still be a major health burden. The government needs to scale up cataract surgical camps across the whole country. South Sudan remains the least successful country in attaining the targets of vision 2020.

The glaucoma screening programme needs to be scaled up for early detection and treatment before it reaches a worse stage. There is a need to increase training of middle ophthalmic cadres for each state, and to expand and integrate eye care services into primary health care programmes. This will help in screening, early detection, treatment and referral of glaucoma cases to centers where there are ophthalmologists.

Ocular corneal dystrophies were the third commonest eye diseases. This is different from most of the studies done in Nigeria [11, 15] and Ethiopia [8] where refractive error is the third commonest eye disease. Our clinic impression is that climatic droplet keratopathy and corneal dystrophy are very common among cattle keeping communities in South Sudan. Environment and genetics may have played a big role. More studies, in form of surveys, need to be carried out in this area in order to justify this uniqueness.

Refractive error was still common. This is a very important eye disease whose prevalence varies globally. It is dependent on the race, culture, environment, genetics, etc. Regular screening and immediate correction of refractive error plays a big role in its management. South Sudan is deficient in refractionists. An immediate training programme needs to be initiated to produce a sizable number of refractionists for each state backed by availability of equipment for refraction. This will assist in reducing refractive errors in the communities as well as preventing amblyopia among children.

Allergic conjunctivitis was the fourth common eye disease. This was similar to one study done in Nigeria [11] but another Nigerian one [13] showed that allergic conjunctivitis was the commonest eye disease. Therefore, within the same country, variability of disease pattern can occur.

Conclusion

Cataract and glaucoma contributed to 75% of the eye diseases in this community. More attention is needed by the state Ministry of Health to provide eye care services in order to improve eye status in Akon payam and elsewhere in the state. The priority of the Ministry should be to reduce the burden of these eye diseases since cataract is treatable and blindness from glaucoma can be prevented or delayed by early detection and treatment. Frequent and regular outreaches need to be conducted.

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References

1. Pi LH, Lin Chen L, Liu Q, NingKe N, Fang J, Zhang S, et al. Prevalence of eye diseases and causes of visual impairment in school-aged children in western China. *J Epidemiol* 2012; 22:37-44. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3798578/pdf/je-22-037.pdf>
2. Ukponmwan, C.U. 2013. Pattern of Ocular Morbidity in Nigeria. *Asian Pacific Journal of Tropical Disease*, 3, 164- 166. [http://www.scirp.org/\(S\(351jmbntvnsjt1aadkposzje\)\)/reference/ReferencesPapers.aspx?ReferenceID=1859972](http://www.scirp.org/(S(351jmbntvnsjt1aadkposzje))/reference/ReferencesPapers.aspx?ReferenceID=1859972). Accessed 10/November/2016
3. Resnikoff S, Pascolini D, Etya'ale D, Kocur I, Pararajasegaram R, et al. 2004. Global data on visual impairment in the year 2002. *Bull World Health Organ* 82: 844–851. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2623053/pdf/15640920.pdf>. Accessed on 10 November 2016.
4. Thylefors B. 1987 A simplified methodology for the assessment of blindness and its main causes. *World Health Stat Q* 40: 129–141. <http://www.uniteforsight.org/global-impact-lab/tonypamphlet.pdf>
5. World Health Organization: Visual impairment and blindness. Fact Sheet N°282. Updated August 2014. <http://www.who.int/mediacentre/factsheets/fs282/en/>. Accessed 10 November 2016.
6. Resnikoff S, Pascolini D, Mariotti SP, Pokharel GP. Global magnitude of visual impairment caused by uncorrected refractive errors in 2004. *Bull World Health Organization*. <http://www.who.int/bulletin/volumes/86/1/07-041210/en/>. Accessed on 10 November 2016.
7. Jadoon MZ, Dineen B, Bourne RR, Shah SP, Khan MA, Johnson GJ, et al. Prevalence of blindness and visual impairment in Pakistan: The Pakistan national blindness and visual impairment survey. *Invest Ophthalmol Vis Sci* 2006; 47:4749-55. <http://iovs.arvojournals.org/pdfaccess.ashx?url=/data/Journals/IOVS/932936> on 11/10/2016
8. Mehari Z A. A study of ocular morbidity of patients attending ophthalmic outreach services in rural Ethiopia. *International Journal of Medicine and Medical Sciences* Vol. 3 (4), pp. 450-454, June, 2013.
9. RMKC, AleJB, Singh SK. Pattern of blindness in Mechi: A hospital based study in Mechi Eye Care centre. *J Nepal Med Assoc* 1998; 37:422-426.
10. Rizyal A, Shakya S, Shrestha RK, Shrestha S. A study of ocular morbidity of patients attending a satellite clinic in Bhaktapur, Nepal. *Nepal Med Coll J* 2010; 12:87-9.
11. Monsudi KF, Saka ES, Azonobi RI. Pattern of eye diseases presents at free outreach in rural community in the Northwestern Nigeria. *Sudan Med Monit* 2015; 10:113-6
12. Ngondi J, Ole-Sempele F, Onsarigo A, Matende I, Baba S, et al. (2006) Prevalence and causes of blindness and low vision in southern Sudan. *PLoS Med* 3(12): e477.
13. Hassan, et al.: Pattern of presentation at a free eye clinic. *Nigerian Journal of Clinical Practice*. Apr-Jun 2013, Vol 16, Issue 2. <http://www.njconline.com> Assessed October 28, 2016
14. Mahmoud AO, Olatunji FO, BuariSB, SanniH. Survey of blindness and ocular morbidities in Kwara State, Nigeria. *Niger J Surg Sci* 2005; 15:26-31.
15. Chukwuka IO, Pedro-Egbe CN, Onua AA. Ocular problems among public service retirees in a Southern Nigerian Metropolitan City. *Niger J Ophthalmol* 2016; 24:16-9.