Prevalence and causes of blindness in a tropical African population

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Summary
A population based survey of Egbedore Local Government area (LGA), a tropical African population in Osun State, Nigeria was conducted to determine the prevalence and causes of blindness in the community, Osun State, one of the new states created on 27th August, 1991 is situated in the southwest region of Nigeria. It has a population of about 2, 654, 244 using the population growth rate of 3.0 percent per year. Egbedore LGA has a population of 49,555 being the projected estimate of the local census done in 1991.

Study design: The study was in accordance with World Health Organisation recommendations. 3204 rural dwellers were examined. The survey team was divided into:
1. Registration team
2. Retrieval team
3. Visual acuity team
4. Ocular examination team.

The survey candidates, once registered were asked to go to a nearby school or health center where visual acuity and ocular examination teams completed the assignment. The retrieval team consisted of an ophthalmic nurse and a local escort who persuaded and brought to examination site registered individuals who failed to appear voluntarily. Ocular examination team performed the eye examination.

Analysis of data was done using personal computer AT model and systat package for analysis.

Result:- It is found that 1.18% of the population was blind by WHO standard. Cataract alone accounted for 47.4% of the blind, uncorrected aphakia 18.4%, glaucoma 15.8%, phthisis bulbi 5.3%, uveitis, optic atrophy, macular degeneration, retinitis pigmentosa and refractive error all accounted for 2.6% each.

Conclusion:- More than half of the burden of blindness is potentially curable. About a third is preventable through health education, early diagnosis and prompt treatment.

A cataract outreach programme with provision of low cost aphakic glasses will go a long way in reducing blindness in this community and Osun State in general.

Keywords: *Prevalence, Causes, Blindness, Osun state.*

Résumé
Introduction:- Une étude basée sur la population du government Local du milieu d'Egbedore (LGA), une population africaine tropicale dans l'Etat d'Osun, au Nigeria a été effectuée afin de décider la fréquence et les causes de la cécité dans la communauté. L'état d'Osun, un des nouveaux états crée le 27 aôut 1991 est situé dans la région du sud ouest du Nigeria compte environ 2,654,244 habitants tout en utilisant le taux de croissance de 3, 0 pourcent par an. Egbedore LGA compte 49,555 habitants d'après le recensement de la population locale fait en 1991.

Plan d'Étude:- L'étude était comforme aux recommendations de l'Organisation Mondiale de la Sante. 3204 habitants rural ont été étudiés. Le groupe d'étude s'était reparti ainsi: (1) Groupe d'inscription (2) Groupe de récupération (3) Groupe d'acuité visuelle (4) Groupe d'examen oculaire. Aussi tôt qu'on inscrit les sujets, ils vont directement a une école où au centre de soins, tout près, où les groupes d'acuité visuelle et examen oculaire achevent le travail. Le groupe de récupération se compose d'une infirmière ophtalmique et un guide local qui essaie de persuader et d'examner les individus obstinés à la salle d'examen pour les inscrire. Le groupe d'examen oculaire font l'examen oculaire.

On fait l'analyse des données avec l'utilisation de Model AT ordinateur personnel et le paquet systat pour l'analyse.

Résultats:- On a noté que 1,18% de la population était aveugle d'après la norme établie par OMS. La Cataracte toute seule constitue 47,4% des aveugles, l'aphakie non-corrigée 18,4%, glaucome 15,8%, bulbi phatisie 5,3%, uveite, atrophie optique, dégéneration maculaire, rétinite pigmentosa et erreur de réfraction tous constituent 2,6% chacun.

Conclusion:- Plus d'une moitié de probleme, de la cécité sont potentiellement guérissable. Environ le troisieme est évitable à travers l'enseignement sanitaire, un diagnostic dans un bref delai et traitement rapide. Programme d'une association travaillant sur le terrain en ce qui est de la cataracte avec la fourniture/prestation des lunettes aphakie à bas prix va, beaucoup diminuer les cas de la cécité dans cette communauté et dans l'Etat d'Osun en général.

Introduction
The sense of seeing is one of the very important senses in the body. The loss of the ability to see therefore is a serious physical and emotional condition, which prevents the afflicted individual from functioning adequately within the society thus causing serious socio-economic consequences on the communities involved. This loss of function of the blind person(s) is especially serious in developing countries where there are little or no facilities for the rehabilitation of the blind. The definition of blindness varies from one country to the other due to varying concepts. However, for purposes of uniformity and comparison, the World Health Organization (WHO) proposed a scale of visual impairment and blindness in the tenth Revision of International classification of diseases[1]. In this study, an individual with a visual acuity of less than 3/60 (Snellen 6m scale) in the better eye is regarded as blind. The global prevalence of blindness was 0.7%, ranging from 0.3% in the Established Market Economies and Former Socialist Economies of Europe to 1.4% in sub-Saharan Africa[2]. In Africa and especially Nigeria, until recently, most studies were either hospital or blind school based studies. These are not fully representative of the prevalence of blindness in a population. In Osun State, located in the southwestern part of Nigeria, blind registers are non-existent and in fact when there are no benefits accruing to the blind, only

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few if any will come out for registration.

Therefore, a population-based survey of the prevalence and causes of blindness is a prerequisite to the proper planning and development of adequate technology to reduce the blindness rates in this state.

The pattern of causes of blindness varies from one country to the other. Regional variations also exist within countries depending on prevailing local conditions such as geographical, cultural, socio-economic or dietary factors. The prevalence and causes of blindness in urban areas will differ from that in rural areas due to several factors.

The purpose of this paper is to highlight the prevalence and causes of blindness in our locality.

Materials and Methodology
Materials

An epidemiological survey of inhabitants of Egbedore Local Government Area (LGA) in Osun State was carried out.

Osun State is one of the new states created on 27th August 1991.It is situated in the Southwest region of Nigeria. It is bordered in the West and North West by Oyo state, in the East by Ondo State and in the South by Ogun State. It is divided into 23 LGA (1998) of which Egbedore Local Government Area is one of them. The State has an estimated population of about 2,654,244 using the population growth rate of 3.0 percent per year[3].

The study was done in the Egbedore Local Government Area (LGA) of Osun State, Nigeria with a population of 49,555 being the projected estimate of the local census done in 1991[3]. This study was in accordance with World Health Organization recommendations[1]. At the commencement of the survey, cooperation of village heads, local chiefs, health personnel in local dispensaries/Maternity Clinics and school heads was sought to make sure their subjects were well informed well in advance.

The list of wards in the Local Government Area was drawn and four (4) wards were chosen at random. A random sampling of five (5) villages was taken from the forty-two villages within all selected wards. These villages were then divided into clusters depending on the average number of household per village. Small villages were considered single clusters while larger ones were divided into several clusters. A random sampling of 5 clusters was done.

All households within the boundaries of each chosen cluster were visited and all permanent residents (i.e. resident for at least 1year) were screened. The survey team included ophthalmic personnel in the state (Consultant, Medical Officers and six Eye Nurses), one local inhabitant of the region and one Community Health Extension Worker in each cluster region as field assistants.

The survey team was divided into:
1 Registration team
2 Retrieval team
3 Visual acuity team
4 Ocular examination team.

The survey candidates, once registered were asked to go to a nearby school or health center where visual acuity and ocular examination teams completed their assignment. The retrieval team consisted of an ophthalmic nurse and a local escort who persuaded and brought to examination site registered individuals who failed to appear voluntarily. Ocular examination team performed the eye examination.

Each team was adequately trained for a period of 8 weeks. Registration included, name, age, sex and occupation.

Screening

Each member of the household (adult and preschool children between the ages of 4-6 years) had visual acuity done with each eye at a time; using the standard sentinel "E" Optotype placed at a distance of three meters away in broad day light Adequate explanation about what the individual should see was given in the local language making sure each of them understood the procedure before starting. Individuals that normally wear glasses for distant vision were tested with their glasses on. Children under four years of age were tested by using the ability to fixate a light source held at 30-50cm from the face, and follow it when moved in different directions. Those who had a poorer vision than 3/60 were tested with PH hole (PH) to detect refractive errors. Aphakic eyes were tested with + 10 diopter spherical lens.

Final study group (FSG)

The final study group consisted of participants who failed to see 3/60. A questionnaire was administered on all of them. Information regarding demographic data such as name, age, sex, occupation and level of education was collected. Also included was history of ocular disease, past medical and family history, orthodox or traditional eye care utilization. The questionnaire was pretested to ensure adequacy and appropriateness of questionaire.

Eye examination

Trained ophthalmic personnel using portable equipment performed eye examination. The assessment included pen torch examination of the eyelids looking for deformity, trichiasis, and entropion; conjunctiva for evidence of xerophthalmia; cornea for opacities, and lens for cataract.

Persons with suspicious lesions were transferred to the state specialist Hospital for slit lamp examination. Intraocular pressure (IOP) was done using Schiotz tonometer on all individuals above the age of 40 years and those below 40 years of age with suspicious discs.

Posterior segment lesions were assessed with a direct ophthalmoscope and persons with lens opacities or suspected peripheral retinal lesions had dilated fundoscopy.

Skin snip examination for microfilaria was done on individuals in the FSG with lesions suspicious of Onchocerciasis. Skin snip was taken from two different sites-iliac crest and scapula. A hypodermic needle was used to pick up the skin after injecting 0.2ml 2% xylocaine and with the use of Bard parker size 15 blades, the skin was excised and transferred to the laboratory in normal saline solution contained in a universal bottle.

After the examination, a single main cause of blindness in each eye was recorded. A contributory factor was assigned to conditions with multiple ocular pathologies. Classification of the cause of blindness was done as recommended by WHO[1]. Each blind person was assessed to identity the

action needed e.g. spectacle correction, medical treatment or Surgery.

Individuals with infective eye disorder and those with eye complaints during the screening process were treated free. Transport fare to the state specialist hospital was given to individuals that needed slit lamp examination and ophthalmoscopy.

Analysis of data was done using SPSS 10.

Results

A total of 3204 inhabitants of Egbedore LGA were examined. Thirty-eight (1.18%) of them were blind in both eyes. The majority of them were aged between 20 and 79 years. There were more females (55.6%) than males (44.4%) but males outnumbered females in the extremes of age (Table 2.)

In the 20-39 age group, (most economically viable period of life) females outnumbered males. Twenty-one (55.3%)

Table 1   Sample population

	Sample (no)	Percentage of sample population
Not blind in both eyes	3166	98.81
Blind in both eyes	38	1.18
Total:	3204	100

Table 1.1 Shows the proportion of blind cases in Egbedore LGA. 1.18 % of the population was blind in both eyes. The estimated p=. 011 is found to be statistically significant at alpha=. 05 (alpha being the probability level of significance) using Student's t statistics.

Table 2   Sex distribution of blindness by wards

Ward	M	F	Total blind
Awo	4	2	6
Ido Osun	7	2	9
Ara	5	6	11
Iragberi/Okinni	5	7	12
Total =	21	17	38

Overall 55.3% of the blind were males while 44.7% were females (M: F: 1.2:1). Females were more affected in Ara and Iragberi/Okinni wards. This was however, not statistically significant.

Table 3   Distribution of blindness by wards

Ward	No examined	No of blind	% blind
Awo	546	6	1.1
Ido Osun	1412	9	0.64
Ara	738	11	1.5
Iragberi/Okinni	508	12	2.4
Total =	3204	38	1.18

Table 3: shows that prevalence of blindness varied between 0.6 to 2.4%.

Table 4   Distribution of blindness in the wards

Ward	Awo	Ido Osun	Ara	Iragberi	Total
Cataract	4	1	8	5	18(47.4)
Uncorrected Aphakia	1	2	1	3	7(18.4)
Glaucoma		3		2	6(15.8)
Cornea Phthisis		2			2(5.3)
Uveitis			1		1(2.6)
Optic atrophy		1			1(2.6)
Macular degeneration			1		1(2.6)
Retinitis Pigmentosa			1	1	1(2.6)
Refractive error	1				1(2.6)
Total:	6	9	11	12	38

of the blind were males while seventeen (44.7%) were females (M: F: 1.2:1).

Some cases had different causes in the 2 eyes. In such cases, the more readily treatable/preventable cause of blindness was chosen for data analysis.

The most common cause of blindness was cataract accounting for 47.4% of blind cases. Uncorrected aphakia came second (18.4%). Glaucoma came third accounting for 15.8% of the blind. Optic atrophy, retinitis pigmentosa, macular degeneration, refractive error all accounted for 2.6% each of the blind. A positive skin snip was found in the only case of optic atrophy and 2 cases of the eighteen people with cataract blindness.

Discussion

A reliable estimate of the prevalence and causes of blindness in a rural community in Osun State has shown certain features that can be used to represent characteristics of blindness in the state.

The exact ages of most adults in the study were difficult to determine, as most of them were illiterates and without records of birth. However, some of them were able to estimate their ages if their births occurred close to, or coincided with major national or global occurrences e.g. civil war, independence, world wars 1 and 2 and so on. Estimates were also made from the age of the first child of the family. In other instances, the age

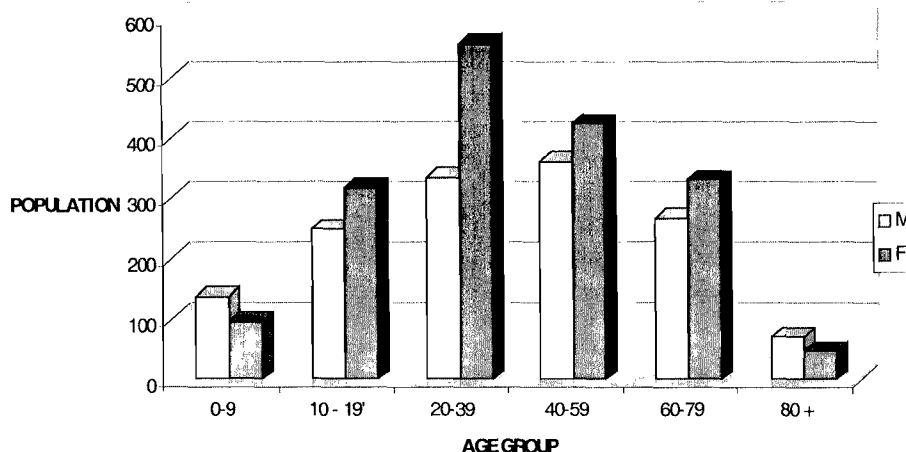

AGE & SEX DISTRIBUTION OF SAMPLE POPULATION

Fig. 1 *Shows that greater than half of the sample were seen below 40 years of age. There were more females(55.6%) than males (44.4%) but males outnumbered females in the extremes of age (0-9, 80 and above). In the 20-39 age group (most economically viable period of life), females outnumbered males.*

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was estimated from the physical appearance of individuals though this may be quite deceptive in view of the poor nutritional status of rural dwellers.

Over half (53%) of the sample was seen to be below 40 years of age. In the age bracket 20-39 years (the most economically viable period of life), females outnumbered males.

Thirty-eight (1.18%) of the total population was blind using the WHO criterion of best visual acuity of less than 3\60[1]. This burden of blindness is several times more than that obtained in developed countries (0.2 - 0.44%)[4]. The prevalence rate thus determined is similar to the estimated overall average for developing countries with limited health and eye care services (1%)[2].

The prevalence of blindness in Nigeria, however depends on the region e.g. Adeoye found a prevalence of 0.9% in southern Nigeria[5], Ezepue 0.33% in Eastern Nigeria[6], Rabiu 8.2% in Northern Nigeria[7] and 1.18% in this study. The higher value in Northern Nigeria is probably due to endemic trachoma and onchocerciasis in the north. A positive skin snip was recorded in only 3 blind cases in this study.

The most common causes encountered were cataract (47.4%), uncorrected Aphakia (18.4%) and glaucoma (15.8%). These 3 major causes are avoidable. Next on the list is corneal scar/phthisis as a cause of blindness (5.3%). No case of trachoma was found in the study population. This is in keeping with previous reports in southern Nigerian as opposed to northern Nigerian.

Bilateral blindness from ocular trauma was not a feature in this study.

Cataract is the leading cause of blindness as seen in most other studies[5,6]. It accounted for almost half (47.4%) of all blindness. All cases of uncorrected Aphakia (18.4%) in this study were a result of couching. This is an ancient method practiced by dislocating the cataractous lens with a sharp needle, thorn or manual pressure. Unorthodox, traditional doctors who move from one village to the other do it. The procedure is presumed cheaper than orthodox surgery, less time consuming and no hospital stay. However, complications such as endophthalmitis, panophthalmities, severe uveitis, retinal detachment, vitreous hemorrhage, secondary glaucoma are common, which make the patients lose the eye. Yet, Cataract blindness can be readily cured using a simple, short and cheap surgical procedure.

Six (15.8%) of the blind in this study were due to glaucoma.

Only 3 of the blind in this study had a positive skin snip. Also, onchocerciasis is more prevalent in the Northern parts of the country. The only case of optic atrophy had a positive skin snip.

Corneal scar and phthisis bulb accounted for 5.3% of blindness in this study. As expected bilateral blindness from corneal scar and phthisis is almost non-existent in developed countries[4]. In developing countries, malnutrition together with the common utilization of harmful traditional eye medication, and application of noxious agents such as pa-

tient's urine and camphor during mild episodes of conjunctivitis may lead to severe gonococcal infection, eye destruction or healing with corneal scar or phthisis bulb.

Age related macular degeneration (AMD) was not commonly found in this study. It was responsible for 2.6% of cases. This is similar to other population studies done in developing countries[8,9]

In developed countries however, AMD is considered to be an important and leading cause of blindness; 29.8% in Scotland[4].

Conclusion

This study highlights the high prevalence of blindness (1.18%) and the various causes in this locality, most of which are avoidable.

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