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## Causes of childhood blindness at ECWA Eye Hospital, Kano, Nigeria

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### Summary

The study aimed at identifying the causes of childhood blindness at ECWA Eye Hospital, Kano. The causes of visual loss in 31 consecutive patients aged  $\leq 16$  years who attended the ECWA eye Hospital between 1993 and 1996, who had vision of  $< 3/60$  in the better eye were recorded. The eyes were examined with a slit lamp or flashlight a loupe, and an ophthalmoscope. The intraocular pressure was taken with either a Schiotz or an applanation tonometer. There were 14 males (45.0%), the mean age was 6 years; range: 1 to 15 years. Corneal causes were responsible for blindness in 54.8%. Measles was responsible for 10 cases; neonatal infection was responsible in 2 cases. Four cases were due to lens lesions. By aetiologic category, childhood factors accounted for (32.3%). The causes in 51.7% were not known. Hereditary factors and perinatal factor accounted for 6.4% cases each. Intrauterine factors were responsible for 1 case. Eighteen (58.6%) of the cases were due to avoidable causes; 12 (38.4%) being preventable and 6 (19.2%) treatable. The causes of Childhood blindness in this study are consistent with those of low economic region with high prevalence of avoidable blindness.

**Keywords:** *Childhood, blindness, causes, treatable, avoidable, preventable.*

### Résumé

Pour identifier la cause de la cécité infantile à l'hôpital ophtalmologique d'ECWA, Kano. Les causes de la perte visuelle chez 30 patients consécutifs âgés de  $\leq 16$  ans visitant l'hôpital ophtalmologique d'ECWA entre 1993 et 1996, qui avaient une vision de  $< 3/60$  étaient enregistrés. Les yeux étaient examinés à l'aide de la loupe et d'un ophthalmoscope. La pression intraoculaire était prise avec soit le Schiotz ou le tonomètre d'appplanation. Ils y avaient 14 mâles (45.0%), d'une moyenne d'âge de 6 ans; variant entre 1 à 15 ans. Des causes cornéales étaient responsables de la cécité chez 54.8%. La rougeole était responsable de 10 cas; infection néonatale chez 2 cas. Quatre cas

étaient due aux lésions du cristallin. Par catégorie étiologique, les facteurs infantiles étaient estimés à 32.3%. Les causes chez 51.7% étaient non connues. Les facteurs héréditaires et périnatales étaient estimés à 6.4% cas chacun. Un seul cas était due aux facteurs intrautérins. Dix huit (58.6%) des cas étaient due a des causes évitables; 12 (38.4%) étant prévenable et 6 (19.2%) traitable. Les causes de la cécité infantile dans cette étude sont consistant chez ceux des régions économiques basses ayant un taux élevé de cécité évitable.

### Introduction

Information on the magnitude and causes of childhood blindness is sparse especially in developing countries. If the "blind years" is considered, childhood blindness is second only to cataract in its contribution to world blindness [1]. There is an estimated 1.4 million blind children worldwide [2]. Approximately three quarters of these live in the poorest regions of Africa where resources for management and control programs are scarce. In these low-income countries with high under-5 mortality rates, the prevalence is as high as 1.5 per 1000 children. In high-income countries with low under-5 mortality rates, the prevalence is about 0.3 per 1000 children [3]. Studies in Nigeria [4,5], Kenya, Malawi and Uganda [6] show that the major causes of childhood blindness are corneal opacity from measles and vitamin A deficiency, cataract, glaucoma and infections. In the developed world, genetic diseases, and congenital anomalies are the major causes [7]. Within a given country the causes vary with the passage of time, reflecting different levels of socioeconomic development and provision of healthcare services [8]. So, there is need to evaluate blindness causes from time to time to assess the effectiveness of corrective measures.

Due to the fact that blindness in children is relatively rare, population-based data on the causes of childhood blindness are difficult to obtain, particularly in developing countries. Examination of children enrolled in special institutions like hospitals and schools for the blind are alternative sources, but are often biased. Several childhood blindness studies, albeit focal, have been carried out in the Southern part of Nigeria [9,10,11] but only few [12] in the

northern part. This informed the analysis of the data collected on this subject between 1993 and 1996. The study aimed at identify the cause of childhood blindness at ECWA Eye Hospital, Kano.

### Materials and methods

The collection of data for this survey was carried out in the course of routine clinical work at the ECWA Eye Hospital, Kano. ECWA Eye Hospital is a Missionary Hospital situated at Kano, a cosmopolitan City in the northern part of Nigeria. The patients were mainly from Kano, while some were from other parts of Nigeria. The causes of visual loss in 721 consecutive patients who attended the above Hospital between 1993 and 1996, who had vision of 3/60 in one or both eyes were recorded in a protocol form. Blindness was defined as a vision of 3/60 or worse in the better eye.

For each patient, a brief history of onset of visual loss, family history, ethnic group and place of residence (village/town/city) was taken. Visual acuity was measured using a snellen or E-chart. The anterior segment was examined using a slit lamp or flashlight and a loupe. The posterior segment was evaluated by indirect or direct ophthalmoscopy and the intraocular pressure taken with either a Schiotz or an applanation tonometer.

The main causes of blindness and their primary anatomical sites were recorded. Where multiple pathologies were found the primary and most important cause contributing to blindness at the time of presentation was recorded. Other causes were recorded as associated causes. Attempts were made where possible to identify the aetiology of the anatomical problem leading to blindness.

### Results

Thirty one out of the 721 patients were children < 16 years who were bilaterally blind while an additional 31 children were unilaterally blind. The later were excluded from further analysis.

There were 14 males (45.0%) and 17 females (55.0%) the mean age was 6 years. The minimum age was 1 year and maximum was 15 years. The age groups are as shown in table 1.

### Anatomical causes of blindness

Whole globe: One patient (3.2%) had whole globe lesion which was due to congenital anophthalmia. Glaucoma was responsible for blindness in 2 patients (6.5%). Corneal causes were responsible for blindness in 17 patients (54.8%). Ten of the 17 cases were recorded to

be due to measles infection and 2 due to ophthalmia neonatorum. The causes could not be ascertained in the remaining 5 cases. Four cases of blindness due to lens abnormality were recorded. Two of them were complicated cataract while 2 were familiar.

Three patients were blind from uveal cause, while 2 patients each were blind from optic nerve and retinal causes respectively. Table 2.

**Table 1:** Age and sex distribution of blind children

Age group (years)	Male		Female		Total	
	No	%	No	%	No	%
0-4	7	22.6	5	16.0	12	38.6
5-10	5	16.0	8	26.0	13	42.0
11.-15	2	6.4	4	13.0	6	19.4
Total	14	45.0	17	55.0	31	100.0

**Table 2:** Anatomical site of blindness

Anatomical site	No	%
Whole globe	1	3.2
Glaucoma	2	6.5
Cornea	17	54.8
Lens	4	12.9
Uvea	3	9.7
Retina	2	6.5
Optic nerve	2	6.5
Total	31	100

### Aetiological category

Hereditary factors (familiar cataract) accounted for 2 cases (6.4%), intrauterine factors (congenital anophthalmos) for 1 case, perinatal factor {(Ophthalmia neonatorum (ONN))} for 2 cases while childhood factors (measles) accounted for 10 cases (32.3%). The aetiology of blindness in 16 cases (51.7%) was not known. Table 3.

**Table 3:** Causes of blindness by aetiological category

Aetiological category	No	%
Hereditary disease	2	6.4
Intrauterine factor	1	3.2
Perinatal factor (ONN)	2	6.4
Childhood factor	10	32.3
Unknown	16	51.7
Total	31	100.0

### Avoidable blindness

Eighteen 58.6% of the cases were due to avoidable causes; 12, (38.4%) being preventable and 6, (19.2%) treatable. Table 4.

**Table 4:** Causes of avoidable blindness

Preventable	No	%
Measles	10	32.0
NN infections	2	6.4
<i>Sub total</i>	12	38.4
<i>Treatable</i>		
Uveitis	2	6.4
Glaucoma	2	6.4
Cataract	2	6.4
<i>Sub total</i>	6	19.2
<b>Total avoidable</b>	<b>18</b>	<b>58.6</b>

## Discussion

Several compelling reasons that link the control of blindness in children to child survival justified the inclusion of the control of blindness in children as a high priority within the World Health Organizations (WHO) VISION 2020 programme [11]; blind years is their entire life span. Many of the conditions associated with blindness in children are also causes of child mortality (e.g. premature birth, measles, congenital rubella syndrome, vitamin A deficiency, and meningitis) and the fact that many of these causes of blindness are either preventable or treatable.

Preventable causes (corneal causes) constituted the greatest number (54.8%) of blindness in our series. This is the typical finding in sub Saharan Africa [13,14]

Although, not directly comparable with the present study in view of the difference in the methodology, the finding of 20% of the corneal causes by another recent work in the neighbourhood of the study area [12] may be an indication that the National Program on immunization instituted may be impacting positively on the corneal cause of blindness (especially measles) in the area. Although in that work corneal scar was acknowledged to be the single most important identifiable cause of childhood blindness.

The lens was the second most common anatomical site of blindness in our series. Some workers [12] in the area and those in the southern part of Nigeria [4] who worked in blind schools found lens causes to be the most common cause of blindness. Other workers in the southern part of Nigeria [15] found retinal dystrophy to be the most common cause of blindness and very few cases (11.5%) of corneal scar. Similarly, another study [16] of childhood eye diseases in south eastern part of Nigeria recorded no case of measles infection. The difference may be due to a regional difference in the prevalence of the various causes of blindness as previously documented [17]

Poor access to eye care services may also explain the absence of pseudophakia and aphakia in our series compared to the work of others [4]. However, this may be a true indication of lack of access to eye care services.

Uvea was the third most common anatomical site of blindness in our series. Similarly, 6.5% each of the cases of glaucoma, retinal and optic nerve causes of blindness were also found. Similarly low prevalence of blindness from such causes were reported in poor countries [4,18]. This may be due to lack of requisite human and material resources to diagnose those diseases. The same reason may explain the low percentage of blindness from whole globe causes.

Absence of cases of ROP and evidence of previous treatment in patients with glaucoma also indicate lack of access to eye care indicating that many premature babies did not survive and congenital glaucoma patients were not receiving treatment.

The aetiology of blindness found in our series is consistent with findings in poor economy where childhood factors form the major cause and a high percentage of blindness of unknown aetiology. These were 32% and 51% respectively our series reflecting lack of facilities for management of childhood blindness. Presence of a large proportion of visual loss of unknown aetiology is typical finding in other studies in developing countries such as Nigeria [4] North India [19], and Sri Lanka [20]. The findings in the present study is at variance with those of medium and developing economies in which hereditary causes [8], whole globe [21], or perinatal causes [22] predominate.

The findings of 58.6% preventable causes is a usual trend in sub Saharan African countries [4,6,12,23]. Preventable causes of blindness can be reduced at the primary level of service delivery: Corneal scarring is often associated with measles and vitamin A deficiency. With improved immunisation coverage, the incidence of measles related corneal ulcer has been reported to be on the decline [2]. Maternal education and food fortification with Vitamin A will hopefully further reduce the rate of blindness from corneal causes.

For treatable causes of blindness, there is need to establish specialised, paediatric ophthalmology units, training of more doctors and other health personnel in subspecialties of pediatric ophthalmology to provide children's eye care services early and effectively.

## Conclusion

Causes of Childhood blindness in this study is consistent with those of low economic region with

high prevalence of avoidable blindness. There is need to strengthen the primary level eye care service delivery.

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